THE
MOHANDAS INDOLOGICAL SERIES
75

# Text Book of
# SWASTHAVRITTA

(According to New Syllabus CCIM, New Delhi)



**Dr. Bargale Sushant Sukumar**
M.D., Ayu., M.Sc. Yoga
Assistant Professor
Department of Swasthavritta
S.D.M. College of Ayurveda & Hospital, Hassan, Karnataka

**Dr. Shashirekha H. K.**
M.D., Ayu., (Ph.D.)
Associate Professor
Department of Samhita Siddhanta
S.D.M. College of Ayurveda & Hospital, Hassan, Karnataka

CHAUKHAMBHA PUBLICATIONS
New Delhi

Text Book of Swasthavritta
ISBN : 978-93- 81608-81-4



*Publisher :*
**CHAUKHAMBHA PUBLICATIONS**
4262/3, Ansari Road, Darya Ganj
New Delhi-110002 (India)
Telephone : 011-23259050, 23268639
*E-mail : chaukhambhapublication@gmail.com, cpub@vsnl.net*



Edition: First, 2016
: Reprint, 2017, 2108
Price : ₹ 695.00

Head Office :
**CHAUKHAMBHA SANSKRIT SANSTHAN**
*Publishers and Distributors of Oriental Cultural Literature*
Post Box No. 1139
K. 37 / 116, Gopal Mandir Lane, Golghar (Near Maidagin)
Varanasi-221001 (U.P.) India
Telephone : 0542-2333445, 2335930
*E-mail : cssvns@gmail.com*

Sister Concern :
**CHAUKHAMBHA SANSKRIT SANSTHAN**
692/93, Raviwar Peth, Kapadganj
Near D.S. House, Pune - 411002 (Maharashtra) India
Telephone : 020-24493955, Mobile No. 09970193955
*E-mail : hn.shah@rediffmail.com*

*Printed by :* Globe Offset Press, New Delhi

# Foreword

I am happy to write a foreword massage for "Text book of Swasthavritta" written by Dr. Bargale Sushant Sukumar, who is working as Assistant Professor in the Department of Swasthavritta and Yoga, Sri. Dharmasthala Manjunatheshwara College of Ayurveda & Hospital, Hassan Karnataka, India.

There is a great demand for Standard English text books on Swasthavritta & Yoga written according to syllabus of Central Council Indian Medicine New Delhi. The Author has highlighted the concepts of Swasthavritta and Yoga in a simple language with illustration of tables, chart, and images. The efforts of author are highly appreciable for compiling the references from various ancient Ayurvedic classics and arranging the same in very legible manner.

I have no doubt that, this book will be helpful for the under graduate and post graduate students and will be very well acceptable by academicians and research scholars.

I pray lord Dhanvantri to shower the Blessings on him.

**Dr. Prassanna Narasimha Rao**
M.D. (Ayu), Ph.D
Principal and C.M.O.
S.D.M. College of Ayurveda and
Hospital, Hassan, Karnataka-573201

19. Dr. Madhu Asst. Professor Dept. of Swasthavritta, KLE BMK Ayurvedic College, Belgaum, Karnataka.
20. Dr. Sandeep S Asst. Professor Dept. of Swasthavritta, Sushruta Ayurvedic Medical college, Bangalore, Karnataka
21. Dr. Prabhu C. Nagalapur Asso. Professor Dept. Of Swasthavritta, Shree Jagadguru Gavisiddheshwara Ayurvedic Medical College and Hospital, Koppal, Karnataka.
22. Dr. Nikhila Hiremath Asso. Professor Dept. Of Swasthavritta. Sri Sri Ayurvedic medical college, Bangalore, Karnataka
23. Dr. M.S. Yalagond Asso. Professor Dept. Of Swasthavritta, A.V.S. Ayurveda Mahavidyala, Bijapur.
24. Dr. Sudhakar Reddy Professor Dept. of Swasthavritta, JSS Ayurvedic Medical College and Hospital, Mysuru, Karnataka.
25. Dr. Rekha B. V. Asso. Professor Dept. of Swasthavritta, JSS Ayurvedic Medical College and Hospital, Mysuru, Karnataka.
26. Dr. Ravi Hosamani, Asso. Professor Dept. of Swasthavritta, BVVS Ayurvedic medical college and Hospital, Baglkot.
27. Dr. Bhimappa Ugare Asso. Professor Dept. of Swasthavritta, SDM trust's Ayurvedic Medical College and Hospital, Terdal, Dist- Baglkot.
28. Dr. Anil Bagalkoti Asso. Professor Dept. of Swasthavritta, Sri Jagadguru Gurusiddeshwara co-operative hospital society's Ayurvedic Medical College Ghataprabha, Karnataka.
29. Dr. Geeta Junjurwad Asso. Professor Dept. of Swasthavritta, SDM trust's Ayurvedic Medical College and Hospital, Terdal, Dist- Baglkot.
30. Dr. Altaf Asst. Professor Dept. Of Swasthavritta. Sri Sri Ayurvedic medical college, Bangalore, Karnataka.

Would like to express heartfelt gratitude to all my well wisher, whose blessing and wishes directly and indirectly made me to write "Text Book of Swasthavritta".

I am also thankful to computer expert Shri Jitendra Kumar Srivastava for editing the matter.

I take this opportunity to remember my wife Dr. Shashirekha H.K. and show the love and affection to my son Satvik also I express my sincere thanks to all my family members.

**Dr. Bargale Sushant Sukumar**
M.D. (Ayu), MSc. Yoga.

# Content

# Paper-1

# Vaiyaktika Swasthavritta (Part - A)

# CHAPTER 1 Swasthavritta Nirupana

"Ayurveda" is the system designed to distinctly explain the merits and demerits, state of happiness or otherwise good and bad for life and the life itself within their parameters.

- हिताहितं सुखं दुःखं आयुस्तस्य हिताहितं । मानं च तच्च यत्रोक्तं आयुर्वेद स उच्चयते ॥

(च.सू. 1/41)

## Objective of Ayurvedic Science

धर्मार्थ काम मोक्षाणां, आरोग्यं मूलं उत्तमं ॥ (च.सू. 1/15)

The purpose of Ayurveda is to procure a good health to accomplish constituted duty, acquisition of wealth, contentment of desires and salvation. So these four factors constitute the objective of the 'Purusha'.

## Definition of Health (Swastha)

समदोषः समाग्निश्च समधातुमलक्रियः । प्रसन्नात्मेन्द्रियमनाः स्वस्थ इत्यभिधीयते ॥ (सु.सू. 15/41)

Sushrutacharya describes the features of a healthy man, Doshas (Vata, Pitta, Kapha), Agni (digestive fire), Dhatus, Malas (waste products) and Kriyas are normal, Atma (soul), Indriya (sense organ) and Manas (mind) are peaceful is said to be healthy.

Swastha (health) means all Doshas, Agni, Dhatus, Malas are in the state of equilibrium along with mental, sensory and spiritual pleasantness and happiness.

स्वस्थस्य भावः स्वास्थ्य ॥ (चक्रपाणि च.सू. 5/13)

The person without any abnormality or any disease is known as healthy or Swastha.

रोगस्तु दोषवैषम्यं दोषसाम्यमरोगता । रोगाः दुःखस्य दातारो ज्वरप्रभृतयो ते ॥ (भा.प्र.)

Abnormal state of Dhatus which produces Dukha is Vikara or disease. Balance or normal state of Dhatus which produces Sukha is Prakruti is Health or Arogya.

## Arogya Laxana/Lingani-According to Kashyapacharya

अन्नभिलाषो भुक्तस्य परिपाकः सुखेन च । सृष्टविन्मूत्र वातत्वं शरीरस्य तु लाघवं ॥
सुप्रसन्नेन्द्रियत्वं च सुखस्वप्नप्रबोधनम् । बलवर्णायुषो लाभः सौमनस्यं समाग्निता ॥
विद्यादारोग्य लिङ्गानि विपरिते विपर्ययम् । (का.सं.खि. 5/6)

Desire for the intake of food, proper and easy digestion of the ingested food,

# Preface

We are happy to present the standard text book on Swasthavritta, which will be useful for the students of third year B.A.M.S. and post graduate students of Swasthavritta and Yoga as well as to enthusiastic readers of Ayurveda. We have taken great care that all the topics mentioned as per the new syllabus of CCIM have been covered in this book. There are two papers of 100 marks each Swasthavritta and Yoga paper 1 and Swasthavritta and Yoga paper 2. Each paper contains two sections again part A and Part B.

In paper Swasthavritta and Yoga Paper 1- Part A -Vaiyaktika Swasthavritta

We have described personal hygiene which covers mainly Ayurveda aspect prevention of disease dealing with Dincharya, Ratricharya, Rutucharya, Ahara (diet), Nidra, Brahmacharya etc. Proper reference and Shlokas have been given for the benefits of students while explaining all concepts of Ayurveda.

In Part B- Yoga and Nisargopachara, all aspects of Yoga and Naturopathy have been described in this part. we have described personal Hygiene which covers Yoga and naturopathy aspect prevention of disease dealing with Panchakosha Theory, Astanga yoga, Shat Karma, Bandhas, Mudras and in naturopathy Jala Chikitsa (Hydrotherapy), Mrittikachikitsa (Mud therapy), Suryakiranasevana (sun bath - heliotherapy) Mardana (Massage), Diet types, Upavasachikitsa (Fasting therapy), Visramachikitsaupayoga etc.

In paper Swasthavritta and Yoga Paper 2-Part A-Samajika Swasthavritta. All aspects of preventive measures form communicable diseases and non communicable diseases, food borne diseases, pollution of water, air, land, sound etc. Disposal of solid waste, Excreta Disposal methods, Occupational Health, Epidemiology etc.

Part B- we have described about Primary Health Care, Family welfare Programmes, MCH programme, Preventive geriatrics, World Health Organization, International health agencies, National Health Policy, Health statistics, Health Administration, National health programmes and National Nutritional Programmes.

This is the text book on this subject written in English language and hence will be useful to all students.

We hope that like all other text books published by Chaukhamba Sanskrit Sansthan, Varanasi, students will welcome this book also and hence we wish all them success in their journey of healthy life.

**Dr. Bargale Sushant Sukumar**
**Dr. Shashirekha H.K.**

# Acknowledgement

I express my deep sense of gratitude to Padma Bhushan Dr. D. Veerendra Heggadeji, honourable President of Sri. Dharmasthala Manjunatheshwara Education Society, Ujire, Dakshina Kannada.

My sincere thanks to our Honourable Secretary Dr. B. Yashoverma, Sri. Dharmasthala Manjunatheshwara Education Society, Ujire, Dakshina Kannada for his blessing and encouragement in all aspects.

I whole heartedly thank our respected Sir Dr. Prasanna N. Rao Principal and CMO, Sri. Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan.

I am very Grateful to Dr. Sanjay K.S. Principal of A.L.N. Rao Memorial Ayurvedic Medical College Koppa, Dist. Chikmagular and Dr. P.B. Aparaj Principal of SDM trust's Ayurvedic Medical College and Hospital, Terdal, Dist- Baglkot.

I am very Grateful to Dr. Mallika K J Academic Dean and Professor and HOD Dept. of Samhita, Sri. Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan.

I am very Grateful to my parents Smt. Sumati and Shri. Sukumar Bargale, Smt. Leelavati and Shri. Komari Gowda H. R., Smt. Lolakshamma and Shri. Suresh H.R., Smt. Neeta and Shri Suresh Bargale, Smt. Sujata and Shri. Manohar Smt. Pavitra and Shri. Ramesh H.K.

I am thankful to Departmental colleagues Dr. T.B. Tripathy Professor and HOD Dept. of Swasthavritta, Dr. Shivakumar Associate Professor, Dr. M. B. Kavita, Associate Professor, Dr.Gurubasavaraj Y. Assistant Professor.

I whole heartedly thanks all the Teaching faculty members and Non-teaching staff, Para medical and all students of our institute.

My sincere thanks to Librarian Shri Komal Kumar, Smt. Vinoda and the library staff members for providing number of book for my references.

At this moment I remember and thank my students Dr. Joyti, Dr, Haripriya, Dr. Saurabh, Dr.Rajesh, Dr. Dipuram, Dr. Arun, Dr. Mahesh Raj, Dr. Asha, Dr. Dneeraj, Dr. Rakshitha, Dr.Vijeetha, Dr. SreeHarsha, Dr, Venu, Dr. Harshita, Dr, Laxmi, Dr. Pooja, Dr. Anjali, Dr. Siddhartha.

**I am also thankful to**

1. Dr. Girish K J Professor Dept. of Kaya Chikitsa, S.D.M. College of Ayurveda and Hospital, Hassan.



2. Dr. Ashwini Kumar Professor Dept of Panchakarma, S.D.M. College of Ayurveda and Hospital, Hassan.
3. Dr. Suhas Kumar Shetty Professor Manas Roga, S.D.M. College of Ayurveda and Hospital, Hassan.
4. Dr. Gopikrishna Professor Dept. of Shalya Tantra, S.D.M. College of Ayurveda and Hospital, Hassan.
5. Dr. Reena Kulkarni Asso. Professor Dept. of Kaumarbhrutya, S.D.M. College of Ayurveda and Hospital, Hassan.
6. Dr. B.G. Kulkarni Asso. Professor Dept. of Sharir Rachana, S.D.M. College of Ayurveda and Hospital, Hassan.
7. Dr. Lohita B.A. Asso. Professor Dept. of Panchakarma, S.D.M. College of Ayurveda and Hospital, Hassan.
8. Dr. Akshara Kulkarni Asst. Professor Dept. of Kriya Sharir, S.D.M. College of Ayurveda and Hospital, Hassan.
9. Dr. Neha Gadgil Asst. Professor Dept. of Kriya Sharir, S.D.M. College of Ayurveda and Hospital, Hassan.
10. Dr. Praveen B.S. Asso. Professor Dept. of Panchakarma ALVS ayurvedic medical college, Mudabiri. Karnataka.
11. Dr. Vijay Neglur Asso. Professor Dept. of Swasthavritta, S.D.M. College of Ayurveda and Hospital, Udupi, Karnataka.
12. Dr. Sandesh Sheety, Asst. Professor Dept. of Swasthavritta, S.D.M. College of Ayurveda and Hospital, Udupi, Karnataka.
13. Dr. Kashinath S. Asst. Professor, Dept. of Swasthavritta, NIA Jaipur
14. Dr. Mangla Gouri, Asst. Professor Dept. of Swasthavritta, IMS, Faculty of Ayurveda, BHU, Varanasi.
15. Dr. Budesh Kanaj Asst. Professor Dept. of Swasthavritta, DGMCA, Gadag, Karanataka.
16. Dr. Ashok Patil Asso. Professor Dept. of Swasthavritta, DGMCA, Gadag, Karanataka.
17. Dr. Sanjeev Tonni Asso. Professor Dept. of Swasthavritta, KLE BMK Ayurvedic college, Belgaum, Karnataka
18. Dr. Sandeep Sagare Asso. Professor Dept. of Swasthavritta, KLE BMK Ayurvedic college, Belgaum, Karnataka

evacuation of faeces, urine and flatus properly, lightness in the body, pleasantness in sense organs, proper timely sleep and awakening, gain of strength, life and pleasant mind and normal Agni are the features of the health and opposite state its illness.

### Anindita Purusha-According to Charakacharya

सममांसप्रमाणस्तु समसंहननो नरः । दृढेन्द्रियो विकाराणां न बलेनाभिभूयते ॥
क्षुत्पिपासातपसहः शीतव्यायामसंसहः । समपक्ता समजरः सममांसचयो मतः ॥ (च.सू. 21/18-19

Person endowed with well-formed muscles, compactness and strong sense organs will not be afflicted with strong diseases, and he can with stand hunger, thirst, heat, cold and exercise. The food gets digested and gets assimilated properly, resulting in proper nourishment of Mamsa and all Dhatus.

### Importance of Swasthavritta

धर्मार्थकाममोक्षाणामारोग्यं मूलमुत्तमम । रोगास्तस्यापहर्तारः श्रेयसो जीवितस्य च । (च.सू. 1/15)

Main aim of Ayurveda is to attain Dharma, Artha, Kama and Moksha by health. Ill health takes away the health and happiness from life.

प्रयोजनं चास्य स्वस्थ्य स्वास्थ्यरक्षणमातुरस्य विकारप्रशमनं च ॥ (च.सू. 30/26)

Charakacharya emphasizes on the importance of maintenance of health of healthy person and curing the disease of the ill.

सुष्ठु अवतिष्ठते नीरोगत्वेनेति स्वस्थः तस्य वृत्तिः स्वस्थरुपतयाऽनुवर्तनं, तत्र स्वस्थवृतौ मतमभिमतं पूजितमिति यावत । (चक्रपाणि च.सू. 1/67)

Chakrapani commenting on Swasthavritta mention the condition free from disease is Swastha i.e. Healthy and regimens followed to keep one self-healthy is Swasthavritta.

न जन्तुः कश्चिदमरः पृथिव्यां जायते क्वचित । अतो मृत्युरनिवार्यः स्यात्किन्तु रोगान्निवारयेत ॥
(शा.सं. 5/51)

Sharangadhrara quotes no creature in the universe is immortal, it is impossible to prevent death, but it is possible to prevent disease. So one should try for prevent the disease.

नगरी नगरस्यैव रथस्येव रथी यथा । स्वशरीरस्य मेधावी कृत्येस्ववहितो भवेत ॥ (च.सू. 5/103)

Person should perform such actions which are good for his body as the officer in charge of the city and charioteer in charge of the chariot protect city and the chariot respectively.

सर्वमन्यत्परित्यज्य शरीरमनुपालयेत । तदभावे हि भावानां सर्वाभावः शरीरिणाम ॥ (च.नि. 6/7)



Charakacharya further emphasises on the maintenance of health. One should take care of his body by neglecting all other things because if body is not healthy then nothing is existing.

तच्च नित्यं प्रयुञ्जीत स्वास्थ्यं येनानुवर्तते । अजातानां विकाराणामनुत्पत्तिकरं च यत ॥ (च.सू. 5/13)

One should regularly follow diet and regimen, which keep good health and prevent diseases, which are not manifested.

मानवो येन विधिना स्वस्थस्तिष्ठति सर्वदा । तमेव कारयेद्वैद्यो यतः स्वास्थ्यं सदेप्सितम ।
दिनचर्या निशाचर्यामृतुचर्या यथोदिताम । आचरन्पुरुषः स्वस्थः सदा तिष्ठति नान्यथा ॥
(भा.प्र. 5/1-2)

The methods by which men can remain healthy always should be instructed by physician, since health is always desirable. By following Dincharya, Nishacharya and Rutucharya described for health of mean but not otherwise.

नरो दिनादिचर्याभिर्यो न वर्तेत नित्यशः । स एव लभते रोग ततः पथ्यं समाचरेत ॥ (यो.र. रात्रिचर्या 55)

One who does not follow the Dinacharya and Ratricharya regimens properly as stipulated in Ayurveda, are likely to be infected with multiple health problem. Hence everyone should adhere to these regimens strictly in the interest of his own health.

## Health

### Introduction

Health is a dynamic process because it is always changing. We all have times of good health, times of sickness, and maybe even times of serious illness. As our lifestyles change, so does our level of health. Those of us who participate in regular physical activity do so partly to improve the current and future level of our health.

'Health' is a word widely used by us, but its meaning is very often misinterpreted. It is word which has meaning of depth. Health is not perceived in the same way by all the members of community. Traditionally 'health' has been viewed as a condition of absence of disease. As science advanced, various professional people viewed 'health' in their own way.

The Constitution of the World Health Organization, which came into force on April 7, 1948, defined health "as a state of complete physical, mental and social well-being." The writers of the Constitution were clearly aware of the tendency of seeing health as a state dependent on the presence or absence of diseases: so they added to that definition that an individual, if he is to be considered healthy, should not suffer from any disease (...."and not merely the absence of disease or infirmity").

**Health :** Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. (WHO) Spiritual, emotional and vocational dimensions have also been proposed in defining health.

**Definitions of health**

1. "The condition of being sound in body, mind or spirit especially freedom from physical disease or pain." (Webster)
2. "Soundness of body or mind, that condition in which its functions are duly and efficiently discharged." (Oxford English dictionary)
3. "A condition or quality of the human organism expressing the adequate functioning of the organism in given conditions, genetic and environmental."
4. "A modus vivendi enabling imperfect men to achieve a rewarding and not too painful existence while they cope with an imperfect world."
5. "A state of relative equilibrium of body forms and function which results from its successful dynamic adjustment to forces tending to disturb it. It is not passive interplay between body substance and forces impinging upon it but an active response of body forces working toward readjustment." (Perkins)

**Dimensions of Health**

Health is multi-dimensional. The WHO definition envisages three specific dimensions the physical, the mental and the social.

Total dimensions are :

1. Physical
2. Mental
3. Social
4. Spiritual
5. Emotional
6. Vocational

**1. Physical Dimensions :** The physical dimension of health is easiest to understand.

a. The sign of physical health care
b. A good complexion
c. Clean skin
d. Bright eyes
e. Lustrous hairs
f. Body with firm flush



g. Not too fat
h. Sweet breath
i. Good appetite
j. Sound sleep
k. Regular activity of bowel and bladder
l. Smooth easily coordinated bodily movements
m. All organs of normal size and functioning normally
n. Pulse rate, Blood pressure and exercise tolerance within normal ranges

Evaluation of physical health :

1. Self-assessment of overall health
2. Inquiry into symptom of ill health risk factors
3. Inquiry into Medication
4. Inquiry into Fitness
5. Inquiry into Medical services
6. Standardized questionnaire for CVD, RD
7. Clinical examination
8. Nutrition & dietary assessment

**2. Mental Dimensions :** Mental health is not mere absence of mental illness; good health is the ability to respond to many varied experiences of life with flexibility and a sense of purpose. Mental health defined as "a state of balance between the individual and the surrounding world, a state of harmony between oneself and others, coexistence between the realities of self and that of other people and that of environment."

Characteristics of Mentally healthy person :

a. Free from internal conflicts
b. Well adjusted
c. Searches for identity
d. Strong sense of self-esteem
e. Knows himself, his needs, problems and goals
f. Self-control- the person possess good self-control, not dominated by anger, fear and jealously, worries etc. he is able to solve problem when confronted with.
g. Coping with stress and anxiety

**3. Social Dimension :** Quantity and quality of an individual's interpersonal ties and the

extent of involvement with the community. Social wellbeing implies harmony and integrates.

a. within the individual,
b. between each individual and other member of society
c. between individual and world in which they live

Characteristics of social health-

a. Possession of social skills, social functioning
b. Ability to see oneself as a member of community
c. Focuses on social and economic conditions

4. **Spiritual Dimension** : It is not at a religious concept it is a concept by which it exposes man to integrity, principles, ethics and helps to lead him a life with a purpose which elevate him to the higher planes of thought.
5. **Emotional Dimension** : Emotional as are feeling or forces that emerge suddenly in the mind, so emotional dimension includes his emotion, felling and ability to control them during various situations of life.
6. **Vocational Dimension :** this dimension is concerned with the occupation. Occupations play an important role in promoting both physical and mental health. When work is fully adapted to human goals, capacities and limitations matches exactly to his occupation, the person is vocationally healthy if not the individual feels unhappy and frustrated.

**Positive Health**

It is a state of physical, mental, social and spiritual wellbeing, when a person enjoys an equilibrium state with his environment. It is an important component of improving the quality of life. It implies the ability to lead a socially and economically productive life.

Factors favoring positive health :

a. Proper genetic endowment
b. Proper nutrition
c. Conducive physical, biological and psycho-social environment
d. Good socio-economic status
e. Proper education including knowledge of healthful ways of living.
f. Promotive, preventive and restorative health services.

**Concept of wellbeing-objective, subjective, standard of living, quality of life**

Wellness further describes health status. It allows health to be placed on a continuum



from one's optimal level ("wellness") to a maladaptive state ("illness"). Wellness is a dynamic process that is ever changing. The well person usually has some degree of illness and the ill person usually has some degree of wellness.

The classic description of wellness was developed by Dunn in the early 1960s. According to Dunn (1961), high-level wellness means functioning to one's maximum health potential while remaining in balance with the environment.

**Objective Components :** Standard of Living and Level of Living

**Subjective Component :** Quality of Life

**Standard of Living**

Standard of Living Refers to Expenditure, Goods we Consume, Services we enjoy.

**Definition :** Income and Occupation, standards of housing, sanitation, nutrition, level of provision of health, educational, recreational and other services may all be used individually as measures of socio-economic status-collectively as an index called "Standard of Living."

**Level of Living :** Health, Food Consumption, Education, Occupation & Working Conditions, Housing, Social Security, Clothing, Recreation & Leisure, Human Rights etc.

**Quality of Life :** Quality of Life Subjective component

**Definition :** "The condition of life resulting from the combination of the effects of the complete range of factors such as those determining health, happiness, education, social and intellectual attainments, freedom of action, justice and freedom of expression."

**Physical Quality of Life Index :** Various attempts have been made to reach one composite indicator from a number of the Indicators. The Physical Quality of Life Index (PQLI) is one such index

1. Infant Mortality
2. Life Expectancy at age one.
3. Literacy

**PQLI :** does not measure economic growth, Measures social, economic & political policies.

**Human Development Index**

1. Longevity (life expectancy at Birth)
2. Knowledge (adult literacy rate and mean years of schooling)
3. Income (real GDP per capita in purchasing power-parity Dollars) etc.

### Concepts of Prevention

The concepts of prevention as enunciated by Leavell and Clark have stood the test of time. The basic framework worked out by them has practical utility even today. The four phases of prevention are:

1. Primary prevention
2. Secondary prevention
3. Tertiary prevention.

These phases are further categorized into five levels of prevention as follows :

Primary prevention- Health promotion and Specific protection

Secondary prevention- Early diagnosis and treatment

Tertiary prevention- Disability limitation and Rehabilitation.

## PRIMORDIAL PREVENTION

It has come from a Latin word 'primordium' means beginning. It means prevention at a stage, when the risk factors have not yet developed. Primordial prevention is aimed to eliminate the development of risk factors, while primary prevention is aimed to reduce the risk of exposure. Primordial prevention is achieved by health education. Example being, information is imparted to school children for adopting and maintaining healthy lifestyles.

## PRIMARY PREVENTION

The process of primary prevention is limited to the period before the onset of clinical disease in an individual. Thus activities directed to prevent the occurrence of disease in human populations fall in this category. These activities are related to health promotion and specific protection

### Health promotion

Health promotion is an all embracing entity which goes much beyond prevention of only specific disease. It is the means to attain a state of "positive health", or at least, "freedom from disease". Health promotion concerns activities within as well as outside the health sector.

Examples of activities within the health sector are: Health education to increase awareness of health problems so that populations identify their health needs and become familiar with preventive strategies and the health facilities available. This is the only component which has a long-term and lasting benefit.

a. Health education can also improve compliance with advice, medication and follow-up.



b. Improved protected water supply systems.
c. These again have a long-term impact.
d. Improvement of environmental sanitation.
e. Inculcation of healthy habits.
f. Family life education.

**Specific protection :** Specific protection has benefitted to a great extent by improved modern day medical technology. Technological break-through have provided adequate and appropriate tools for prevention. However, specific protection dates back to 1753 when James Lind advocated the use of citrus fruits to seamen in order to prevent scurvy. Jenner's discovery of the smallpox vaccine in 1796 gave a further boost to strategies for specific protection. Mass chemoprophylaxis is also a modern tool of specific protection. Other examples of specific protection are as follows:

a. Active immunization by vaccines against measles, polio, diphtheria, pertussis, tetanus, hepatitis B, etc.
b. Passive immunization by gamma globulins for tetanus, rabies, viral hepatitis, etc.
c. Nutritional supplementation in mid-day school meal program; ICDS program, etc. to prevent against PEM.

## SECONDARY PREVENTION

Secondary prevention comes into play after the disease process has been initiated in the human host. The aim of such an approach is to minimize the spread of disease and to reduce the serious consequences. This is achieved through early diagnosis and treatment. Early diagnosis and prompt initiation of treatment can be undertaken at various levels:

a. In the general population or in an age specific population.
b. In captive groups, such as school children, jail inmates and industrial workers.
c. In a hospital or clinical setting.

Early diagnosis and prompt treatment offers benefits to the affected individuals as well as to their families and the community. It helps to reduce the transmission of infection and, hence, is considered as a method of prevention. As a preventive strategy, it is most useful for diseases with long incubation period or long latent period since sufficient time is available to prevent further progression of disease and to improve further progression of disease and to improve prognosis. In non-communicable diseases, sufficient lead time should be available.

## TERTIARY PREVENTION

Tertiary prevention acts at the stage where disease has got established in the

individual. It is a costly venture, though recent efforts at community based rehabilitation have tried to bring down the costs. Tertiary prevention can be applied at the last two levels of prevention. These are:

**Disability limitation :** Here the disease has progressed significantly and has caused some loss of function of a temporary or permanent nature. The idea is to provide relief to the affected individual so that a total handicap can be prevented. This mode of prevention can be illustreated by the example of leprosy. Leprosy can lead to irreversible ocular damage and blindness when left untreated. If multidrug therapy is instituted even after some ocular damage has occurred, total blindness can still be prevented.

**Rehabilitation:** Rehabilitation can be considered as a preventive measure in that if effectively utilized, it can prevent further social drift of the affected individual. Social drift is the phenomenon of going down the social ladder due to loss of ability to generate income caused by disease.

Rehabilitation is an extremely costly venture. The aim of rehabilitation is to integrate the affected individual in the community by optimizing his functional ability. It involves psychological, vocational and social and educational intervention.

# CHAPTER 2 Dincharya ( दिनचर्या )

Dincharya is composed of two words Dina and Charya.

Dina means a day or day time or day today.

Charya means duties, regimens, action to be carried.

Thus Dincharya :

दिने दिने चर्य दिन चर्यः ।
दिनस्य वा चर्य दिनचर्य ।
प्रतिदिन चर्य दिन चर्य ।

Arunadattta in his commentary explaines regimens done daily called as Dincharya.

मानवो येन विधिना स्वस्थस्तिष्ठति सर्वदा । तमेव कारयेद्वैद्यो यतः स्वास्थ्यं सदेप्सितम् ॥
दिनचर्या निशाचर्यामृतुचर्या यथोदिताम । आचरन्पुरुषः स्वस्थः सदा तिष्ठति नान्यथा ॥

(भा.प्र. 5/1)

The methods by which men can remain healthy always should be instructed by physician, since health is always desirable. By following Dincharya, Nishacharya and Rutucharya described for health of mean but not otherwise.

**Aim and importance of Dincharya**

**Aim :**

a. Maintenance the normal health.
b. Increased life span without any diseases.

**Importance :**

a. Regimens done daily to maintenances normal health.
b. Maintenance of hygiene (Shoucha) and keeps the body cleans etc.
c. Desire for the intake of food, proper and easy digestion of the ingested food.
d. Prolong the life and longevity.
e. Keeps the mind calm and quiet and helps in meditation
f. Helps in increases the strength of Indriyas.
g. Helps in increase the strength of body.
h. Prevents all the diseases.

**Brahma Muhurta (Getting up in the morning)**

ब्राह्मे मुहूर्त उत्तिष्ठेत्स्वस्थो रक्तार्थमायुषः । (अ.ह.सू. 2/1)

One desirous of long healthy life should get up in Brahma Muhurta. After considering the position of digestion or indigestion. (Food taken previous night)

ब्राह्मे मुहूर्ते बुध्येत स्वस्थो रक्तार्थमायुषः । तत्र सर्वाघशान्त्यर्थं स्मरेच्च मधुसूदनम् ॥
(भा.प्र. 5/4 यो.र.)

ब्राह्मे मुहूर्ते उत्तिष्ठेज्जीर्णाजीर्ण निरुपयन । रक्तार्थमायुषः स्वस्थो जातवेगः समुत्सृजेत ॥
(अ.स.सू. 3/2)

The healthy person, should wakeup from bed in the Brahma Muhurtam i.e. around 48 to 96 minutes before the sunrise to preserve his health, after considering the condition of digestion of food taken in previous night whether properly done or not. Then he should offer prayer to lord Madusudana, so that all the Papa deeds he has indulged in are forgiven by the god.

आयुष्यमुषसि प्रोक्तं मलदीनां विसर्जनम । तदत्र्कूजनाध्मानोदर गौरवारणम ॥(भा.प्र. 5/7, यो.र.)

Attending to nature's call (like passing of Mala, Mutra etc.) in early hours is a good habit for better health and problems like Antra Kujanam, Adhmana and Udara Gouravam (heaviness of abdomen) are also relived by attending to natures call in early hours of the day immediately after awakening up from bed at Brahma Muhurtam .

दध्याज्यादर्शसिद्धर्थं बिल्वगोरोचनस्त्रजाम् । दर्शनं स्पर्शन कार्यं प्रबुद्धेन शुभावहम् ॥
स्वमाननं घृते पश्येद यदीच्छेच्चिरजीवितम् ॥ (भा.प्र. 5/5, यो.र.)

One should see and touch curd, ghee, Sarsapa (Mustard seeds), Bilwa, Gorocana (cow bile duct), garlands etc. immediately after awakening from the sleep. It is good beginning i.e. Subhavaham. Viewing once facial reflection in ghee is good nature's practice for promotion of Dheergha Jeevitam or longer life.

**Ushajalapana-Drinking water**

सवितुः समुद्यकाले प्रसुतीः सलिलस्य पिबेदष्टौ । रोगजरापरिमुक्तो जीवेद्वत्सरशतं साग्रम ॥ अर्शः शोथ ग्रहण्यो ज्वरजठरजराकुष्ठमेदोविकार-मुत्राघातास्त्रापित्तश्रवणगलशिरः श्रोणिशूलक्तिरोगाः ॥ (भा.प्र.)

Drinks eight Prasruti (768 ml) of water at the time of early sunrise shall live for a hundred years and more free from diseases and old age. Person drinks water in early morning can not suffer from Arsha, Shotha, Grahani, Jwara, Jathara vikara, Kushtha, Medoroga, Raktapitta, ear and eye disease etc.

**Sharirachinta**

शरीर चिन्तांनिर्वर्त्यकृत शौचविधिस्तत । (अ.ह.सू. 2/1)



The healthy person should get up during Brahma Muhurta to protect his life. After considering the position of digestion or indigestion food taken in previous night. The person should next attend to eliminating the Mala and Mutra.

गुदादिमलमार्गाणां शौचं कांन्ति बलप्रदम । पावित्र्यकरमायुष्यमलक्ष्मीकलिपापहत ॥
(भा.प्र. 5/12, यो.र.)

Cleaning after defecation, urination etc. keeps those areas clean, promotes complexion, strength, holiness, lifespan and removes poverty, unrest and evils.

प्रक्षालनं हि पाण्योश्च पाद्योः शुद्धिकारणम् । मलश्रमहरं वृष्यं चक्षुष्यं राक्षसापहम ॥
(भा.प्र. 5/13, यो.र.)

Washing of hands and legs always leads cleanliness and removes tiredness, improves Sukra, eye sight and prevents the attack of negative force or infection.

**Malatyaga (Shauchavidhi)**

.....जात वेगः समुत्सृजेत । उदङमुखोमुन्नशकृद्दक्षिणाभिमुखोनिशि ।
वाचं नियम्य प्रणतः संवीताऽगोरवगुण्ठित्॥ प्रवर्त्तयेत प्रचलितं न तु यत्रादुदीरयेत ।
नामेध्यमार्गमृतभस्मागोस्थानाकीर्णगोमये । पुरान्तिकाग्निबल्मीकरम्योतकृष्ठचिचिद्रुमे ।
न नारीपूज्यगोर्केन्दुवाय्वन्नाग्निजलं प्रति ॥ न चातिरस्कृत्य महीं भयाशक्तयोस्तु कामतः ।
नवेगितोऽन्यकार्यः स्यान्नाजित्वासाध्यमामयम ॥ (अ.स.सू. 3/3-5)

One should excrete the urine and faces only after getting the urge, facing north during daytime and south during night, silently, without diverting attention on other things, having covered the body and head and should allow the excreta to pass naturally on their own and not by strain. One should not pass them at following places- unclean place, road, heaps of soil, ash, cow dung, cow shed, where movement of peoples is there nearer to city, sacrificial altar or on hill, place meant for disposal of dead bodies, under and above the trees. Also not in front of women, respectful persons, cows, sun, moon, wind, fire and water.

In case of fear or handicapped persons the elimination can be done according to one's desire.

निशल्य दुष्टमृत्पिण्डीपरिमृष्टमलायन । अभ्युधृताभि शुचिभिरद्भिर्मृद्भिश्च योजयेत ॥
लेपगन्धापहं शौचमनुत्पतितबिन्दुभिः । (अ.स.सू. 3/8)

One should, after elimination, clean the parts with lumps of mud, which is clean and has no defects (thorn, stones) with pure water drawn out along with mud cleanly to remove the particles and smell in a way that water is not sprinkled on the other part of the body etc.

**Mukha Prakshalana/Acamana**

मुख प्रक्षालनं शीतपयसा रक्तपित्तजित । मुखस्य पिडकाशोषनीलिका व्यगंनाशनम् ॥

कुर्याद्वापि कटुष्णेन पयसा आस्यविशोधनाम । कफ़वातहरं स्निग्धं मुखशोषविनाशनम ॥

(यो.र. 32-33)

क्षीरवृक्षकषायैर्वा क्षीरेण च विमिश्रितैः । भिल्लोदककषायेण तथैवामलकस्य वा ॥
प्रक्षालयेन्मुखं नेत्रे स्वस्थः शीतोदकेन वा । नीलिकां मुखशोषं च पिडकां व्यङ्गमेव च ॥
रक्तपित्तकृतान् रोगान् सद्य एव विनाशयेत् । ( सु.चि. 24/15-16 )

The face wash with Sheatala Jala prevents bleeding problems (Raktapitta), subsides Mukhapidika, Mukharoga, Mukhanilika and Vyanga and while washing with warm water pacifies Kapha and Vata Doshas, makes face oily or Singha by removing the Rukshata or dryness of the face.

स्पृष्ट्वा धातूनमलानश्रु वसाकेशनखांश्युच्तान । स्नात्वा भोक्तुमना भुक्तवा सुप्त्वा क्षुत्वा सुराच्चने ।
रथ्यामाक्रम्य चाचामेदुपविष्ट उददमुखः ॥ प्राडमुखो वा विविक्तस्थो न बहिर्जानु नान्यहक ।
अजल्पन्नुत्तरासङ्गी स्वच्छैरङ्गुष्ठमूलगैः ॥ नोदधृतैर्नानतो नोर्ध्व नाग्निपक्वैर्न्न पूतिभिः ।
न फ़ेन्बुल्बुदक्षीरर्नैकहस्तार्पितैर्जलैः ॥ (अ.सं.सू. 3/8-11)

One should do Acamana after the following acts- touching the blood, fat, tissues, excreta, tears, hair and after cutting nails, after taking bath, before and after taking food and getting up from sleep and after sneezing, at the time of worship of god and after travel or walking.

One should facing east or north in lonely place and not keeping the hands beyond knees, not looking at the other thing, silently, wearing an upper garment Acamana should be done with pure water.

The water should be taken up to thumb and slipped without making any sound, without spilling , the person should be erect posture and the water should be devoid of bad odour , forth and alkalinity. The hand should be cleans.

**Dantadhavana and Preparation of Ayurvedic Tooth Poder and Paste**

शरिरचिन्तां निर्वर्त्य कृतशौच विधिस्ततः ॥ अर्कन्यग्रोधखदिरकरज ककुभादिजम् ।
प्रातर्भुक्त्वा च मृद्वग्रं कषायकटुतिक्तकम । कनीन्यग्रं समस्थौल्यं प्रगुणं द्वादशाऽगुलम् ।
भक्ष्येदन्तमांसान्यबाधयन् ॥ (अ.ह.सू. 2/2-3)

वटासनार्कखदिरकरञ्जकरवीरजम । सर्जारिमेदापामार्गमालतीककुबोद्भवम ।
कषायतिक्तकटुकं मूलमन्यदपीदृशम । विज्ञातवृक्षं क्षुण्णग्रमृज्वग्रन्थि सुभूमिजम ।
कनीन्यग्रसमस्थौल्यं सुकूच्चं द्वादशाऽगुलम् । प्रातर्भुक्ता च यतवाग्भक्षयेद्दन्तधावनम ।

(अ.स.सू. 3/12-14)



भक्षयेद्दन्तपवनं द्वादशांगुलमायतम । कनिष्ठिकाऽग्रत्स्थूलमृज्वग्रन्थिं तथाऽव्रणम ॥
एकैकं घर्षयेद्दन्तं मृदुना कूर्चकेन तु । दन्तशोधनचूर्णेन दन्तमांसान्यबाधयन ॥ (अ.स.सू. 3/14-15)

भक्षयेद्दन्तपवनं दन्तमांसान्यबाधयन् । निहन्ति गन्धं वैरस्यं जिह्वादन्तास्यजं मलम् ॥
निष्कृष्य रुचिमाधत्ते सद्यो दन्तविशोधनम् । करञ्जकरवीरार्कमालतीककुभासनाः ॥
शस्यन्ते दन्तपवने ये चाप्येवंविधा द्रुमाः । (च.सू. 5/72-73)

One should clean his teeth in two times morning and night after intake of food with twinges of Arka, Vata, Khadira, Karanja and Arjuna. (अ.ह.सू. 2/2-3)

Asana, Karavira, Sarja, Arimeda, Apamarga, Malati, Jati. (अ.सं.सू. 3/13)

Which are Kashaya, Katu and Tikta in taste; twigs should of size of tip of little finger in thickness and twelve Angulas in length and straight. Its top made like a soft brush by chewing, the teeth should be cleaned without hurting or injuring the gums.

अवेक्ष्यर्तुं च दोषं च रसं वीर्यं च योजयेत । (सु.चि. 24/5-6)
मधुको मधुर श्रेष्टः करजः कटुके तथा । निम्बस्तु तिक्तके श्रेष्टः कषाये खदिरास्तथा ॥

(भा.प्र. 5/17, यो.र.)

In early morning this should be used considering season, Doshas, Rasa and Veerya, as having Kashaya, Madhura, Katu, Tikta rasa. Nimba is best among Tikta Rasa, khadira among Kashaya Rasa, Madhuka among Madhura Rasa, Karaja is best among Katu Rasa.

दन्तान पूर्वमधो घर्षेत प्रातः सिञ्चेच्च लोचनं । तोयपूर्णमुखो ग्रीष्मशरदोः शीतवरिणा ॥

(अ.सं.सू. 3/22)

The lower row of teeth should be brushed first. Keeping the mouth filled with water the eyes are to be splashed with water every morning with cold water in Grishma and Sarada Rutu.

**Tooth powder and paste**

क्षौद्रव्योषत्रिवर्गाक्तं सतैलं सैन्धवेन च ॥ चूर्णेन तेजोवत्याश्च दन्तान्नित्यं विशोधयेत् ।
एकैकं घर्षयेद्दन्तं मृदुना कूर्चकेन च ॥ दन्तशोधनचूर्णेन दन्तमांसान्यबाधयन् ।

(सु.चि. 24/7-8, भा.प्र. 5/16)

वाप्यत्रिवर्गत्रितयक्षौद्राक्तेन च घर्षयेत । शनैस्तेन ततो दन्तान दन्तमासान्तबाधयन ॥ (अ.स.सू. 3/15)

Powder of Jejovati mixed with honey Trikatu, Triphala and Trijataka, oil, Kustha Churna and Sandhava Lavana should be used daily for cleaning teeth. Every tooth should be rubbed with soft brush and tooth powder without injuring the gums.

**Benefits**

त दौर्गन्ध्यओपदेहौ तु श्लेष्माणं चापकर्षति । वैशद्यमन्नाभिरुचि सौमनस्यं करोति च ॥

(सु.चि. 24/9)

It removes foul smell, sliminess, Kapha and provides clarity, desire of food and cheerfulness.

**Contraindication for Dantadhavana**

नाद्यादजीर्णवनथुश्वासकास ज्वरार्दिती । तृष्णास्यपाक ह्रन्नेत्र शिरः कर्णामयी च तत ॥

(अ.ह.सू. 2/4, अ.स.सू. 3/18)

Person suffering from indigestion, vomiting, dysponea, cough, fever, facial paralysis, excessive thirst, mouth ulceration, diseases of the heart, eyes, head and ears, should not make use of the tooth brush.

नैवश्लेष्मातकारिष्टबिभितधवधन्वजान । बोल्ववञ्जुलनिर्गुण्डीशिग्रुतिल्वकतिन्दुकान ॥
कोविदारशमीपीलुपिप्पिलेङ्गुदगुल्गुलून । पारिभद्रकमम्किकामोचक्यौ शाल्मलीं शणम ॥
स्वाद्वम्ललवणं शुष्कं सुषिरं पूति पिच्छिलम । पालाशमासनं दन्तधावनं पादुके त्यजेत ॥

(अ.स.सू. 3/19-21)

Twigs of Slesmataka, Arishta, Bibhitaka, Dhava, Dhavnvan, Bilva, Vancula, Nirgundi, Shigru, Tilvaka, Kovidara, Sami, Pilu, Pippala, Ingudi, Gulgulu, Paribhadraka, Amlika, Mocaka, Salmali and Sana should not be used as tooth brush. So also the twigs of these trees which have sweet, sour and salt tastes, which are very dry, hallow emitting bad smell and gummy.

**Jihvanirlekhanavidhi**

जिह्वानिर्लेखनं रौप्यं सौवर्णं वाक्षमेवच । तन्मलाहरं शस्तं मृदु श्लेष्णं दशाऽगुलम ॥ (सु.चि. 24/3)

जिह्वानिर्लेखनं हैमं राजतं ताम्रजं तथा । पाटितं मृदु तत्काष्ठं मृदुपत्रमयं तथा ॥
दशाङ्गुलं मृदु स्निग्धं तेन जिह्वां लिखेत्सुखम । तज्जिह्वामलवैरस्यदुर्गन्धजडताहरम ॥ ( भा.प्र. )

सुवर्णरूप्यताम्राणि त्रपुरीतिमयानि च ॥ जिह्वानिर्लेखनानि स्युरतीक्ष्णान्यनृजूनि च ।
जिह्वामूलगतं यच्च मलमुच्छ्वासरोधि च । दौर्गन्ध्यं भजते तेन तस्माजिह्वां विनिर्लिखेत् ॥

(च.सू. 5/74-75)

Tongue cleaning should be made of silver, gold or plants. It should be soft, smooth and ten finger long and able to eliminate dirt and bad taste and smell from the mouth.

**Anjana (collyrium to the eyes)**

सौवीरञ्जनं नित्यं हितमक्ष्णोस्ततोभजेत । (अ.ह.सू. 2/4, च.सू. 5/15)



सौवीरञ्जनं नित्यं हितमक्ष्णोस्ततोभजेत । लोचने भवतस्तेन मनोज्ञे सूक्ष्मदर्शने ॥

(भा.प्र. 39, अ.स.सू. 3/24)

Sauvirajana is good for eyes, so it should be used daily; by this eyes become beautiful and capable of seeing minute things even.

चक्षुस्तेजोमयं तस्य विशेषात श्लेष्मतो भयम । योजयेत्सप्तरात्रेतस्मात्स्त्रावणार्थं ॥

(अ.ह.सू. 2/5, अ.स.सू. 3/24)

पञ्चरात्रे अष्टरात्रे या स्त्रावणार्थं रसञ्जनम । (च.सू. 5/16)

Eye is full of Tejas and high risk of troubles especially from Kapha, hence Rasajana should be used once a week, to drain Kapha. (A.Hr.Su.)

According to Charakacharya Rasajana is applied once in five or eight days at night for lacrymation of eyes.

**Method of application**

Ask the person to sit comfortably physician should stand in front of him, elevate the upper eye lid of the person with left thumb and apply the collyrium to the interior of lower lid, just below the cornea starting from the Kaninika, slowly moving towards Apanga. After application of collyrium the person should close his eyes and move the eye ball slowly to make uniform distribution. Eye lids are also to be moved slightly. After half an hour it should be washed with water, holding the upper lid with the thumb of left hand, the eye is to be wiped with soft cloth slowly and repeatedly. If the collyium sticking on the lid of the left eye should be wided with right thumb and on that of the right eye by the left thumb.

स्त्रोतोञ्जन मतं श्रेष्ट विशुद्धं सिन्धुसम्भवन । द्रुष्टे कण्डूमलहरं दाहक्लेदरुजापहम ॥ (भा.प्र.)
अक्ष्णो रूपावहं चैव सहते मारुतातपौ । नेत्रे रोगा न जायन्ते तस्मादञ्जनमाचरेत ॥ (भा.प्र.)

Srotonjana obtain from Sindhu is pure and best. It removes burning, itching and dirt and eliminates watering, pain of eyes, provides brilliance and vision tolerance to wind and sun rays and prevents eye diseases therefore one should applied Anjana regularly.

**Contraindication for Anjana**

रात्रौ जागरितः श्रान्तश्छर्दितो मुक्तवास्तथा । ज्वरातुरः शिरः स्नातो नाक्ष्णोरञ्जनमाचरेत ॥ (भा.प्र. 42)
भुक्तवाञ्छिरसा स्नातः श्रान्तश्छर्दनवाहनैः । रात्रौ जागरितश्चापि नाञ्ज्याज्ज्वरित एव च ॥

(सु.चि. 24/20)

श्रमोदावर्तरुदितमद्य क्रोधभयज्वरैः । वेगाघातशिरोदोषैश्चार्तानां नेष्यतेञ्जनम ॥
रागदुरुतिक्तमिरास्त्रावमूलसंरंभसंभवान । (सु.उ. 18)

In person who have not slept during the night, tiredness, Udavarta, crying after taking

food, after washing the head, anger, fear or sorrow, during fever, headache, indigestion, suppression of natural urges, thirst, intake of Madya. Person who are exposed to fire or heat of sun, redness of eyes, blindness, excessive lacrymation, pain and swelling, cloudy or rainy weather etc.

**Samyaga Anjana laxana**

विशद लघ्वनास्रावि क्रियापटु सुनिर्मलम । सशान्तोपद्रवं नेत्रं विरिक्तं समयादिशेन ॥ (सु.चि. 24)

Clear vision, lightness, no excessive lacrymation, proper function, purity of eyes and alleviation of diseases are to proper action of Anjana.

**Pratimarsha Nasya**

औषधमौषधसिद्धो वा स्नेहो नासिकाभ्यां दीयत इति नस्यम् । तद् द्विविधम्–शिरोविरेचनं स्नेहनं च । तद् द्विविधमपि पञ्चधा । तद्यथा–नस्यं, शिरोविरेचनं, प्रतिमर्शः, अवपीडः, प्रधमनं च ॥ (सु.चि. 40/21)

Sneha processed with drugs are administered through the nostrils, this is called Nasya.

Two types - Shirovirechana and Snehana these two divided in subtypes

Five types - Nasya, Shirovirechana, Pratimarsha, Avapida, Pradhamana.

कटुतैलादि नस्यार्थे नित्याभ्यासेन योजयेत् । प्रातः श्लेष्माणि मध्याङ्गेपित्ते सायं समीरणे ॥

सुगन्धवदनाः स्निग्धानिः स्वना विमलेन्द्रियाः । निर्वलीपलितव्यङ्ग भवेयुर्नस्यशीलिनः ॥ (यो.र. 35)

The Nasya should be performed daily with Katu Tila etc. oils in case Kapha predominance, it should be done in the morning, in Pitta after noon, in Vata evenings should be perferred.

The daily practice of Nasya imparts, Sugandhita to body, Snigdhata to speech, cleans the body organs and prevents Vali, Palitya i.e. ageing and graying of hair etc.

प्रतिमर्शे भवेत स्नेहोनिर्दोषः उभयार्थकृत । प्रतिमर्शस्तु नस्यार्थ करोति न च दोषवान ॥
ततः स्नेहांगुलिं दद्यात प्रातर्निशि च सर्वदा । न चोच्छिद्येदरोगाणां प्रतिमर्शः सदार्ढयकृत ॥
(सु.चि. 40/49)

Pratimarshya is the type of Nasya devoid of any complications. The finger should be dipped in oil and drops should be instilled into nostril. This should be inhaled inside, which makes the body string. As the amount is only two drops, it is devoid of any complications and administer at any time.

प्रतिमर्शश्चतुर्दशसु कालेषूपादेयः । तद्यथाः – तल्पोत्थितेन, प्रक्षालितदन्तेन, गृहान्निर्गच्छता, व्यायामव्य-वायाध्वपरिश्रान्तेन, मूत्रोच्चारकवलाञ्जनान्ते, भुक्तवता छर्दितवता, दिवास्वप्नोत्थितेन, सायं चेति ॥ (सु.चि. 40/49)



- तल्पोत्थितेन - After getting up from bed.
- प्रक्षालितदन्तेन - After tooth brushing
- गृहान्निर्गच्छता - While going out of the house
- व्यायाम - Being tried due to physical exercise
- व्यवाय - After coitus
- अध्वपरिश्रान्तेन - Travelling on foot
- मूत्रोच्चार - After passing urine and facecs
- कवलाञ्जनान्ते - After gargles and collyrium
- भुक्तवता - After taking food
- छर्दितवता - After vomitting
- दिवास्वप्नोत्थितेन - Awakening from day sleep
- सायं - In the evening

**Benefits of Pratimarsha Nasya**

तत्र तल्पोत्थितेनासेवितः प्रतिमर्शो रात्रावुपचितं नासास्रोतोगतं मलमुपहन्ति मनःप्रसादं च करोति, प्रक्षालितदन्तेनासेवितो दन्तानां दृढतां वदनसौगन्ध्यं चापादयति, गृहान्निर्गच्छता सेवितो नासास्रोतसः क्लिन्नतया रजो धूमो वा न बाधते, व्यायाममैथुनाध्वपरिश्रान्तेनासेवितः श्रममुपहन्ति, मूत्रोच्चारान्ते सेवितो दृष्टेर्गुरुत्वमपनयति, कवलाञ्जनान्ते सेवितो दृष्टिं प्रसादयति, भुक्तवता सेवितः स्रोतसां विशुद्धिं लघुतां चापादयति, वान्तेनासेवितः स्रोतोविलग्नं श्लेष्माणमपोह्य भक्ताक्वाङ्क्षामापादयति, दिवास्वप्नोत्थितेनासेवितो निद्राशेषं गुरुत्वं मलं चापोह्य चित्तैकाग्र्यं जनयति, सायं चासेवितः सुखनिद्राप्रबोधं चेति ॥
(सु.चि. 40/50)

- तल्पोत्थितेनासेवित - Removes dirt of the nasal passage collected in night and provides cheerfulness.
- प्रक्षालितदन्तेना सेवितो - it produces firmness of teeth and Sugandha in mouth.
- गृहान्निर्गच्छता सेवितो - Dust or smoke not harm because of moisturing of the nasal passage.
- व्यायाम मैथुरध्वपरिश्रन्तेनासेवित - Removes tiredness of physical exercise, coitus and travelling on foot it used thereafter.
- मूत्रोच्चारान्ते सेवितो - Used after passing urine and faces, removes heaviness of eyes.
- कवलाञ्जनान्ते सेवितो - Used at the end of gargle and collyrium it makes the vision clear.
- भुक्तवता सेविता - Used after taking food, it brings purity of passages and lightness.
- वान्तेनासेवित - Used after vomiting it produces desire.
- भक्तकाङ्क्षामापद्यति - Used after food removing mucus attached to the passage.

- दिवास्वप्नोत्थितेनासेवितोनिद्राशेषं - Used after rising from day sleep, it eliminates the hangover and dirt and produce concentration of mind.
- सायं साचेवित - Used in evening it makes comfortable sleep and easy awakening.

नस्येन रोगाः शाम्यन्ति नराणामूर्ध्वजत्रुजाः । इन्द्रियाणां च वैमल्यं कुर्यादास्यं सुगन्धि च ॥
हनुदन्तशिरोग्रीवात्रिकबाहूरसां बलम् । वलीपलितखालित्यव्यङ्गानां चाप्यसंभवम् ॥
(सु.चि. 40/54-55)

Nasya cures the diseases of organs above shoulder of human beings get relieved, sense organs become clean, mouth emits good smell, bestows strength to the lower jaw, teeth, head, neck, upper back, arms and chest and non-appearance of wrinkles of the skin, grey hairs, baldness and discolored patches on the face.

**Pratimarsha Pramana (Quantity of medicine)**

ईषदुच्छ्वसितः स्नेहो यावद्वक्त्रं प्रपद्यते । नस्ये निषिक्तं तं विद्यात् प्रतिमर्शं प्रमाणतः ॥ (सु.चि. 40/53)

Quantity of oil put into the nose which comes into the mouth when the person sucks the air that should be understood as ideal quantity that should be administered as Pratimarsha Nasya.

**Feature of Proper Nasya**

तस्य योगातियोगायोगानामिदं विज्ञानं भवति । लाघवं शिरसो योगे सुखस्वप्नप्रबोधनम् ।
विकारोपशमः शुद्धिरिन्द्रियाणां मनःसुखम् ॥ (सु.चि. 40/32-33)

In proper use, lightness of head, easy sleeping and awakening, cures the disorders, clarity of sense organs and cheerfulness.

**Features of Excessive Nasya**

कफप्रसेकः शिरसो गुरुतेन्द्रियविभ्रमः । लक्षणं मूर्ध्न्यतिस्निग्धे रूक्षं तत्रावचारयेत् ॥
(सु.चि. 40/34)

Excessive mucus secretion, heaviness of head, dysfunction of sense organs are the sign of excessive uses Nasya.

**Feature of Insufficient Nasya**

अयोगे वातवैगुण्यमिन्द्रियाणां च रूक्षता । रोगाशान्तिश्च तत्रेष्टं भूयो नस्यं प्रयोजयेत् ॥
(सु.चि. 40/35)

In deficient use, Vata is vitiated, roughness appears in organs and disorder is not alleviated. In such case, appropriate Nasya should be used again.



**Gandusha and Kavala**

असंचार्या तु या मात्रा गन्डुषः स प्रकिर्तितः ॥ (सु.चि. 40/62)

Mouth is completely filled with Gandusha Dravya and kept without movement is called Gandusha.

**Types** - According to Vagbhata :

| | |
|---|---|
| Singdha -Vata | Samana- Pitta |
| Ropana- Vrana | Sodhana - Kapha |

**Drvya use for Gandusha**

एवं स्नेहपयःक्षौद्ररसमूत्राम्लसंभृताः । कषायोष्णोदकाभ्यां च कवला दोषतो हिताः ॥ (सु.चि. 40/64)

Gargles consisting of Sneha, milk, honey, meat juice, urine, sour gruel and also decoction and hot water are whole same according to Dosha.

**Kavala**

सुखं संचार्यते या तु मात्रा स ( सा ) कवलः स्मृतः ॥ (सु.चि. 40/62)

The Drvaya used moves easily in mouth called as Kaval.

**Methods**

तावच्च धारयितव्योऽनन्यमनसोन्नतदेहेन यावद्दोषपरिपूर्णकपोलत्वं नासास्रोतोनयनपरिप्लवश्च भवति तदा विमोक्तव्यः, पुनश्चान्यो ग्रहीतव्य इति ॥ (सु.चि. 40/63)

**Gandusha :** It should be done with concentration, sitting erect, liquid should be kept in full mouth till Dosha gets filled in mouth or before discharge from nasal passage and eyes; after that, the liquid should be spit out and another quantity of liquid taken in.

**Kavala :** Method of practicing is same as Gandusha and only difference is that amount is less in Kavala and movements done in Kavala.

**Benefits**

गण्डुष मथ कुर्वित शीतेन पयसा मुद्रः । कफतृष्णामलहरं मुखान्तः शुद्धिकारणम् ।
सुखोष्णोदकगण्डुषः कफारुचिमलापहः । दन्तजाड्यहरश्चपि मुखलाघवकारकः ॥ (यो.र.·29-30)

Gandusha should be done repeatedly with cold water; it removes Kapha, Trushna and Mala. Gandusha with warm water removes Kapha, Aruchi and strengthen teeth, promotes lightness in the mouth.

**Aycgya for Gandusha/ Kavala**

विषमुर्च्छमदार्तानां शोषिणां रक्तपित्तिनाम । कुपिताक्षिमल क्षीणरुक्षाणां स न शस्यते ॥ (यो.र. 31)

It should not be undertaken by the person affected with Visha, Murcha, Mada,

Kshaya Roga, Raktapitta, Netra Roga, Ksheena Mala, Ruksha Mala, these people should not practice Gandusha Dharana.

**Gandusha Samyaka Yoga Laxana**

व्याधेरेषचयस्तुष्टिर्वैशद्यं वक्त्रलाघवम् । इन्द्रियाणां प्रसादश्च कवले शुद्धिलक्षणम् ॥ (सु.चि. 40/65)

Cures the disorders, proper nourishment, clarity of mouth and lightness in the sense organs, this is the features of proper evacuation of Gandusha.

**Gandusha Ayogya Laxana**

हीने जाड्यकफोत्क्लेशावरसज्ञानमेव च । (सु.चि. 40/66)

Improper gargling leads to one suffer from stiffness, excitation of Kapha and loss of taste sensation.

**Gandusha Atiyoga Laxana**

अतियोगान्मुखे पाकः शोषतृष्णाऽरुचिक्लमाः ॥ (सु.चि. 40/66)

Excessive use of gargle causes stomatitis, dryness, thirst, anorexia and exhaustion.

**Tambula Sevana**

ततो नावनगण्डुषधूमताम्बूल भाग्भवेत । (अ.ह.सू. 2/6)

After Anjana the person should make use of Navana, Gandusha, Dhuma and Tambula.

रुचिवैशद्यसौगन्ध्यमिच्चन्वक्त्रेण धारयेत् । जाति लवग कर्पूर कङ्कोल कटुकैः सह ॥
ताम्बुलिनां किसलयं हृद्यं पूगफकन्वितम् ॥ (अ.स.सू. 3/36-37)

धूमेनापोह्य हृद्यैर्वा कषायकटुतिक्तकैः । पूगैः कर्पूरकस्तूरीलवंगसुमनः फलैः ।
फलैः कटुकषायैर्वा मुखवैशद्यकारिभिः । ताम्बूलपत्रसहितै सुगन्धैर्वा विचक्षण ॥

(भा.प्र. 5/164-165)

Person who desires good taste, cleanliness and pleasant smell of mouth, should keep in his mouth the tender leaves of Tambula (betel leaves) along with Jati, Lavanga, Karpura, Kankola and Katuka mixed with arec nut. It is very good for heart.

पथ्यं सुप्तोत्थिते भुक्ते स्नाते वान्ते च मानवे । द्वित्रमेकं पूगं च सचूर्णखदिरं च तत ॥

(अ.स.सू. 3/38-39)

ताम्बूलमुक्तं तीक्ष्णोष्णं रोचनं तुवरं सरम् । तिक्तं क्षारोषणं कामरक्तपित्तकरं लघु ॥
वश्यं श्लेष्मास्यदौर्गन्धमलवातश्रमापहम । मुखवैशद्यसौगन्धकान्ति सौष्ठवकारकम ॥

(भा.प्र. 5/167-168)

Chewing betel leaves is recommended after a night sleep, after a bath, after the meals



and after sexual activity in the night. Chewing is said to pacify all three Doshas and cheerfulness, it cleanses the mouth, removing all bad odours, it makes the mouth fragrant, more importantly it causes an extra secretion of saliva, which will increase the digestion. It is also useful after vomiting or when some organic poison has entered the stomach. It adds to conviviality in assemble of likeminded people.

It is advisable 3 to 4 times per day. Excessive chewing of betel leaves causes of impairs the physique, diminishes strength, injuries eye sight, dulls the complexion of the skin, looses teeth and root of hair and causes deafness. It aggravates both Vata and Pitta, excessive chewing weakness the digestive power.

**Contraindication for Tambula Sevana**

ताम्बूलं क्षतपित्तास्त्ररुक्षोत्कुपित चक्षुषाम् । विषमुर्च्छामदार्तानांमपथ्ये शोषिणामपि ॥ (अ.ह.सू. 2/7)
रक्तपित्त क्षतक्षीण रुक्षोत्कुपितचक्षुषाम् । विषमुर्च्छामदर्तानांमपथ्यं शोषणां च तत ॥

(अ.सं.सू. 3/37-38)

It is contraindication for person who is suffering from the disease Raktapitta, wounds, dryness and redness of eyes, poisoning effects, unconsciousness, intoxication and even from consumption.

**Dhumapana-Medicated Smoking**

प्रायोगिकं ततो धूमं गन्धमाल्यादिचाचरेत । धूमादस्योर्ध्वजत्रूत्था न स्युर्वात कफामयाः ॥

(अ.स.सू. 3/32)

One should undertake use of Dhumapana and application of Gandhamalya (garland of flower) etc. Dhumapana cures the diseases of existing above the clavicles and diseases due to Va.. and Kapha do not occurs by taking Dhumapana regularly.

**Types :**

धूमः पञ्चविधो भवति; तद्यथा–प्रायोगिकः, स्नैहिको, वैरेचनिकः, कासघ्नो, वामनीयश्चेति ॥

(अ.स.सू. 3/32)

**Dhumapana Vidhi (procedure of inhaling medicinal smoke)**

मुखेन तं पिबेत् पूर्वं नासिकाभ्यां ततः पिबेत् । मुखपीतं मुखेनैव वमेत् पीतं च नासया ॥
मुखेन धूममादाय नासिकाभ्यां न निर्हरेत् । तेन हि प्रतिलोमेन दृष्टिस्तत्र निहन्यते ॥
विशेषस्तु प्रायोगिकं घ्राणेनाददीत, स्नैहिकं मुखनासाभ्यां, नासिकया वैरेचनिकं, मुखेनैवेतरौ ॥

(सु.चि. 40/7-8)

First, smoke should be inhaled from mouth and next through the nostrils, that inhaled through mouth should be let out by the mouth itself and so also that smoke inhaled by nose

the smoke inhaled by mouth should be let out through the nose by doing so, smoke travelling in opposite direction destroys vision.

Prayogika Dhumapana should be inhaled especially through the nose, Snaihika Dhumapana inhaled through the mouth and nose both, Virechanika should be through the nose and other Kasaghna and Vamaniva through the mouth only.

**Timing for Dhumapana**

प्रयोगपाने तस्याष्टौ कालाः संपरिकीर्तिताः । वातश्लेष्मसमुत्क्लेशः कालेष्वेषु हि लक्ष्यते ॥
स्नात्वा भुक्त्वा समुल्लिख्य क्षुत्वा दन्तान्निघृष्य च । नावनाञ्जननिद्रान्ते चात्मवान् धूमपो भवेत् ।
(च.सू. 5/33-35)

Eight times are prescribed for smoking as a daily routine because in these times the aggravation of Vata and Kapha Dosha. A cautions person should smoke after bath, meals, vomiting, sneezing, tooth brushing, snuffing, use of collyrium and sleep.

Thus diseases of part above Jatru and predominant in Vata and Kapha do not arise. Smoking should be done thrice with three puffs each times.

आद्यास्तु त्रयो धूमा द्वादशसु कालेषू पाद्येयाः । तद्यथा–क्षुतदन्तप्रक्षालन नस्य स्नान भोजन दिवास्वप्न मैथुनच्छर्दि मूत्रोच्चारहसितरुषित शस्त्र कर्मान्तेष्विति । तत्र विभागो–मूत्रोच्चारक्षवथु हसितरुषितमैथुनान्तेषुस्नैहिकः, स्नानच्छर्दनदिवास्वप्न प्रान्तेषु वैरेचनिकः, दन्तप्रक्षालनस्य, भोजन शस्त्र कर्मान्तेषु प्रायोगिकः इति ॥ (सु. चि. 40/13)

Snaihika - Mutra, Kshavathu, Hasita-Rushita, Maithuna.
Vairechanika - Snana, Chardi, Divasvapna.
Prayogika - Dantaprakshalana, Bhojana, Shastrakarma.
Total no - 12 times

परं द्विकालपायी स्यादद्यः कालेषु बुद्धिमानः ।

During the times of day the wise should smoke twice a daily routine, once for unctuous and thrice or four times for evacuative effects.

**Benefits of Dhumapana**

गौरवं शिरसः शूलं पीनसार्धावभेदकौ । कर्णाक्षिशूलं कासश्च हिक्काश्वासौ गलग्रहः ॥
दन्तदौर्बल्यमास्रावः श्रोत्रघ्राणाक्षिदोषजः । पूतिघ्राणास्यगन्धश्च दन्तशूलमरोचकः ॥
हनुमन्याग्रहः कण्डूः क्रिमयः पाण्डुता मुखे । श्लेष्मप्रसेको वैस्वर्यं गलशुण्ड्युपजिह्विका ॥
खालित्यं पिञ्जरत्वं च केशानां पतनं तथा । क्षवथुश्चातितन्द्रा च बुद्धेर्मोहोऽतिनिद्रता ।
धूमपानात् प्रशाम्यन्ति बलं भवति चाधिकम् । शिरोरुहकपालानामिन्द्रियाणां स्वरस्य च ॥
न च वातकफात्मानो बलिनोऽप्यूर्ध्वजत्रुजाः । धूमवक्त्रकपानस्य व्याधयः स्युः शिरोगताः ॥
(च.सू. 5/27-32 )



Dhumapana cures heaviness and pain in head, chronic rhinitis, headache, eye and ear pain, cough, hiccup, dyspnoea, spasm in throat, weakness of teeth, discharge due to disorder of ear, nose, eyes, bad smell from nose and mouth, toothache, anorexia, spasm in jaw and back neck, inching, worms, paleness, excessive salivation, disorder of voice, tonsillitis, enlarged Uvula, alopecia (baldness)grey hairs, hairs falling, sneezing excessive drowsiness, lack of function of intellect, excessive sleep etc. By this, strength of hairs, skull, sense organs and voice increases.

**Features of proper Dhumapana**

हृत्कण्ठेन्द्रियसंशुद्धिर्लघुत्वं शिरसः शमः । यथेरितानां दोषाणां सम्यक्पीतस्य लक्षणम् ॥
(च.सू. 5/37)

Well cleansing of heart, throat and sense organs, lightness of head and pacification of Doshas, these are the symptoms of proper smoking.

**Features of Excessive Dhumapana**

बाधिर्यमान्ध्यमूकत्वं रक्तपित्तं शिरोभ्रमम् ॥ (च.सू. 5/38)
तालुगलशोष परिदाह पिपासा मूर्च्छा भ्रम मद कर्णक्ष्वेड दृष्टि नासारोग दौर्बल्यान्यतियोगो जनयति ॥
(सु.चि. 40/17)

Smoking used in excess and untimely cause's complication such as deafness, blindness, dumbness, internal hemorrhage, vertigo, thirst, fainting, noise in ears, diseases of nose and debility are the features of Atiyoga.

**Features of Improper Dhumapana**

अविशुद्धः स्वरो यस्य कण्ठश्च सकफो भवेत् । स्तिमितो मस्तकश्चैवमपीतं धूममादिशेत् ॥
(च.सू. 5/53)

Improper smoking is absence of clarity of voice, presence of Kapha in throat and heaviness of head etc.

**Contraindication for Dhumapana**

तत्र शोकश्रम भयामर्षैर्ष्यविषरक्तपित्त मदमूर्च्छा दाहपिपासापाण्डुरोगतालुशोषच्छर्दि शिरोऽभिघातोद्वारापतर्पित तिमिर प्रमेहोदराध्मानोर्ध्ववातार्ता बालवृद्धदुर्बलविरिक्ता स्थापित जागरित गर्भिणी रूक्ष क्षीणक्षतोरस्कमधुघृतदधिदुग्ध मत्स्य मद्य यवागू पीताल्पकफाश्च न धूममासेवेरन् ॥
(सु.चि. 40/11)

Persons afflicted with grief, fatigue, fear, jealously, increases heat or poison, those suffering from bleeding disease, intoxicatication, fainting, burning sensation, profound thirst, anemia, dryness of throat, vomiting, injury to the head, belching, malnutrition,

blindness, diabetes, abdominal enlargement and reverse upward peristalsis, children, old persons, debilitated those who had purgation and decoction enema, who were awake(loss of sleep), pregnant women, those who are dry, emaciated, injured in chest, who have consumed honey, ghee, curd, milk, fish, wine and thick gruel and who have mild increased of Kapha should not intake smoke.

**Abhyanga-(oil massage)**

अभ्यऽगमाचरेनित्यं स जराश्रम वातहा । दृष्टिप्रसादः पुष्ट्यायुः स्वप्नसुत्वकत्व दार्ढ्यकृत।।
शिरः श्रवण पादेषु तं विशेषेण शीलयेत ॥ (अ.ह.सू. 2/7)
अभ्यंगो मार्दवकरः कफ़वातनिरोधनः । धातुनां पुष्टिजननो मृजावर्णबलप्रदः ॥ (सु.चि. 24/30)
अभ्यंगो वातहा पुष्टिस्वप्नदार्ढ्यबृहत्वकृत । दग्धभग्नक्षतरुजाक्लमश्रमजरापहः ॥
रथाक्षचर्मघटवत भवन्त्यभ्यंगो गुणाः। स्पर्शनेऽभ्याधिको वायुः स्पर्शनं च त्वगाश्रयम ॥
त्वच्यश्च परमभ्यंगो यस्मात्तं शीलयेदतः। शिरः श्रवणपादेषु तं विशेषण शीलयेत ॥

(अ.स.सू. 3/55-57)

अभ्यंग कारयेन्नित्यं सर्वेष्वेंगेषु पुष्टिदम । (भा.प्र. 5/56)

Abhyanga should be practice daily, it delays aging, cures tiredness and Vata disorders, improves vision, complexion, and nourishment to the body, long life, good sleep, good lustrous skin and strength. It should be done specially to head, ears and feet.

One should massage the body with luke warm oil, according to season, in direction of body hair, oil can be used according Dosha, season and conditions. It is performed in seven positions in order. 1. Sitting 2. Supine3. Left lateral 4. Prone 5.right lateral 6. Supine 7. Sitting with legs extend to the front.

**Contraindication for Abhyanga**

वर्ज्योऽभ्यगकफग्रस्तं कृतं संशोध्यजीर्णिभिः ॥ (अ.ह.सू. 2/9)

Person suffering from Kapha disorder, after Shodhana therapy and indigestion are unfit for Abhyanga.

**Shirobhyanaga**

स केश्यः शीलितो मूर्ध्नि कपालेन्द्रियतर्पण ॥ (अ.स.सू. 3/58)
नित्यं स्नेहार्द्रशिरसः शिरःशूलं न जायते । न खालित्यं न पालित्यं न केशाः प्रपतन्ति च ॥
बलं शिरःकपालानां विशेषेणाभिवर्धते । दृढमूलाश्च दीर्घाश्च कृष्णाः केशा भवन्ति च ॥
इन्द्रियाणि प्रसीदन्ति सुत्वग्भवति चाननम् । निद्रालाभः सुखं च स्यान्मूर्ध्नि तैलनिषेवणात् ॥

(च.सू. 5/81-83)

अभ्यंग शीलितो मूर्ध्नि सकलेन्द्रियतर्पकः । दृष्टितुष्टिकरो हन्ति शिरोभूमिगतान्गदान ॥



केशानां बहुतां दार्ढ्यं मृदुतां दीर्घतां तथा । कृष्णतां कुरुते कुर्याच्छिरसः पूर्णतामपि ॥

(भा.प्र. 5/59-60)

Daily practice of Shirobhyanaga prevents the headache, graying of hair, hair fall, gives strength to skull, hair became firm rooted, long and black, sense organs became cheerful and face with pleasant glow along with sound sleep and happiness.

**Karna Purana**

न कर्णरोगा वातोत्था न मन्याहनुसंग्रहः । नोच्चैः श्रुतिर्न बाधिर्यं स्याच्नित्यं कर्णतर्पणात् ॥

(च.सू. 5/84)

हनुमन्याशिरः कर्णशूलघ्नं कर्णपूरणम् । (अ.स.सू. 3/59)
न कर्णारोगा न मलं न च मन्याहनुग्रहः । नोच्चैः श्रुतिनं बाधिर्यं स्यानित्यं कर्णपूरनात ॥

(भा.प्र. 5/61-62)

Daily practice of Karna Purana is prevents the disorder and pain of ear due to Vata Doshas, stiffness of back and jaws, hard hearing, deafness do no occurs.

**Padabhyanga**

खरत्वं स्तब्धता रौक्ष्यं श्रमः सुप्तिश्च पादयोः । सद्य एवोपशाम्यन्ति पादाभ्यङ्गनिषेवणात् ॥
जायते सौकुमार्यं च बलं स्थैर्यं च पादयोः । दृष्टिः प्रसादं लभते मारुतश्चोपशाम्यति ॥
न च स्याद्गृध्रसीवातः पादयोः स्फुटनं न च । न सिरास्नायुसंकोचः पादाभ्यङ्गेन पादयोः ॥

(च.सू. 5/90-92)

पादाभ्यङ्गस्तु तत्स्थैर्यनिद्रादृष्टि प्रसादकृत । पादसुप्ति श्रमस्तम्भ संकोच स्फुटनप्रणतु ॥

(अ.स.सू. 3/59, भा.प्र. 5/63-64

Daily practice of Padabhyanga helps to remove dryness, stiffness, roughness, tiredness and numbness instantly. It also makes the skin smooth, provides strength and stability to feet, improves the sleep and vision, and pacifies Vata. It also prevents diseases like Grudhrasi, cracking of foot and stiffness of ligaments and tendons of foot.

Duration of Massage and effects on the body-

300 Matras (94 seconds) - Romanta (upto hair root)
400 Matras (133 seconds) - Twacha (upto skin)
500 Matras (160 seconds) - Rakta (upto blood)
600 Matras (190 seconds) - Mamsa (upto flesh)
700Matras (228 seconds) - Medas (upto fat)
800 Matras (240 seconds) - Asthi (upto bones)
900Matras (285 seconds) - Majja (upto bone marrow)

**Udvartana (Massage)**

उद्वर्तनं कफहरं मेदसः प्रविलायनम । स्थिरिकरणमऽगानां त्वकप्रसादकरं परम ॥

(अ.सं.सू. 3/66, अ.हृ.सू. 2/15)

Udvartana mitigates Kapha, liquefies the fat, produce stability of the body parts and excellence of the skin.

उद्वर्तनं वातहरं कफमेदोविलापनम् । स्थिरीकरणमऽगनां त्वक्प्रसादकरं परम् ॥ (सू.चि. 24/51)

Udvartana mitigates aggravation of Vata and Kapha, liquefies the fats, stability of the body and cleanses the skin.

उद्वर्त्तन कफ़हरं मेदोघ्नं शुक्रदं परम । बल्यं शोणितकृच्चापि त्वकप्रसादम्रुदुत्वकृत॥ (भा.प्र. 5/69-70)

Udvartana mitigates Kapha and Medas, Shukra Vardhaka, Balya, increases the Rakta and cleanses the skin.

**Udgharshana and Udsadana**

उद्धर्षणम् अस्नेहौषधचूर्णादिभिघर्षणम् । सस्नेह कल्केनोद्धर्षणमुत्सादनम ॥

(डल्हण सु.चि. 24/52-56)

**Udgharshana** means massage with powder of herb without oil.

**Udsadana** means massage with paste of herbs along with oil.

**Benefits**

सिरामुखविविक्तत्वं त्वक्थस्याग्नेश्च तेजनम् । उद्धर्षणोत्सादनाभ्यां जायेयातामसंशयम् ॥
उत्सादनाद् भवेत् स्त्रीणां विशेषात् कान्तिमद्वपुः । प्रहर्षसौभाग्यमृजालाघवादिगुणान्वितम् ॥
उद्घर्षणं तु विज्ञेयं कण्डूकोठानिलापहम् । ऊर्वोः संजनयत्याशु फेनकः स्थैर्यलाघवे ॥
तेजनं त्वग्गतस्याग्नेः सिरामुखविवेचनम् । उध्दर्षणं त्विष्टिकया कण्डूकोठविनाशनम् ॥

(सू.चि. 24/52-56)

Udgharshana dilated blood vessels and enhances the Agni in skin. Utsadana enhances the complexion in women's, gives pleasure, cleanliness, auspicious, feeling of lightness and such other beneficial qualities.

Udgharshana cures itching; eruptions and a disorder of Vata, use of Phenaka (soap nut) bring about stability and lightness to the thighs and mitigates itching, rashes, inactivity of Vata and wards off dirt and diseases. Massaging with the powder enhance the Agni of skin. dilates the veins and cures itching and rashes.

**Samvahana (संवहन) (mild massage or pressing by hands)**

प्रीतिनिद्राकरं वृष्यं कफवातश्रमापहम । संवाहन मांसरक्तत्वकप्रसादकरं सुखम ॥ (सु.चि. 24/83)



संवाहनं सुखकरस्पर्शः मर्दनं तु गाठ पादाभ्यामारभ्य करिपर्यन्तं ॥ (डल्हण सु.चि. 24/83)
संवाहनं मांसरक्तत्वकप्रसादकरं परम । प्रीतिनिद्राकरं वृष्यं कफ़वातश्रमापहम ॥ ( भा.प्र. 5/189 )

Samvahana is mild massage or gentle touch, started from foot to waist which produces pleasantness (Sukhakara Sparsha). Samvahana enhances affection sleep and virility takes away Kapha and Vata, tiredness and produces clearness of Mamsa, Rakta and Twaka. It is also acts as Sukakaraka.

**Vyayama (व्यायाम) Exercises**

शरिरायासजननं कर्म व्यायामसंज्ञितम । (सु.चि. 24/38)
शरीरायासजननं कर्म व्यायाम उच्यते । लाघवं कर्मसामर्थ्यं दिप्तोऽग्निर्मेदसः क्षयः ॥

(अ.स.सू. 3/61)

शरिरचेष्टा या चेष्टा स्थैर्यार्था बलवर्धिनी । देहव्यायामसंस्थाता मात्रया तां समाचरते ॥ (च.सू. 7/31)
लाघवं कर्मसामर्थ्यं दिप्तोऽग्निर्मेदसः क्षयः । विभक्त घनगात्रत्वं व्यायामादुपजायते ॥ (अ.हृ.सू. 2/10)
लाघवं कर्मसामर्थ्यं विभक्तघन गात्रत्वं । दोषक्षयोऽग्निवृद्धिश्च व्यायामादुपजायते ॥ (भा.प्र. 5/47-48)

The action which produces tiredness in body is Vyayama.

The physical action, which enhancing then strength of the body, increases the digestive fire, Dosha Kshaya, when performed in the required times is called Vyayama.

**Features of proper exercise**

स्वेदागमः श्वासवृद्धिर्गात्राणां लाघवं तथा । हृदयाद्युपरोधश्च इति व्यायामलक्षणम् ॥ (च.सू. 7/34)

Sweating, increased respiration rate, lightness in the body and increased heart rates are the features of proper exercise.

**Benefits**

लाघवं कर्मसामर्थ्यं दिप्तोऽग्निमेदसः क्षयः । विभक्तघनगात्रत्वं व्यायामदुपजायते ॥ (अ.हृ.सू. 2/10)
लाघवं कर्मसामर्थ्यं स्थैर्यं दुःखसहिष्णुता । दोषक्षयोऽग्निवृद्धिश्च व्यायामादुपजायते ॥ (च.सू. 7/32)

lightness of body, ability to work, stability, increase the digestion proper, depletion of excess fat, alleviated of Dosha are normalizes are the benefits of Vyayama.

**Contraindication for Vyayama**

वातपित्तामयी बालोवृद्धोऽजीर्णा च त त्यजेत । (अ.हृ.सू. 2/11)
भुक्तवान्कृतसम्भोगः कासी श्वासी कृशः क्षयो । रक्तपित्तो क्षती शोषी न तं कुर्यात्कदाचन ॥ (भा.प्र.)

Person suffering from disease of Vata and Pitta, Kasa, Shwasa, Krusha, Kshaya, Raktapitta, Injured, Shosha, children, old age, those having indigestion, after food and after Maithuna karma should avoid Vyayama.

**Effects of excessive exercise**

तृष्णा क्षयः प्रतमको रक्तपित्तं श्रमः क्लमः । अतिव्यायामतः कासो ज्वरछर्दिश्च जायते ॥
व्यायाम जागराध्वस्त्रीहास्यभाष्यादि साहसम । गजंहिं इवाकर्षन भजन्नतिविनश्यति ॥
(अ.ह.सू. 2/13-14)

अतिव्यायामतः कासो ज्वरछर्दिश्चः श्रमः कलमः । तृष्णा क्षयः प्रतमको रक्तपित्तं च जायते ॥
(भा.प्र. 5/55)

Excessive exercise leads, thirst, emaciation, difficulty to breathe, Raktapitta, tiredness, cough, fever and vomiting.

Excessive exercise, awakening in night, excessive, sexual intercourse, over speaking, overstraining destroys the persons as lion which tries to drag the elephant gets destroyed.

**Vyayama in Rutus**

अर्धशक्ता निषेव्यस्तु बलिभिः स्निग्धभोजिभि । शीतकाले वसन्ते च, मन्दमेव ततोऽन्यदा ॥
(अ.ह.सू. 2/11)

Person who are strong and indulge in fatty foods, daily, in cold seasons, and spring should do it half of their strength only, while others in other season should mild exercise.

**Chankramana (Mild Excerise or Mild Walking)**

यत्तु चङ्क्रमणं नातिदेहपीडाकरं भवेत् । तदायुर्बलमेधाग्निप्रदमिन्द्रियबोधनम् ॥ (सु.चि. 24/80)

Moderate walking does not cause much trouble to the body, enhances life span, intelligence, digestive power, stimulated the sense organs.

**Snana (स्नान) Bath**

दीपनं वृष्य मायुष्यं स्नानमूर्जाबलप्रदम । कण्डूमलश्रम् स्वेदतन्द्रातृऽदाहपाप्यजित ॥
(अ.ह.सू. 2/16, भा.प्र. 5/71)

दौर्गन्ध्यं गौरवं तन्द्रां कण्डूं मलमरोचकम् । स्वेदबीभत्सतां हन्ति शरीरपरिमार्जनम् ॥
पवित्रं वृष्यमायुष्यं श्रमस्वेदमलापहम् । शरीरबलसन्धानं स्नानमोजस्करं परम् ॥
(च.सू. 5/93-94)

निद्रादाहश्रमहरं स्वेदकण्डूतृषापहम् । हृद्यं मलहरं श्रेष्ठं सर्वेन्द्रियविबोधनम् ॥ (सु.चि. 24/57)

After doing massage, if one takes bath person cures the bad odour, heaviness of body, downiness, itching, impurities, anorexia and bad smell of sweat.

Bathing is purifying, aphrodisiac, life promoting, destroys the fatigue, sweat, dirt, strength, compactness and Ojus at same time cures tiredness, sweat and impurities of body.



**Effect of cold and hot water bath**

शीतेन पयसा स्नानं रक्तपित्त प्रशान्तिकृत । तदेवोष्णेन तोयेन बल्यं वातकफापहम ॥ (यो.र. 73)
उष्णाम्बुनाऽधकायस्य परिषेको बलावहः । तेनैव चोत्तमाऽगस्य बलहत्क्लेश चक्षुणाम ॥
(यो.र. 74, अ.ह.सू. 2/17)

Cold water bath cures the bleeding disorder; hot water bath excluding head enhances strength and destroys Vata and Kapha.

Hot water on 'Adhokaya' below the neck improves body strength and hot water bath on head leads to loss of strength, hair and sight gradually.

**Contraindication for Snana**

स्नानमर्दितनेत्रस्त्रकर्णरोगातिसारिषु । आध्मानपीनसाजीर्ण भुक्तवत्सु च गर्हितम ॥ (अ.ह.सू. 2/18)

तच्चातिसारज्वरितकर्णशूलानिलार्तिषु । आध्मानारोचकाजीर्णभुक्तवत्सु च गर्हितम् ॥ (सु.चि. 24/62)

Bath is contraindicated for those suffering from Ardita, diseases of eyes, mouth, ears, Atisara, Adhamana, Jwara, Pinasa, Ajeerna and immediately after food.

**Anulapana ( अनुलेपन )**

सौभाग्यदं वर्णकरं प्रीत्योजोबलवर्धनम् । स्वेददौर्गन्ध्यवैवर्ण्यश्रमघ्नमनुलेपनम् ॥ (सु.चि. 24/63)

Applying cosmetic powder, paste, oil etc. Which are fragrant on the body is auspicious, increases complexion, affection, Ojas, strength, removes sweat and bad odour, discoloration, tiredness.

स्नानं येषांनिषिद्धं तु तेषामप्यनुलेपन ।

Applying powder is also contraindication to those bath is contraindicated.

**Mukhalepana ( मुखलेपन ) Applying Cosmetics**

मुखालेपाद् दृढं चक्षुः पीनगण्डं तथाऽऽननम् । अव्यङ्गपिडकं कान्तं भवत्यम्बुज सन्निभम् ॥
(सु.चि. 24/65)

Apply cosmetic powder on face gives strength to face, eye, fullness and prominence to checks and face, make face free of color patches and eruptions and increase Kanti of face like, lotus flower.

**Vastradharana ( वस्त्रधारण ) Cloth and Dressing**

कौशेयं चित्रवस्त्रं च रक्तवस्त्रं तथैव च । वातश्लेष्महरं शीतकाले तत्तु विधारयेत ॥
(यो.र. 80, भा.प्र. 5/79)

रक्षोघ्नमथ चौजस्यं सौभाग्यकरमुत्तमम् । सुमनोऽम्बररत्नानां धारणं प्रीतिवर्धनम् ॥ (सु.चि. 24/64)

In cold season one should wear 'Kausheya' i.e. warm clothes, which are multi colored and red colored dresses, as there pacify Vata and Kapha Doshas. Wearing dress and ornaments which like by the person, dispels, evil, enhances vitality, best to bestow auspiciousness and increases affection (love).

**Role of clean dress in life**

काम्यं यशस्यमायुष्यमलक्ष्मीघ्नं प्रहर्षणम् । श्रीमत् पारिषदं शस्तं निर्मलाम्बरधारणम् ॥ (च.सू. 5/95)

वासःशृंगाररत्नानां धारणं प्रीतिवर्धकम । रक्षोघ्नमर्थ्यमोजस्यं सौभाग्यकरमुत्तम ॥ (भा.प्र. 5/92)

Wearing clean cloth enhances bodily Charm, reputation, longevity and prevents inauspiciousness. It brings about pleasure, grace competence to participate in conferences and good look.

मेध्यं सुशीतं पित्तघ्नं काषायं वस्त्रमुच्यते । तद्धारयेदुष्णकाले तच्चापि लघु शस्यते ॥

(यो.र. 81, भा.प्र. 5/80)

In hot season, one should wear decoction or 'Kashaya' colored clothes, (saffron or orange coloured), which are said to be 'Medhya' i.e. improves intelligence,seetala or cold and Pitta Shamana. Even in decoction color lighter one is superior.

शुक्लं तु शुभदं वस्त्रं शीतातपनिवारणम । न चोष्णं न च वा शीतं तच्च वर्षासु धारयेत ॥

(यो.र. 82, भा.प्र. 5/81)

In Varsha Kala i.e. rainy season one should wear Shukla i.e. white coloured. Which is auspicious, cold and protects from sun rays as the white cloth is neither hot nor cold.

**The effects of new clean cloths**

यशस्यं काम्यमायुष्यं श्रीदानन्दावर्धनम । त्वच्यं वशीकरं रुच्यं नवं निर्मलाममबरम ॥

(यो.र. 83, भा.प्र. 5/82)

Wearing new and neat cloths ensures fame, fulfills desire and promotes life span, money, happiness and is beneficial to skin and attracts attention of people.

**The effect of dirty cloths**

कदापि न जनैः सद्भिर्धार्यं मलिनम्बरम । तत्तु कण्डूक्रिमिरं ग्लान्यलक्ष्मीकरं परम ॥

(यो.र. 84, भा.प्र. 5/83)

One should never wear dirty and unwanted cloths as there may cause Kandu, Krimi, Glani, poverty and is inauspicious.

**Seasonal Lepa external application**

कुङ्कुमं चन्दनं चापि कृष्णागुरुविमिश्रितम । उष्णं वातकफध्वंसि शीते काले तदस्यते ॥

(यो.र. 85, भा.प्र. 5/84)



In cold seasons, the application of Lepa made from Keasara, Candana, Krishna Agaru is Ushna and relieves Vata and Kapha Doshas, and therefore it is useful in cold seasons.

**Chandanadi Lepa**

चन्दनं घनसारेण वालकेन न मिश्रितम । सुगन्धि परमं शीतमुष्णकाले प्रशस्यते ॥

(यो.र. 86, भा.प्र. 5/85)

Pralepa or cream prepared with combination of Candana, Karpura should be used in summer season.

चन्दनं घुसृणोपेतं मृगनाभिसमायुतम । न चोष्णं न च शीतं वा वर्षाकाले तदिष्यते ॥

(यो.र. 87, भा.प्र. 5/86)

The Pralepa prepared from Candana, Kesara and Mruganabhi is good in rainy season as it is neither Ushna nor Sheeta.

**The effects of Pralepa**

अनुलेपस्तृषामूर्च्छादुर्गन्धश्रमदाहजित । सौभाग्यतेजस्त्वग्वर्णकान्त्योजोबलवर्धनः ।

(यो.र. 88, भा.प्र. 5/87)

The general effects of application of Pralepa are it relieves Trushna, Murccha, foul smell, tiredness and Daha i.e. burning sensation and it improves Saubhagya, Teja, luster, Ojus and Bala.

**Contraindication for Pralepa**

स्नानानर्हस्य लोकस्य त्वनुलेपोऽपि नो हितः ॥ (यो.र. 88, भा.प्र. 5/87)

The person who is not eligible for Snana is also not eligible for the Pralepa.

**Use of fragrances**

वृष्यं सौगन्ध्यमायुष्यं काम्यं पुष्टिबलप्रदम् । सौमनस्यमलक्ष्मीघ्नं गन्धमाल्यनिषेवणम् ॥

(च.सू. 5/96)

Uses of scents and garlands stimulates libido, produces good smell in the body, enhances longevity and charm, it gives nourishment and strength to the body it is pleasing to the mind and prevents in auspiciousness.

**Dandadharana (दण्डधारणम) Uses of Hand Stick**

स्खलतः संप्रतिष्ठानं शत्रूणां च निषूदनम् । अवष्टम्भनमायुष्यं भयघ्नं दण्डधारणम् ॥ (च.सू. 5/102)

The use of walking stick prevents slipping and averts the enemy; it gives strength and longevity. It averts fear from the attacks of reptiles etc.

शुनः सरीसृपव्यालविषाणिभ्यो भयापहम् । श्रमस्खलनदोषघ्नं स्थविरे च प्रशस्यते ॥
सत्त्वोत्साहबलस्थैर्यधैर्यवीर्यविवर्धनम् । अवष्टम्भकरं चापि भयघ्नं दण्डधारणम् ॥

(सु.चि. 24/76-77)

Holding stick removes fear of dog, reptile, ferocious beasts and horned animals. Alleviated fatigues, slipping and other defects and is particularly useful for old persons. It promotes the quality of Satva, enthusiasm, strength, steadiness, patience and power provides, removes fear.

**Padatradharana ( पादत्रधारण/उपानद ) Wearing of foot wear**

पादरोगहरं वृष्यं रक्षोघ्नं प्रीतिवर्धनम् । सुखप्रचारमोजस्यं सदा पादत्रधारणम् ।
अनारोग्यमनायुष्यं चक्षुषोरुपघातकृत् । पादाभ्यामनुपानद्भ्यां सदा चङ्क्रमणं नृणाम् ॥

(सु.चि. 24/71-72)

पादुकाधारणं कुर्यात्पूर्वं भोजनतः परम । पादरोगहरं वृष्यं चक्षुष्यं चायुषो हितम् ॥ (भा.प्र. 5/97)

Regular uses of foot wear alleviating diseases of feet, promotes semen, ward off evil organism, gives pleasure and comfort in moving and is whole some for Ojus.

Always walking on foot without shoes has adverse effects on health and life span and also harmful to eyes.

चक्षुष्यं स्पर्शनहितं पादयोर्व्यसनापहम् । बल्यं पराक्रमसुखं वृष्यं पादत्रधारणम् ॥ (च.सू. 5/100)

Use of foot wears is conducive to eye sight and skin. It protects the feet from reptiles, etc. It gives strength and facilitates the display of physical force (courage) and is libidinal stimulant. (Virility)

**Chatra Dharana ( छत्रधारण ) Holding umbrella**

वर्षानिलरजोघर्महिमादीनां निवारणम् । वर्ण्यं चक्षुष्यमोजस्यं शंकरं छत्रधारणम् ॥ (सु.चि. 24/75-76)

Wearing of turban is purifying and whole some for hairs and protects from wind, sun rays and dust. Holding umbrella eliminates rains, wind, dust; snow etc. is wholesome for complexion, vision and Ojus and has overall salutary effects.

ईतेः प्रशमनं बल्यं गुप्त्यावरणशङ्करम् । घर्मानिलरजोम्बुघ्नं छत्रधारणमुच्यते ॥ (च.सू. 5/101)

Use of umbrella averts the attacks of diseases etc. it gives strength and protect one from evil spirits, it covers and bring about happiness, and it guards against the sun. wind, dust and rain.

**Ushanisha Dharana ( उष्णीषधारण ) Wearing head dress**

पवित्रं केश्यमुष्णीषं वातातपरजोपहम । (सु.चि. 24/87)



उष्णीषं कान्ति कृत्केश्यं रजोवातकफापहम । लघु यच्छस्यते तस्माद गुरु पित्ताक्षिरोगकृत ॥

(यो.र. 5/223)

Wearing Ushnisha (head wear) is auspicious, increases complexion, is good for hairs, prevents dust, wind and Kapha that which is light is ideal where as heavy are gives diseases of Pitta origin and of the eyes.

**Ratnabharana Dharana ( रत्नाभरणधारणम ) Wearing the gems and ornaments**

धन्यं मङ्गल्यमायुष्यं श्रीमद्व्यसनसूदनम् । हर्षणं काम्यमोजस्यं रत्नाभरणधारणम् ॥ (च.सू. 5/97)

Wearing of gems and ornaments adds to the prosperity, auspiciousness, longevity, grace, Pusthikara, Dushta Swapna Nashaka, prevents damagers from snakes, evil spirits, etc. it is pleasant and charming it is also conducive to Ojus.

**Asthamangala (Eight auspicious things)**

लोकेऽस्मिनन्मगलायन्यष्टौ ब्राह्मणो गौर्हुताशनः । पुष्प स्त्रक्सर्पिरदित्य आपो राजा तथाऽष्टमः ॥

(भा.प्र. 5/96)

Brahmana, cow, fire, garlands of flower, ghee, sun, water and king these eight are considered as auspicious in this world.

**Nakhadi Kartana - Nail, Moustaches, beards, hair cutting etc.**

पञ्चरात्रान्नखश्मश्रुकेशरोमाणि कर्त्तयेत । केशश्मश्रुनखादीनां कर्त्तनं सम्प्रसाधनम ॥
पौष्टिकं धन्यमायुष्यं शौचकान्तिकरं परम । उत्पाटयेत्तु लोमानि नासाया न कदाचन ॥
तदुत्पाटनतो दृष्टेदौर्बल्यं त्वरया भवेत । केशपाशे प्रकुर्वीत रजोजन्तुमलापहम ॥
आदर्शालोकनं प्रोक्तं मङ्गल्यं कान्तिकारकम । पौष्टिकं बल्यमायुष्यं पापालक्ष्मीविनाशनम ॥

(भा.प्र. 5/43-46)

Nails, moustaches/beards, hairs of the head and body should be cut/ removed once in five days, this bestows beautiful appearance, stouten the body, is auspicious, gives long life, removes dirtiness and gives resplendence. Hairs inside the nose should never be pulled out by force, by doing so disorders of vision develop quickly. Hair of the head should be made tidy using a Prasadhani(comb) this is good for the hairs, removes dirt, worms and wastes. Looking into a mirror is auspicious, bestows complexion, stoutness, strength, long life, and wards off sins and inauspicious.

## Madhyahnacharya

### Bhojana

सायंप्रातर्मनुष्याणाभिशनं श्रुतिचोदितम । नान्तराभोजनंकुर्यादग्निहोत्रसमो ॥ (यो.र. 5/108)

The food should be consumed twice a day i.e. morning and evening only like 'Agnihotra' it should not be taken in between. The food should take timely is good effective.

आहारः प्रीणनः सद्योबलकृद्देहधारणः । स्मृत्यायुः शक्तिवर्णोः सत्वशोभाविवर्धकः ॥ (यो.र. 5/106)

The food consumed immediately after feeling hungry, gives satisfaction, strength, Dharana i.e. ability to carry out routine function, improves memory, Ayu (prolong life span), color, Ojus, Sukra, and appearance.

यथोक्तगुणसम्पन्नमुपसेवेत भोजनम । विचार्यदेशकालादीन्कालयोरुभयोरपि ॥ (यो.र. 5/107)

The food that contains the quality prescribed for food items in the classic should be consumed twice a day daily considering the factors like, Desha, Kala, etc. by the individual.

### Bhojana karma

Purva karma to be adopted before food consumption-

भोजनाग्रेसदापथ्यंलवणार्द्रकभक्षणम । अग्निसंदीपकंरुच्यंजिह्वाकण्ठविशोधनम ॥

(यो.र. 5/122, भा.प्र. 5/123)

Before taking the food, one should always chew small pieces of Ardraka well mixed with Lavana as it is a very beneficial practice and promotes the Agni, increase appetite and clears up tongue and throat.

### Method of Eating

अश्नीयात्तन्मनाभूत्वापूर्वंतुमधुरंरसम । मध्येऽम्ललवणौपश्चात्कटुतिक्तकषायकान ॥

(यो.र. 5/125, भा.प्र. 5/123)

While eating, one should be involved in the process mentally and physically and start with Madhura Rasa Dravya. Followed by Amla and Lavana items and lastly Katu, Tikta, Kashaya Dravya, thus a broad indication regarding the order of 'Sadrasa' in eating the food is stated.

### Bhojanottaravidhi (activities after meals)

ततःपाणिगतमन्नमन्येनापनीयदन्तान्तरस्थंशचनैःशोधनेनविशोध्यविधायलेपगन्धस्नेहापनोदमाचान्तोऽ-गुल्यग्रगलिताम्बूलादकृतवदनवैशद्यो धूमपानादि ह्रतोर्ध्वकफवेगः पदशतमात्रंगत्वावामपार्श्वेनसंविशेत । द्रवोत्तरभोजनस्तुश्य्यांनातिसेवेत ॥ (अ.स.सू. 10/59)



एवं भुक्ता समाचामेद्रूक्षग्रहणपूर्वक । भोजने दन्तलग्नानि निर्हत्याचनमं चरेत ॥
दन्तान्तरगतं चान्नं शोधनेनाहरेच्छनैः । कुर्यादनिर्हतं तद्धि मुखस्यानिष्टगन्धताम ॥
दन्तलग्नमनिर्हार्यं लेपं मन्येत दन्तवत । न तत्र बहुशः कुर्याद्यत्रं हिर्हरणं प्रति ॥ (भा.प्र. 5/154-156)

After taking food, one should remove the food particles in the hand by the other clean hand; should remove the food residues remaining in the teeth by Sodhana; should clean the mouth from sticking material, smell, oiliness by gargling; should smear the eyes with the water trickling from the fingers; should get the mouth pleasant by betel leaves and others; should get the upward movement of Kapha checked by smoking and other; should walk a hundred steps and sleep on left side comfortably; persons who have taken more liquid food should not sleep or lie down for long time.

### Shatapada

भुक्ताशतपदंगच्छेच्छनैस्तेनतुजायते । अन्नसंघात शैथिल्यंग्रीवाजानुकटिसुखम ॥ (यो.र. 5/190)

One should walk at least for hundred steps immediately after taking full meals; this will helps in relieving the congestion of food in the stomach causes Greeva, Janu and Katisukham.

### Prohibited acts after food intake

यानप्लवनवाहनाग्न्यातपांश्चभुक्तवान्वर्जेत ॥ (अ.सं.सू. 10/60)

One should after eating avoid riding on vehicles and horse etc. swimming, exposing to fire and sunlight.

### Sadacara

धर्मोत्तराभिरर्थ्याभिः कथाभिस्त्रिगुणात्मभिः । मध्यंदिनस्य गमयेदिष्टशिष्टसहायवान ॥ (अ.स.सू. 3/81)

मैत्री सद्भिदः समं कुर्यात्स्नेहं सत्सु तु सर्वथा । संसर्ग साधुभिः कुर्यादसत्सङ्गं परित्यजेत ॥

(भा.प्र. 5/235)

Afternoons should be spent in the company of persons, who are liked who are good and helpful, engaging on self in reading stories dealing with the three qualities with Dharma predominating.

न लोकभूपविद्विष्टैर्न सङ्गच्छेतनास्तिकैः । (अ.स.सू. 3/81)

One should not associate with persons who are hated by society and the king (government) and those who are atheists.

One should dwell in places where water, herbs, sacrificial faggots, flower, grass and firewood are plentiful: where there is enough of food and other essential: which is safe

and beautiful, where learned men, god's ascetics and experts in many sciences, men who are self-controlled, who support the three Vargas (Dharma, Artha and Kama) scrupulously and such other good people reside.

Person should avoid the following ten sinful activities and conquer the internal enemies. Himsa (Cruelty), Astheya (Stealing), Anyathakama (unlawful sex), Paisunya (backbiting), Parusa (harsh speech), Antra (untruth), Sambhinnalapa(speech causing separation), Vyapada (quarrel, hat redness), Abhidya (jealousy) and Drgviparyaya (misunderstanding): these ten sins pertaining to the body speech and mind should be avoided.

सत्वाद्यवस्थाविविधाश्चतास्ताः सम्यकसमीक्ष्याऽत्महितंविदध्यात । अन्योऽपियः कश्चिदिहाऽस्तिमार्गो-हितोपदेशेषुभजेततंच ॥ (अ.ह.सू. 3/126)

The manifestations of the qualities of Satva etc. are many and varied: each one should be considered on its merits and demerits and only those found suitable for one's own life should be adopted. Any other good rule or regimens found elsewhere should be adopted.

**Cosmetic Effect of Dinacharya Procedures**

**Definition of Cosmetics :** Cosmetics are care substances used to enhance the appearance and odour of Human Body. FDA, USA, defines cosmetics as 'Intended to be applied to the Human body for cleansing, beautifying, promoting attractiveness or altering the appearance without affecting the body's structure or functions. Beauty is a perfect balance of inner and outer self of an Individual.

**Ayurveda :** Beauty is the desire of every individual to give pleasure to the sense. Beauty is not always related to women rather men are more beauty consciousness as the evolution shows male animals are more beautiful. Some are beauty by birth and some are want to become beautiful.

The concept of using herbs for beautification is well defined in Ayurveda. The cosmetic preparations are used for worship and for sensual enjoyment in India since Vedic period. The external application of Anjana, Tilaka, Aguru, Chandana, Haridra etc. to God and Goddess are seen in many Rutuals of India. Cosmetology is the science of alternation of appearance and modification of beauty. Any substance or preparation intended to be placed in contact with the various external parts of human body (epidermis, hair, nails, lips, and external genitals) or with the teeth and mucous membrane of oral cavity with a view exclusively or mainly to cleaning them, changing their appearance and or correcting body odors and or protecting them or keeping them in good conditions.



According to Ayurveda happiness, gloom, sadness and relaxation are the aspects that are reflected by the face and by the body and can't be disguised with cosmetics. In other words, Ayurveda emphasizes on external and internal beauty. It is believed in Ayurveda that one can enhance internal beauty by understanding and following the basic principle of Ayurveda.

**Ushajalapana-Drinking water**

**Effects :** Chakshusya, Medha Shakti prapti, Jaravyadhi Nashaka (prevents old age diseases).

**Sharirachinta**

गुदादिमलमार्गाणां शौचं कान्ति बलप्रदम । पावित्र्यकरमायुश्यमलक्ष्मीकलिपापहत ॥
(यो.र.,भा.प्र 5/13)

Cleaning after defecation, urination etc keeps those areas clean, promotes complexion, strength, holiness, lifespan and removes poverty, unrest and evils.

**Padapakshalana**

प्रक्षालनं हि पाण्योश्च पाद्योः शुद्धिकारणम । मलश्रमहरं वृष्यं चक्षुष्यं राजसापहम ॥ (भा.प्र., यो.र.)

Washing of hands and legs always leads cleanliness and removes tiredness, improves sukra, eye sight and prevents the attack of negative force or infection.

**Mukha prakshala (face wash)**

मुख प्रक्षालनं शीतपयसा रक्तपित्तजित । मुखस्य पिडकाशोषनीलिका व्यगंनाशनम् ॥
कुर्याद्वापि कटुष्णेन पयसा आस्यविशोधनाम । कफ़वातहरं स्निग्धं मुखशोषविनाशनम ॥
(यो.र. 32/33)

The face wash with Sheetala Jala prevents bleeding problems (Rakta pitta), subsides Mukhapidika, Mukha Roga, Mukhanilika and Vyanga and while washing with warm water pacifies Kapha and Vata Doshas, makes face oily or Snigdha by removing the Rukshata or dryness of the face.

**Dantadhavana**

त दौर्गन्धओपदेहौ तु श्लेष्माणं चापकर्षति । वैशद्यमन्नाभिरुचि सौमनस्यं करोति च ॥ (सू.चि. 24/9)

It removes foul smell, sliminess, Kapha and provides clarity, desire of food and cheerfulness.

**Anjana (collyrium to the eyes)**

सौवीरञ्जनं नित्यं हितमक्ष्णोस्ततोभजेत । (अ.ह.सू. 2/4)
लोचने भवतस्तेन मनोज्ञे सूक्ष्मदर्शने । (भा.प्र. 39)

Sauvirajana is good for eyes, so it should be used daily; by this eyes become beautiful and capable of seeing minute things even. It is practiced from cosmetic point of view. One must protect the eyes from excessive moisture due to Kapha and for the same Anjana is explained. Not practicing Anajana might be one of the reasons for early deterioration of vision or Drushtihasa.

**Pratimarsha Nasya**

कटुतैलादि नस्यार्थे नित्याभ्यासेन योजयेत् । प्रातः श्लेष्माणि मध्याङ्गेपित्ते सायं समीरणे ॥
सुगन्धवदनाः स्निग्धनिः स्वना विलेन्द्रियाः । निर्वलीपलितव्यङ्ग भवेयुर्नस्यशीलिनः ॥ (यो.र.अ. 35)

The Nasya should be performed daily with Katu Tila etc. oils in case Kapha predominance, it should be done in the morning, in Pitta after noon, in Vata evenings should be preferred.

The daily practice of Nasya imparts, Sugandhita to body, Snigdhata to speech, cleans the body organs and prevents Vali Palitya i.e. ageing and graying of hair etc.

**Abhyanga**

अभ्यऽगमाचरेनित्यं स जराश्रम वातहा । दृष्टिप्रसादः पुष्ट्यायुः स्वप्नसुत्वकत्व दार्ढ्यकृत ॥

Abhyanga should be practice daily, it delays aging, cures tiredness and Vata disorders, improves vision, complexion, and nourishment to the body, long life, good sleep, good lustrous skin and strength. It should be done specially to head, ears and feet.

**Shirobhyanaga**

नित्यं स्नेहार्द्रशिरसः शिरःशूलं न जायते । न खालित्यं न पालित्यं न केशाः प्रपतन्ति च ॥
बलं शिरःकपालानां विशेषेणाभिवर्धते । दृढमूलाश्च दीर्घाश्च कृष्णाः केशा भवन्ति च ॥
इन्द्रियाणि प्रसीदन्ति सुत्वग्भवति चाननम् । निद्रालाभः सुखं च स्यान्मूर्ध्नि तैलनिषेवणात् ॥
(च.सू. 5/81-83)

Daily practice of Shirobhyanaga prevents the headache, graying of hair, hair fall, gives strength to skull, hair became firm rooted, long and black, sense organs became cheerful and face with pleasant glow along with sound sleep and happiness.

**Padabhyanga**

खरत्वं स्तब्धता रौक्ष्यं श्रमः सुप्तिश्च पादयोः । सद्य एवोपशाम्यन्ति पादाभ्यङ्गनिषेवणात् ॥
जायते सौकुमार्यं च बलं स्थैर्यं च पादयोः । दृष्टिः प्रसादं लभते मारुतश्चोपशाम्यति ॥
न च स्याद्गृध्रसीवातः पादयोः स्फुटनं न च । न सिरास्नायुसंकोचः पादाभ्यङ्गेन पाद्योः ॥
(च.सू. 5/90-92)

Daily practice of Padabhyanga helps to remove dryness, stiffness, roughness,



tiredness and numbness instantly. It also makes the skin smooth, provides strength and stability to feet, improves the vision, and pacifies Vata. It also prevents diseases like Grudhrasi, cracking of foot and stiffness of ligaments and tendons of foot.

**Udvartana (Oil Massage)**

उद्वर्तनं कफहरं मेदसः प्रविलायनम । स्थिरिकरणमऽगानां त्वकप्रसादकरं परम ॥ (अ.ह.सू. 2/15)

Udvartana mitigates Kapha, liquefies the fat, produce stability of the body parts and excellence of the skin.

उद्वर्तनं कफहरं कफमेदोविलापनम् । स्थिरिकरणमऽगानां त्वकप्रसादकरं परम ॥ (सु.चि. 24/51)

Udvartana mitigates aggravation of Vata and Kapha, liquefies the fats, stability of the body and cleanses the skin.

स्नान—

दीपनं वृष्य मायुष्यं स्नानमूर्जाबलप्रदम । कण्डूमलश्रम् स्वेदतन्द्रातृऽदाहपाप्यजित ॥ (अ.ह.सू. 2/16)
दौर्गन्ध्यं गौरवं तन्द्रां कण्डूं मलमरोचकम् । स्वेदबीभत्सतां हन्ति शरीरपरिमार्जनम् ॥
पवित्रं वृष्यमायुष्यं श्रमस्वेदमलापहम् । शरीरबलसन्धानं स्नानमोजस्करं परम् ॥ (च.सू. 5/93-94)

After doing massage, if one takes bath person cures the bad odour, heaviness of body, drowsiness, itching, impurities, anorexia and bad smell of sweat. Bathing is purifying, aphrodisiac, life promoting, destroys the fatigue, sweat, dirt, strength, compactness and Ojus at same time cures tiredness, sweat and impurities of body.

अनुलेपन—

सौभाग्यदं वर्णकरं प्रीत्योजोबलवर्धनम । स्वेददौर्गन्ध्य वैवर्ण्य श्रमघ्नमनुलेपन ।

Applying cosmetic powder, paste, oil etc. Which are fragrant on the body is auspicious, increases complexion, affection, Ojus, strength, removes sweat and bad odour, discoloration, tiredness.

मुखलेपन—

मुखालेपादृढ़ चक्षुः पीनगण्डं तथाऽननम । अव्यऽगपिडकं कान्तं भवत्यम्बुज सन्निभम ।
(सु.चि. २४/६५)

Apply cosmetic powder on face gives strength to face, eye, fullness and prominence to checks and face, make face free of color patches and eruptions and increase Kanti of face like, lotus flower.

**Ayurveda Medicine as Cosmetics**

Charak Samhita classified cosmetics drugs as Varnya, Kustagna, Kandugna, Bayasthapak, Udardaprasamana, etc. Many lepam (poultice) Pradeha, Upnaha, Anjana,

oil are described in Susruta Samhita and Astanga Hrudaya in the context of Twakaroga. The very common medicine are- Kungkumadi Lepam, Dashanga Lepam, Chandanadi Lepam, Dasanasamskar Churna, Kukummadi Taila, Nilibringaraja Taila, Himasagar Taila, etc are very well established medicine in Ayurveda. Sesame Oil is used as a base in many oil in Ayurveda. It contains Lignan compounds called Sesamin and Sesamolin, which are biologically active. These compounds enhance oxidative stability of the oil. They have potential to be used as anti oxidant compounds as well as having a moisturizing effect.

Buttermilk and goat's milk powders traditionally used in Indian face mask preparations have soothing and emollient properties. They also contain vitamin A, $B_6$, $B_{12}$ and E. They would make beneficial alternatives to chemical bases and emollients.

Shikakai is a traditional herb used in hair shampoos. The material is extracted from the Shikakai pods and Shikakai nuts of the Acacia Concinna shrub. The pods are rich in Saponins and make a mild detergenent, which has a neutral pH.

Aritha powder, extracted from Soapnuts (Sapindus Pericarp) also contains Saponins, which acts as a foaming agent. It was used as soap in Ayurvedic tradition. The oils also maintain integrity of cosmetic products and could be used as a base instead of petroleum and plastic derivatives. There are significant evidences already generated for Ayurveda skin care in vitiligo, psoriasis, eczema and acne vulgaris.

**The Ayurvedic cosmetics may group under**

1. Cosmetics for enhancing the appearance of facial skin
2. Cosmetics for hair growth and care
3. Cosmetics for skin care, especially in teenager (acne, pimples and sustaining)
4. Shampoos, soaps, powders and perfumery, etc.
5. Miscellaneous products

# CHAPTER 3 Rathricharya (रात्रिचर्या)

**Sandhyavarja Karma (action to be avoided in the evening)**

एतानिपञ्चकर्माणिसन्ध्यायांवर्जयेदबुधः । आहारंमैथुनंनिद्रांसंपाठंगतिमध्वनि ॥
भोजनाज्जायतेव्याधिमैथुनाग्दर्भविकृतिः । निद्रयानिःस्वतापाठादायुर्हानिर्गतेर्भयम् ॥

(भा.प्र. दिनचर्यादि प्रकरण 5/261-262)

Intake of food, sexual intercourse, sleep, study and walking long distance, these five activities should be avoided in the evening. Intake of food in evening produces diseases, sexual intercourse leads to deformity in fetus, sleeping in evening to loss wealth, reading leads to loss of life span and long walk leads to fear.

**Ratricharya (The regimen to be followed during night)**

**Jyotsna (moonlight)**

ज्योत्स्नाशीतास्मरानन्दप्रदातृटपित्तदाहहत । ततोहीनगुणः कुर्यादवश्योऽनिलंकफम ॥
तमोभयावहंमोहदिऽमोहजनकंभवेत । पित्तहृत्कफहत्कामवर्धनं क्ममकृच्चतत ॥

(भा.प्र. दिनचर्यादि प्रकरण 5/263-264)

Jyotsna (moonlight) is cold in effects, it enhances sexual desire, mitigates thirst, Pitta and burning sensation. Mist of the night is slightly less effect than moon light, aggravates Vata and Kapha. Darkness gives rise to fear, delusion, confusion in recognizing directions, mitigates Kapha, enhances sexual desire causes exhaustion.

**Ratri Bhojana**

रात्रौचभोजनंकुर्यात्प्रथमप्रहरान्तरे । किञ्चिदूनंसमश्नीयाद्दुर्जरम्तत्रवर्जयेत ॥

(भा.प्र. दिनचर्यादि प्रकरण 5/265)

Meals should be taken within the first Prahara (three hours) of the night be slightly less in quantity than the forenoon and devoid of things difficult for digestion.

**Bhojanottara Karma- Activities after taken food**

सायंभुक्त्वालघुहितंसमाहितमनाः शुचि । शास्तारमनुसंस्मृत्यस्वशय्यांचाथसंविशेथ ॥।
देशेशुचावनाकिर्णेद्विन्नाप्तप्रिचारकः । युक्तोपधानंस्वास्तीर्णविस्तीर्णाविषमंसुखम ॥
जानुतुल्यंमृदुशुभंसेवेतशयनासनम । प्राग्दक्षिणशिराः पादावकुर्वाणोगुरुनप्रति ॥
पूर्वापरनिशाभागेधर्ममेवानुचिन्तयेत ॥ (अ.सं.सू. 3/45-46)

Food taken in night easily digestible and wholesome, one should go to bed, with absorbed mind, being clean and after praying gods, one should lie down on his own bed which is in a clean place without many persons and with only two or three trustworthy servants, bed should be with appropriate broad pillow, comfortable and not uneven. Bed and seat should be of the height of one's knee, soft and auspicious. One should sleep with head towards east or south and without directing the legs towards teachers or elders. One should always be engaged in Dharma during the first and last parts of night.

**Use of Anjana in Ratricharya**

चक्षुस्तेजोमयंतस्यविशेषात श्लेष्मतोभयम । योजयेत्सप्तरात्रेतस्मात्स्रावणार्थं ॥ (अ.हृ.सू. 2/5)
पञ्चरात्रे अष्टारात्रे यास्रावणार्थंरसञ्जनम । (च.सू. 5/16)

Eye is full of Tejas and high risk of troubles especially from Kapha, hence Rasajana should be used once a week, to drain Kapha. According to Charakacharya Rasajana is applied once in five or eight days at night for lacrymation of eyes.

**Use of Pratimarsha Nasya in Ratricharya**

कटुतैलादिनस्यार्थेनित्याभ्यासेनयोजयेत् । प्रातः श्लेष्माणिमध्याङ्गेपित्तेसायंसमीरणे ॥
सुगन्धवदनाः स्निग्धनिः स्वनाविमलेन्द्रियाः । निर्वलीपलितव्यङ्गभवेयुर्नस्यशीलिनः ॥ (यो.र. 35)

The nasya should be performed daily with Katu Tila etc. oils in case Kapha predominance, it should be done in the morning, in Pitta after noon, in Vata evenings should be preferred.

The daily practice of Nasya imparts, Sugandhita to body, Snigdhata to speech, cleans the body organs and prevents Vali, Palitya i.e. ageing and graying of hair etc.

प्रतिमर्शश्चतुर्दशसु कालेषूपादेयः, तद्यथा–तल्पोत्थितेन, प्रक्षालितदन्तेन, गृहाग्निर्गच्छता, व्यायामव्यवायाध्वपरिश्रान्तेन, मूत्रोच्चारकवलाञ्जनान्ते, भुक्तवता छर्दितवता, दिवास्वप्नोत्थितेन, सायं चेति ॥
(सु.चि. 40/49)

सायंचासेवितः सुखनिद्राप्रबोध्यंचेति ॥ (सु.चि. 40/50)

Used in evening it makes sleep and awaking easy.

मध्याह्नेसन्ध्ययोरात्रावर्धरात्रेचतुष्पथम । नसेवेतनशर्वर्यावृक्षचैत्यान्न चत्वरम ।
सूनाटवीशून्यगृहश्मशानानिदिवाऽपिना ॥ (अ.स.सू. 3/45-46)

During midday, dusk and dawn, night and midnight, one should not stay at a place of crossing of four roads; during night under trees in Caitya and Catvara (meeting of three roads), during day time also one is prohibited to visit slaughtering place in forest, deserted house and crematorium.



**मैथून (Sexual intercourse)**

**Physiological Desire for Sex**

शरिरेजायतेनित्यंदेहिनांसुरतस्पृहा । अव्यवायान्मेहमेदोवृद्धिः शिथिलतातनोः ॥
(यो.र. रात्रिचर्या 4, भा.प्र. 5/266)

Desire for Sexual act is a physiological phenomenon in every living creature, non indulgence in the natural activity leads to causation of Prameha, Medovruddhi and derangement of body tissues.

बालेतिगीयतेनारीयावद्वर्षाणिषोडश । ततस्तुतरुणी ज्ञेयाद्वात्रिंशद्वत्सरावधि ।
तदूर्ध्वंमधिरुढास्यात्पञ्चाशद्वत्सरावधि । वृद्धातत्परतो ज्ञेयासुरतोत्सववर्जिता ॥
(यो.र. रात्रिचर्या 9,10 भा.प्र. 5/267)

Female persons are categorized into four types-

Upto sixteen years of age- Bala

Above sixteen years to thirty two years- Taruni

Thirty two years to fifty years of age- Atirudha or Proudha

Above fifty years of age- Vruddha.

One should not indulge in sex with Vruddha women, who are devoid of any sexual drive as such they should be avoided.

निदाघशरदोर्बालाहितावियिणेमता । तरुणीशीतेसमयेप्रौढावर्षावसन्तयोः ॥
(यो.र. रात्रिचर्या 11, भा.प्र. 5/269)

Sex desired person in summer can indulge in sexual intercourse with a Bala, in winter with Taruni and in Varsha and Vasanta Rutu with prouddha these practices are stated as Hitakara or beneficial.

नित्यंबालासेव्यमानानित्यंवर्धयेतबलम । तरुणी ह्रासयेच्छक्तिं प्रौढोभ्दावयतेजराम ॥
(यो.र. रात्रिचर्या 12, भा.प्र. 5/270)

If one indulge in sex with a Bala daily his strength increases, sex with Taruni his power declines and sex with Proudha aging process set quickly and he becomes Vruddha early.

**Factor which enhance strength**

सद्योमांसं नवान्नं चाबलास्त्री क्षीरभोजनम । घृतमुष्णोदकस्नानंसद्यः प्राणकराणिषट ॥
(यो.र. रात्रिचर्या 13, भा.प्र. 5/271)

Fresh meat, new rice, Bala Stree, milky food, ghee and warm water or hot water bath these six factors increases the strength.

**Factor which reduce strength**

पूतिमांसंस्त्रियोवृद्धाबालार्कस्तरुणंदधि । प्रभातेमैथुनंनिद्रासद्यः प्राणहरणि ॥

(यो.र. रात्रिचर्या 14, भा.प्र. 5/272)

Fermented food, aged woman, half formed curds, sex in early hours of the day and sleeping in early hours of a day decreases the strength of an individual.

वृद्धोऽपितरुणींगत्वातरुणत्वमवाप्नुयात । वयोधिकांस्त्रियंगत्वातरुणः स्थ्विरयते ॥

(यो.र. रात्रिचर्या 15, भा.प्र. 5/273)

If aged person indulge in sex with Taruni (i.e. 16-32 years age) daily, he becomes younger, on the contrary if a person engages sexually with an old woman he becomes weaker and weaker.

**Benefits of sexual intercourse**

आयुष्मन्तोमन्दजरावपुर्वर्णबलान्विताः सिश्नोपचितमांसाश्चबवन्तिस्त्रीषुसंयताः ॥

(यो.र. रात्रिचर्या 16, भा.प्र. 5/274)

If person follow the rules and methods with respect in his routine sexual activities. His life span increases, aging process also become normal in accordance with age, color, complexion and strength of the body is maintained and his body physique etc. is also maintained well.

**Sexual intercourse in different seasons**

सेवेतकामतः कामंतृप्तोवाजीकृतांहिमेप्रकामंतुनिषेवेतमैथुनंशिशिरागमे ॥

(यो.र. रात्रिचर्या 17, भा.प्र. 5/275)

In Hemanta Rutu one can indulge in sexual pleasure as per the individual's desire and satisfaction duly taking suitable Vajikarana drugs. In Sisira Rutu also one can follow the same, however in Vasanta and Sarad Rutu one can have once in three days; and in Varsha and Grishma once in fifteen days, one can indulge in sexual intercourse.

त्र्यहाद्वसन्तशरदोः पक्षाद्वर्षानिदाघयोः । शीतेरात्रौग्रीष्मेवसन्तेतुदिवानिशि॥

(यो.र. रात्रिचर्या 18, भा.प्र. 5/276)

Timing in accordance with seasons,

Sheetakala (Winter) - Night Time

Grishma (summer) - Day Time

Vasanta (spring) - Day or Night Time

Varsha (rainy season) - Megha Garjana (thunder)

Sarad (autum) - One feels the sexual desire, one should indulge in sexual activity.



**Time for sexual intercourse**

वर्षाषुवारिरुद्धवानेशरत्सुसरसः स्मरः । त्रिभिस्त्रिभिरहोभिर्हिसमेयात्प्रमदांनरः ॥

(यो.र. रात्रिचर्या 19, भा.प्र. 5/278)

According to some other opinion; a wise man should have sexual encounter once in the three days, except in Grishma (summer), where in one can indulge in fifteen days.

सर्वेष्वृतुषुधर्मेषुपक्षात्पक्षादव्रजेद्बुधः । आयुःक्षयभयाद्विद्वान्नाह्नि सेवेतकामिनीम ॥ (यो.र. रात्रिचर्या 20)

अवशोयदिसेवैततदाग्रीष्मवसन्तयोः । (यो.र. रात्रिचर्या 20)

Restriction on sex during day time, a wise man should not indulge in sexual intercourse during day time as it may cause Ayukshaya i.e reduction in life span. If one is not self-controlled person, such person should have sex in day time, only in Grishma and Vasanta Rutu only.

**Unsuitable time for sexual intercourse**

नोपेयात्पुरुषोनारींसंध्ययोर्नचपर्वसु । गोसर्गेचार्धरात्रेचतथासंध्यादिनेऽपिच ॥

(यो.र. रात्रिचर्या 22, भा.प्र. 5/279)

Indulgence in sexual intercourse during early hours of morning and evening time, Parvadina i.e. Amavasya, Ekadasi, Samkrantri, Purnima etc; Gosarga i.e. during the time, when cows moves out to forest etc for eating, midnight, afternoon etc. is prohibited

**Place for sexual intercourse**

कल्पीयोदग्रवयसोवाजीकरणसेविनः । सर्वेष्वृतुष्वहरहर्व्यवायोन्नेवार्यते ॥

घृतक्षीराशनोनिर्भीर्निर्व्याधिर्नित्यगोयुवा विहारंभार्ययाकुर्याद्विशेऽतिशयसंवृते ॥ (यो.र. रात्रिचर्या 23-24)

Person who had consumed food that contained ghee, milk, who is un-fearful, healthy and young should enjoy sex with his woman at a lonely, confidential place, well decorated, scented and where in soft music and songs are audible. In such beautiful setting in e should indulge in sex with his beloved woman.

**Prohibited place for sexual intercourse-**

रम्ये श्राव्याङ्गनागारेसुगन्धिसुखमारुते । देशे गुरुजनासन्नेऽनिभृतेऽतित्रपाकरे॥

श्रूयमाणेव्यथाहेतुवचनेचरमेतन। (यो.र. रात्रिचर्या 25)

One should not participate in sexual intercourse in a place, which near to his teachers residence or in a place which is quite open, or in place where weeping sound are audible. All such places should be avoided for sexual pleasures.

**Preparation before to sexual intercourse**

स्नातश्चन्दनलिप्ताङ्गः सुगन्धसुमनोन्वितः ॥ भुक्तवृष्यः सुवसनः सुवेषः समलङ्कृतः।

ताम्बूलवदनः पत्र्यामनुरक्तोऽधिकस्मरः ॥ पुत्रार्थीपुरुषोनारीमुपेयाच्छयनेशुभे ॥

(यो.र. रात्रिचर्या 26-27, भा.प्र. 5/282)

Male person who well bathed, scented with sandal wood etc, well composed and happy, who had taken nutritive food, well dressed, attractive, who is chewing Tambula, who is in deep love and lust, such person is desiring a male child, should indulge in sexual intercourse with his wife in a comfortable bed.

**Unfit for sexual intercourse**

अत्याशितोऽधृतिः क्षुद्वान्सव्यथाङ्गः पिपासितः। बालोवृद्धोऽन्यवेगार्तस्त्यजेदोगीचमैथुनम ॥

(यो.र. रात्रिचर्या 28, भा.प्र. 5/284)

A person who had heavy meals, who is fearful, hungry, who has no desire for love, who is incompatible with pain etc. thirsty, children aged and who passes urine etc should not indulge in sexual intercourse.

**Eligible female for sexual intercourse**

भार्यातुल्यागुणोपेतांतुल्यशीलांकुलोद्भवाम । अभिकामोऽभिकामंच हृष्टो हृष्टामलङ्कृताम ।
सेवेत प्रमदां युक्त्या वाजीकरणबृंहितः ॥ (यो.र. रात्रिचर्या 29-30, भा.प्र. 5/285)

An individual should indulge in sexual activity with a woman, who is possessing similar qualities, character, good family (Kula), having sexual desire, mentally composed and wearing good ornaments. He should take Vajikarana i.e. aphrodisiacs and Bruhmana i.e. tonics well before indulging in sexual intercourse.

**Un-eligible women for sexual intercourse**

रजस्वलामकामांचमलिनामप्रियांतथा। वर्णवृद्धांवयोवृद्धांतथाव्याधिप्रपीडितम ॥
हिनाङ्गिंगर्भिणीं द्वेष्यां योनिरोगसमन्विताम् । सगोत्रांगुरुपत्नींचतथाप्रव्राजतामपि ॥
नाभिगच्छेत्ततोनारींभूरिवैगुण्यशङ्कया । (यो.र.रात्रिचर्या 34-35, भा.प्र. 5/286-288)

Woman who are not eligible for sexual intercourse, Rajasvala i.e. menstruating woman, no sexual desire, dirty, ugly, belonging to higher caste, diseased, ill developed, belonging to his Gotra, woman of Guru, Nun etc.

**Post sexual diets**

स्नानानुलेपनहिमानिलखण्डखाद्यशीताम्बुदुग्धरसयूषसुराप्रसनाः ।
सेवेतचानुशयनंविरतौरतस्यतस्याऐवमाशुवयुषः पुनरेतिधाम ॥ (यो.र. रात्रिचर्या 45)

After completion of sexual inter course, one should have bath, application of sandal wood paste etc. He should expose to cool air, consume sweets, cold drinks, mutton soup and Sura and should be happy. All these measures prevent loss of strength.



स्नानंसशर्करं क्षीरं भक्ष्यमेक्षवसंस्कृतम । ततोमांसरसः स्वप्नोव्यवायान्तेहिताअमी ॥

(यो.र.रात्रिचर्या 46, भा.प्र. 5/298)

After sexual intercourse, one should take refreshing bath, sugar added milk, sweets, mutton soup. Then one should go for sleep.

**Effects of excessive sex**

अतिव्यवायाज्जयन्तेरोगश्चाऽऽक्षेपकाद्यः । शूलकासज्वरश्वासकार्श्यपाण्डवामयाक्षयाः ॥

(यो.र.रात्रिचर्या 47, भा.प्र. 5/299)

Over indulgence in sexual intercourse causes Akshepaka, Sula, Kasa, Jwara, Shwasa, Karshyata and Panduroga etc.

**Shayanavidhi According to Bhavamishra** ( भा.प्र. दिनचर्या प्रकरण 184-188 )

भुक्तोपविशत स्तन्द्रा शयानस्य तु पुष्टता । आयुश्चक्रमाणस्य मृत्युर्धावति धावतः ॥
श्वासनष्टौ सम्मुत्तानस्तान द्विःपार्श्वे तु दक्षिणे । ततस्तद द्विगुणान्वामे पाश्चत्स्वप्याद्यथासुखम ॥

(भा.प्र. दिनचर्या प्रकरण 184-185)

Simply sitting after food produces stupor and sleeping lads to plumpiness of the body but short and slow walking leads to long life, run a person after meals cause the death.

After meals the person may lie down for a period of eight breathing with face up, for a period of twice that number on right side, for double that time on his left side, afterwards as found convenient.

वामादिशायामनलो नाभेरुध्वैऽपि जन्तूनाम । तस्मातु वामपार्श्वे शयीत भुक्तप्रपाकार्थम ॥
त्रिदोषशमनी खटवा तूली वातकफावहा । भूशय्या बृंहणी काष्ठपटटी तु वातला ॥
भूशय्या वातलाऽतीवरुक्षा पित्तास्त्रनाशिनी । (भा.प्र. दिनचर्या प्रकरण 186-187)

Agni is present on the left side, above the umbilicus; hence the person after taken meals should lie down on his left side for better digestion.

Sleeping on a cot mitigates all the three Doshas, on a swing mitigates Vata and Kapha, on the ground is stoutening the body and aphrodisiac and on wooden planks causes increase Vata, Dryness and mitigates the Pitta and Rakta.

सुशय्यारायनं हृद्यं पुष्टिनिद्राधृतिप्रदम ॥ श्रमानिलहरं वृष्यं विपरितमतोऽन्यथा ॥

(भा.प्र. दिनचर्या प्रकरण 188)

Sleeping on a comfortable bed is pleasing, nourishes the body, good sleep and stability, relives fatigue, aggravation of Vata and is aphrodisiac. Sleeping on uncomfortable bed result opposite to effects.

# CHAPTER 4 Rutucharya (Seasonal Regimen)

## Importance of Rutucharya

ऋतुष्वेषु य एतैस्तु विधिभिर्वर्तते नरः । दोषानृतुकृतान्नैव लभते स कदाचन ॥ (यो.र. 2)

If one follow the regimens prescribed under each and every Rutu (season) such person is never inflicted with seasonal diseases or disorders and he always remains as a healthy person.

चयकोपशमा यस्मिन्दोषां सम्भवन्ति हि । ऋतुषटकं तदाख्यातं रवे राशिषु संक्रमात ॥

(भा.प्र. दिनचर्यादि प्रकरण 309)

The movement of sun from one Rasi to the other is known as Rutu cycle of six seasons. Chaya (mild increase), Kopa (more increase) and Sama (decrease to normal) of Doshas occur in this cycle.

तस्याशिताद्यादाहारद्बलं वर्णश्च वर्धते । यस्यर्तुसात्म्यं विदितं चेष्टाहारव्यपाश्रयम ॥ (च.सू. 6/3)

One who knows the suitable diet and regimens for every season and practices accordingly are enhancing the strength and luster.

ऋतावृतौयएतेनविधिनावर्ततेनरः । घोरानृतुकृतान रोगान्नान्योति सकदाचन ॥ (सु.उ. 64/55)

The person who adheres to these regimens in and out of seasons does not become a victim of dreadful diseases caused by season.

## Rutu Presentation as per Different Acharyas

इह खलु संवत्सरं षडङ्गमृतुविभागेन विद्यात । तत्रादित्यस्योदगयनमादानं च त्रीनृतून्छिशिरादीन ग्रीष्मान्तान व्यवस्येत, वर्षादीन पुनर्हेमन्तान्तान दक्षिणायनं विसर्ग ॥ (च.सू. 6/3)

The year is divided into six parts according to seasons. The northward movement of the sun and its act of dehydration brings about three seasons beginning from late winter to summer. The southward movement of sun and its act of hydration gives rise to the other three seasons beginning with the rainy to early winter.

मासैद्विसंख्यैर्माघाद्यैः क्रमात षडतवः स्मृताः । शिशिरोऽथ वसन्तश्च ग्रीष्मो वर्षाशरद्धिमाः ॥
शिशिराद्यास्त्रिभिस्तैस्तु विद्याद्यनमुत्तरम । आदानं च, तदादत्ते नृणां प्रतिदिनं बलम ॥

(अ.ह.सू. 3/1-2)

With every two Masa (month) commencing with Magha, are the six Rutus Sisira,





Vasanta, Grishma, Varsha, Sharada and Hemanta successively; the three commencing with Sisira, Vasanta and Grishma form the Uttarayana, also known as Adana Kala because the sun takes away the strength of the people daily.

तत्र माघाद्यो द्वादश मासाः, द्विमासिकमृतुं कृत्वा षडऋतवो भवन्तिः ते शिशिरवसन्त-ग्रीष्मवर्षाशरद्धएमन्ताः तेशां तपस्तपस्यौ शिशिरः, मधुमाधवौ वसन्तः शुचिशुक्रौ ग्रीष्मः, नभोनभस्यौ वर्षाः, इषोर्जौ शरत, सहःसहस्यौ हेमन्त इति ॥ (सु.सू. 6/6)

ग्रीष्मो मेशरुशौ प्रोक्तौ पावडमिथुन कर्कयो । सिहकन्ये स्मृता वर्षास्तुलावृश्चिकयोः शरत ।
धनुर्ग्राहौ च हेमन्तो वसन्तः कुम्भमीनयोः ॥ (शा.सं. 2/25-26)

शिशिरः पुष्पसमयो ग्रीष्मो वर्षाशरद्धिमा । माघादिमासयुग्म स्युऋतवः षट क्रमादमी ॥

(भा.प्र. 5/312)

| Ayana | Seasons | Months according to Hindu calendar | Month according to English calendar | Rasi of Sun | Predominant rasa in that Seasons |
|---|---|---|---|---|---|
| Uttarayana (northern solastice) Adana Kala (debilitating period) | Sisira Late Winter | Magha/Tapa Phalguna/Tapasya | Mid January-Mid March | Makara Kumbha | Tikta |
| | Vasanta Spring | Caitra/Madhu Vaishakha/Madhava | Mid March-Mid May | Mina Mesha | Kashaya |
| | Grishma Summer | Jyestha/Suchi Asadha/Sukra | Mid May-Mid July | Vrushabha Mithuna | Katu |
| Dakshinay-ana (southe-rn solastice) Visarga Kala (strength period) | Varsha Rainy | Shravana/Nabha Bhadrapada/ Nabhasya | Mid July-Mid September | Karkataka Simha | Amla |
| | Sharad Autumn | Asvina /Isha Kartika /Urja | Mid September Mid November | Kanya Tula | Lavana |
| | Hemanta Winter | Margasira/Saha Pausha/Sahasya | Mid November Mid January | Vruscika Dhanu | Madhura |

## Adana Kala (Uttarayana)

तस्मिन ह्यत्यर्थतीक्ष्णोष्णरुक्षा मार्गस्वभावतः । आदित्यपवनाः सौम्यान क्षपयन्ति गुणान भुवः ।
तिक्तः कषायः कटुको बलिनोऽत्र रसा क्रमात । तस्मादादानमाग्नेयम् ॥ (अ.ह.सू. 3/3)

आदानं पुनराग्नेयं तावेतावर्कवायू सोमश्च कालास्वभावमार्गपरिगृहीताः कालर्तुरसदोष देहबलनिर्वृत्तिप्रत्ययभूताः समुपदिश्यन्ते ॥ (च.सू. 6/5)

Sun and Wind become very strong and dry during this Uttarayana and take away all the cooling qualities of the earth: Tikta, Kashaya and Katu tastes are more powerful respectively in the three REtus, hence this Adana Kala is Agneya predominantly.

### Effect of Adana Kala on Body

तत्र रविर्भाभिराददानो जगतः स्नेहं वायवस्तीव्ररुक्षाश्चोपशोशयन्तः शिशिर वसन्तग्रीष्मेषु यथाक्रमं रौक्ष्यमुत्पाद्यन्तो रुक्षान रसांस्तिक्तकषायकटुकांश्चभिवर्धयन्तो नृणां दौर्बल्यमावहन्ति ॥ (च.सू. 6/6)

During the period of Adana Kala not only the sun with its rays, but also winds their sharp velocity and dryness, absorb the moisture from the earth. Winds progressively bring about dryness in the atmosphere during the three seasons of periods, viz Sisira, Vasanta and Grishma , which enhance the Tikta, Kashaya, Katu tastes respectively, all having dryness effects and as result, human being also become weak.

### Visarga Kala (Dakshinayana)

.....ऋतवो दक्षिणायनम । वर्षाद्यो विसर्गश्च यव्दलं विसृजत्ययम ॥
सौम्यत्वादत्र सोमो हि बलवान हियते रविः । मेघवृष्ट्यनिलैः शीतैः शान्ततापे महितले ।
स्निग्धश्चेहाम्ललवणमधुरा बलिनो रसाः ॥ (अ.ह.सू. 3/4-6)

The three Rutus commencing with Varsha, Sharad and Hemanta from the Dakshinayana (southern solstice) and Visarga Kala the period in which the sun releases the strength of peoples; because the moon is more powerful and sun loses his strength, the earth becomes cooled of the and heat of sunlight by the effect of clouds, rain and cold wind, unctuous tastes- Amla, Lavana and Madhura are powerful respectively during this period.

### Effect of Visarga Kala on Body

वर्षाशरद्धेमन्तेशु तु दक्षिणाभिमुखेऽर्के कालमार्गमेघवातवर्षाभिहतप्रतापे, शसिनि चाव्याहतबले, माहेन्द्रसलिलप्रशान्तसन्तापे जगति, अरुक्षा रसाः प्रवर्धन्तेऽम्ललवणमधुरा यथाक्रमं तत्र बलमुपचीयते नृणामिति ॥ (च.सू. 6/7)

During the Varsha, Sharad and Hemanta, the sun moves towards the south, and its power of heating is slackened by various factors, viz. the time, course, storm and rain but the moon is not affected. The earth is relieved of its heat by the rain causes unctuousness in the body grow during the Varsha, Sharad and Hemanta respectively. As a result of all these, human beings also progressively grow in strength during the period of Visarga Kala.



### Attribution of Adana Kala and Visarga Kala

| Adana Kala | Visarga Kala |
|---|---|
| Uttarayana-Agneya | Dakshinayan-Soumya |
| Agneya-Agni Guna Pradhana | Soumya-Sheeta Guna Pradhana |
| Vayu-Ati-ruksha | Vayu-Not so Ruksha |
| Moon- Less Bala | Moon- Strong Bala |
| Sun-Strong Bala | Sun-Less Bala |
| Sun dries away Things | Moon Nourishes Things |
| Ruksha,Tikta, Kashaya, Katu | Snigdha, Amala, Madhura, Lavan |
| Gruadully Bala Lessens | Gradully Bala Increases |

### Strength of the body in Six Rutus

शीतेऽग्र्यं वृष्टिघर्मेऽल्पं बलं मध्यं तु शेषयोः । (अ.ह.सू. 3/7)

आदावन्ते च दौर्बल्यं विसर्गादानयोर्नृणाम । मध्ये मध्यबलं, त्वन्ते श्रेष्ठमग्रे च निर्दिशेत ॥ (च.सू. 6/8)

In Sitakala (Hemanta and Sisira) the strength of the people will be maximum, during Varsha and Grishma Rutu it will be poor and remaining Vasanta and Sharad Rutu, and it will be medium.

### Status of Bala during Year

| Uttarayana | | | Dakshinayana | | |
|---|---|---|---|---|---|
| Sisira | Vasanta | Grishma | Varsha | Sharad | Hemanta |
| Aadi<br>Uttam | Madhya<br>Madhyam | Anta<br>Avara | Aadi<br>Avara | Madhya<br>Madhyam | Anta<br>Uttam |

### Sanchaya-Prakopa-Prashamana of Dosha according to Rutu

चयप्रकोपापशंमा वायोर्ग्रीष्मदिषु त्रिषु । वर्षाऽऽदिषु च पित्तस्य श्लेष्मण्: शिशिरादिषु ॥
(भा.प्र. दिनचर्या प्रकरण 319)

| Dosha | Sanchaya (Accumulation) | Prakopa (Vitiation ) | Shamana (Pacification) |
|---|---|---|---|
| Vata | Greeshma | Varsha | Sharad |
| Pitta | Varsha | Sharad | Hemanta |
| Kapha | Sisira | Vasanta | Greeshma |

चीयते लघु रुक्षाभिरोषधीभिः समीरणः । तद्विधस्तद्विधे देहे कालस्यौष्ण्यान्न कुप्यति ।
(भा.प्र. दिनचर्या प्रकरण 320)

Vata undergoes Sanchaya in Grishma Rutu due to predominance of Laghu and Ruksha properties in foods and in the bodies of similar qualities, but does not undergo Prakopa due to the heat of the season.

अद्भिरम्लविपाकाभिरोषधीमिश्च तादृशम । पित्तं याति चयं कोपं न तु कालस्य शैत्यतः ॥

(भा.प्र. दिनचर्या प्रकरण 321)

Pitta undergoes mild increase in Varsha Rutu because of water and food coming sour at the end of digestion but does not undergo great increase due to cold of the season.

चीयते स्निग्धशीताभिरुदकौषधिभिः कफः । तुल्ये च काले देहे च स्वकन्नत्वाना प्रकुप्यति ॥

(भा.प्र. दिनचर्या प्रकरण 322)

Kapha undergoes mild increase in Sisira Rutu because of Snigdha and Sheeta predominance in water and foods and in the bodies of men similar qualities but does not undergo great increase because of its solidification.

हिमे याति शमं पित्तं वायुः श्लेष्मा च चीयते । स वायुः शिशिरे कोपं यात्येवोपचित्तः कफ ॥
हेमन्ते सञ्चितः श्लेष्मा शिशिरे त्वतिचीयते । शीतस्निग्धगुरुद्रव्यैः शैत्यस्कन्नो न कुप्यति ॥

(भा.प्र. दिनचर्या प्रकरण 323-324)

During Hemanta Rutu Pitta becomes decreased to normal while Vata and Kapha increase slightly, that Vata increase greatly in Sisira whereas Kapha undergo mild decrease. Kapha which undergoes mild increase in Hemanta increase further in Sisira Rutu due ingestion of foods of cold, Snigdha and Guru qualities but still does not undergo Parkopa since it becomes solidified by cold. This is the nature of seasons and relation of Doshas.

इति कालस्वभावोऽयमाहारादिवशात्पुन । चयादीन यान्ति सद्योऽपि दोषाःकाले विशेषतः ॥

(भा.प्र. दिनचर्या प्रकरण 325)

Doshas undergo Caya, Prakopa and Shamana immediately also, by the effect of food and especially so in the seasons.

**Dosha Shodhana in Rutu Charya**

हरेव्दसन्ते श्लेष्माणं पित्तं शरदि निर्हरेत । वर्षासु शमयेद्वायं प्राग्विकारसमुच्छयात । (सु.सू. 6/38)

One should eliminate Kapha in Vasanta Rutu, Pitta in Sharad Rutu, and Vayu in Varsha Rutu, prior to the emergence of disorders.

**Hemanata Rutu (Winter season) (Ref. Cha.Su. 6/9-18, Bha.Pra. 5/329, Su.Su. 6/22-23)**

बलिनः शीतसंरोधाध्हेमन्ते प्रबलोऽनलः । भवत्यल्पेन्धनो भातुन स पचेद्वायुनेरितः ॥
अतो हिमेऽस्मिन्सेवेत स्वाद्वम्ललवणान्नसान । (अ.ह.सू. 3/7-8)



In Hemanta Rutu, the people are strong; the Anala (digestive activity) becomes powerful because it gets obstructed by the cold atmosphere. It begins to digest the tissues supported by Vayu(Vata); so in this Hemanta Rutu, use of Madhura, Amla, Lavan Rasa Ahara should be made for eat.

दैर्घ्यान्निशानामेतर्हि प्रातरेव बुभुक्षितः । अवश्यकार्य सम्भाव्य यथोक्तं शीलयेदनु ॥
वातन्यतैलैरभ्यङ्गं मूर्ध्नि तैलं विमर्दनम । नियुद्धं कुशलैः सार्ध पादाघातं च युक्तितः ॥

(अ.ह.सू. 3/9-10)

As the night are longer, persons feel hungry in the early morning itself, so after cleansing of the body, they should resort to the regimen as enumerated in Abhyanga procedure with medicated oil with Vata alleviating property; Murdhi Taila bathing the head with more of oil, mild massaging of the body, wrestling with the skilled to half of his strength and judicious trampling of body.

कषायापहृतस्नेहस्ततः स्नातो यथाविधि । कुङ्कुमेन सदर्पेण प्रदिग्धोऽगुरुधूपितः ।
रसान स्निग्धान पलं पुष्टं गौडमच्छसुरां सुराम । गोधुउमपिष्टमाषेक्षुक्षीरोत्थविकृतीः शुभाः ।
नवमन्नं वसां तैलं, शौचकार्ये सुखोदकम । प्रावाराजिनकौशेयप्रवेणीकौचवास्तृतम ॥
उष्णस्वभावैर्लघुभिः प्रावृतः शयनं भजेत । युक्त्याऽर्ककिरणान स्वेदं पादत्राणं च सर्वदा ॥

(अ.ह.सू. 3/11-14)

After the Abhyanga should be removed by washing with Kashaya decoctions, powder etc. and bathing; then fine paste or powder of Kumkuma and Darpa should be applied, the body exposed to the fumes of Aguru; meat soup mixed with fats, meat of fattened animals, wine prepared with jiggery supernatant portion of Suras and Sura as such should be made use of food prepared from the flour of Wheat, black gram, products of sugarcane and milk, food prepared from freshly harvested corn, muscles, fat and edible oils should be partaken as food; warm water should be used for cleaning , thick sheet made of cotton, leather, silk, wool or bark of tress which are light in weight should be used during sleep; exposure to sunlight, and fire should be resorted to judiciously; foot wear should be worn always.

पीवरोरुस्तनश्रोण्यः समदः प्रमदाः प्रियाः । हरन्ति शीतमुष्णाङ्गो धूपकुङ्कुममधौवनैः ॥ (अ.ह.सू. 3/15)

Women who have well developed thighs, breasts and buttocks, who are enchanting and exhilarated by the use of fragrant fumes, scents and youthfulness and thus made warm in their body, and who liked, drive away the cold by their embrace etc.

अङ्गारतापसन्तप्तगर्भभूवेश्मचारिणः । शीतपारुश्यजनितो न दिषो जातु जायते ॥ (अ.ह.सू. 3/16)

Persons who spend their time residing in houses kept warm by fire, in inner most apartment encircled with others or in underground chambers, will not be affected by the disorders due to cold and dryness.

**Sisira Rutu (Late Winter)**

References - Cha.Su.6/19-21, Bha. Pra. 5/330, Su.Su. 6/24

अयमेव विधिः कर्य्यः शिशिरेऽपि विशेषतः । तदा हि शीतमधिकं रौक्ष्यं चादानकालजम ॥

(अ.ह.सू. 3/17)

Even in Sisira Rutu the same regimen should be adopted more intensely for during this period cold is severe and dryness more, being the effects of Adana Kala.

**Vasanta Rutu (Spring Season)**

References - Cha.Su.6/122-26, Bha. Pra. 5/330, Su.Su. 6/25-28

कफश्चितो हि शिशिरे वसन्तेऽर्कांशुतापितः । हत्वाऽग्नि कुरुते रोगानतस्तं त्वरया जयेत ॥
तीक्ष्णैर्वमननस्याद्यैर्लघुरुक्षैश्च भोजनैः । व्यायामोद्वर्तनाघातैर्जित्वा श्लेष्माणमुल्बणम ॥
स्नातोऽनुलिप्तः कर्पूरचन्दनागुरुकुङ्कुमैः । पुराणयवगोधूममक्षौद्रजाङ्गलशून्यभुक ।
सहकाररसोन्मिश्रानास्वाद्य प्रियया‌ऽर्पितान । प्रियास्यसङ्गसुरभीन प्रियानेत्रोत्पलाङ्कितान ॥
सौमनस्यकृतो ह्रद्यान्तयस्यैः सहितः पिबेत । निर्गदानासवारिष्टसीधुमार्द्वीकमाधवान ॥
शृङ्गबेराम्बु साराम्बु मध्वम्बु जलदाम्बु च । (अ.ह.सू. 3/18-22)

Kapha which has undergone increase in Sisira Rutu becomes liquefied by the heat of the sun in Vasanta, diminishes the Agni, and gives rise to many diseases hence kapha should be controlled quickly, by resorting to strong Vamana, Nasya and other therapies, and also by food which are easily digestible and Ruksha Ahara, physical exercise, Udvartana, etc. Having thus mitigated the Kapha, the person should take bath, anoint the body with the paste of Karpura, Candan, Aguru and Kumkuma, make use of old Yava, Godhuma, Madhu, meat of animals of desert- like land and meat roasted in fire as food; drink the juice of mango fruit mixed with fragrant substances, in the company of friends, getting it served by the beloved women which has been made more pleasant by the sweet scent of their body and the grace of their lily- like eyes; the drink, thereby producing satisfaction to the mind and heart. He should also make use of unspoiled beverages such as Asava, Arsta, Sidhu, Mardvika, Madhava or water boiled with Srngavera or Sarambu or water mixed with honey, or water boiled with Musta.

दक्षिणानिलशीतेषु परितो जलवाहिषु । अदृष्टनस्तसूर्यषु मणिकु टिमकान्तिषु ।
परपुष्टविधुष्ठेषु कामकमान्तभूमिषु । विचित्रपुष्प विधुष्टेषु कामकर्मान्तभुमिषु ॥
विचित्रपुश्पवृक्षेषु काननेषु सुगन्धिषु । गोष्ठीकथाभिश्चित्राभिर्मध्याह्नं गमयेत्सुखी ॥

(अ.ह.सू. 3/23-25)

The person should spend his midday happily in the company of friends engaged in pleasant games, pastimes, storytelling etc. in forests or garden which have cool breeze from south direction, with plenty of reservoirs of water all around, invisible or poor



sunlight, the land covered with shining crystals, with the cuckoo everywhere making pleasant sound and engaged in lovely play, with trees of different kinds of beautiful and sweet smelling flowers.

गुरुशीतदिवास्वौनस्निग्धाम्लमधुरांस्त्यजेत । (अ.ह.सू. 3/26)

Foods which are hard to digest and cold, sleeping at day time, foods which are fatty, Amala and Madhura Rasa should be avoided.

**Grishma Rutucahrya (Summer Season)**

References - Cha.Su.6/27-33, Bha. Pra. 5/331-332, Su.Su. 6/29-30

तीक्ष्णांशुरतितीक्ष्णांशुर्ग्रीष्मे सम्क्षिपतीय यत ॥ प्रत्यहं क्षीयते श्लेष्मा तेन वायुश्च वर्धते ।
अतोऽस्मिन्पटुकटवम्लव्यायामार्ककरान्स्त्यजेत । (अ.ह.सू. 3/26-27)

In Grishma (summer) the sun rays become powerful and appear to be destructive. Kapha decreases day by day and Vata increases consequently, hence in this season avoid use of Lavan, Katu and Amal rasa foods, heavy physical exercises and exposure to sunlight.

भजेन्मधुरमेवान्नं लघु स्निग्धं हिमं द्रवम । सुशीततोयस्तिक्तङ्गो लिह्यात्सक्तून सशर्करान ॥

(अ.ह.सू. 3/28)

**Food** -which are Madhura Rasa, light (easy to digest), fatty, cold and liquid should be taken, take corn flour mixed with cold water and sugar after taking bath in cold water.

**Indication for limited use of wine during summer**

मद्यं न पेयं, पेयं वा स्वल्पं, सुबहुवारि वा । अन्यथा शोषसशैथिल्यदाहमोहान करोति तत ॥

(अ.ह.सू. 3/29)

Madya (wine) should not be taken; if very necessary, taken in very little quantity or diluted with more quantity of water; if wine is taken in large doses, it will cause inflammatory conditions, it will make the body fragile and weak, increases burning sensation and causes delusion.

कुन्देन्दुधवलं शालिमश्रीयाज्जाङ्गलैः पलैः । पिबेद्रसं नातिघनं रसालां रागखाण्डवौ ॥
पानकं पञ्चसारं वा नवमृध्दाजने स्थितम । मोचचोचदलैर्युक्तं साम्लं मृन्मयशुक्तिभिः ॥
पाटलावासितं चाम्भः सकर्पूरं सुशीतलम ॥ (अ.ह.सू. 3/30)

During summer, boiled ricewhite in color, (like full moon) should be eaten along with meat of animals of desert. Meat juice (Mamsa rasa) which is not very thick, Rasala (curds churned and mixed with pepper powder and sugar), Raga (syrup which is sweet, sour and salty)and Khandava (syrup which has all the tastes, prepared with many

substances), Panaka Panchasara, (syrup prepared with Draksha, Madhuka, Karjura, Kasmarya, and Parushaka fruits all in equal quantities, cooled and added with powder of Twak, Ela and Patra etc. and kept inside a fresh mud pot, along with leaves of plantain and coconut trees, and made sour (fermented) should be drunk in mugs of mud or shell; Very cool water kept in mud pot along with flowers of Patala And Karpura (camphor) should be used for drinking.

शशाङ्ककिरणान भक्ष्यान रजन्यां भक्षयन पिबेत । ससितं माहिषं क्षीरं चन्द्रनक्षत्रशीतलम ॥

(अ.ह.सू. 3/31)

Food articles like Shashanka Kirana (hollow, finger-like, fried pastry made of corn flour) should be taken at night; Buffalo milk mixed with sugar and cooled by moonlight and the stars should be used for drinking.

अभ्रङ्कषमहाशालतालरुद्धोष्णरश्मिषु ॥ वनेषु माधवीश्लिष्टद्राक्षास्तवकशालिषु ।
सुगन्धि हिमपानीयसिच्यमानपटालिकै ॥ कायमाने चिते चूतप्रवालफललुम्बिभिः ।
कदलिदलकह्लारमृणालकमलोत्पलैः । कोमलैः कल्पिते तल्पे हसत्कुसुमपल्लवे ।
मध्यंदिनेऽर्कतापार्तः स्वप्याद्धारागृहेऽथवा ॥ पुस्तस्त्रीस्तनहस्तास्यप्रवृत्तोशीरवारिणि ।

(अ.ह.सू. 3/33-36)

Day time should be spent in forests having tall trees reaching the sky such as Shala (shorea robusta), Tala – (Borassus flabellifera) etc., which obstruct the hot rays of the sun, or in houses around which bunches of flowers and grapes are hanging from their creepers. Sheets of cloth spreading sweet scented water, are arranged (to fan the air), all around. Sleep on soft bed prepared with flowers of Kadali (banana), Kalhara, Mrunala (lotus) etc. with fully blossomed flowers place all over or spend the day remaining inside the house cooled by water fountains, water being scented with Ushira, and thereby relieve yourself from the heat of the sun.

**Night regimen**

निशाकरकरकीर्ण सौधपृष्ठे निशासु च ॥ आसना स्वस्थचित्तस्य चन्दनार्द्रस्य मालिनः ।
निवृत्तकामतन्त्रस्य सुसूक्ष्मतनुवाससः ॥ जलार्द्रास्तालवृन्तानि विस्तृताः पद्मिनीपुटाः ।
उत्क्षेपाश्च मृदूत्क्षेपा जलवर्षिहिमानिलाः ॥ कर्पूरमल्लिकामाला हाराः साहरिचन्दनाः ।
मनोहरकलालापाः शिशवः सारिकाः शुकाः । मृणालवलयाः कान्ताः प्रोत्फुल्लकमलोज्ज्वलाः ।
जङ्गमा इव पद्मिन्यो हरन्ति दयिताः क्लमम । (अ.ह.सू. 3/37-41)

At nights, one should sleep on the terrace having good moonlight. Exhaustion due to heat of the day is relieved by, anointing the body with paste of Candana , wearing garlands, avoidance of sexual activities, wearing of very light and thin dress, by fanning with fans made of leaves of Tala or large leaves of Padmini (lily) made wet; syringes



sprinkling cool water softly, garlands of flowers of Karpura, Mallika and of pearls and beads of Harichandana (white sandal paste), children, Sarika (mynah bird) and Shuka (parrot) talking pleasantly; beautiful woman wearing bangles of soft lotus stalk, blossoms of lotus in their hair, moving about nearby.

**Varsha Rutu Carya- (Rainy Season) (Ref. Cha.Su. 6/33-40, Bha.Pra. 5/322-325, Su.Su. 6/33-34)**

आदानग्लानवपुषामग्नि सन्नोऽपि सीदति । वर्षासु दोषैदुष्यन्ति तेऽम्बुलम्बाम्बुदेऽम्बरे ॥
स्तुषारेण मरुता सहसा शीतलेन च । भूबाष्पेणाम्लपाकेन मलिनेन च वारिणा ॥
वह्निनैव च मन्देन, तेष्वित्यन्योऽन्यदूषिषु । भजेत्साधारणं सर्वमूष्मणस्तेजनं च यत ॥

(अ.ह.सू. 3/42-44)

In rainy season, the Agni (digestive activity) is weak. It is already debilitated by Adana Kala; it undergoes further decrease and gets vitiated by the Doshas. The Doshas get aggravated by the effect of thick clouds full of water, cold wind having snow, dirty water because of rain, warmth of the earth and sourness. The poor strength of digestive activity the Doshas start vitiating one another and cause many diseases. Hence all general measures to mitigate imbalanced Doshas and to improve digestive activity should be adopted.

आस्थापनं शुद्धतनुर्जीर्णं धान्यं रसान कृतान । जाङ्गलं पिशितं यूषान मध्वरिष्टं चिरन्तनम ॥
मस्तु सौवर्चलाढ्यं वा पञ्चकोलावचूर्णितम । दिव्य कौपं शतं चाम्भो भोजनं त्वतिदुर्दिने ॥
व्यक्ताम्ललवणस्नेहं संशुष्कं वशौद्रवल्लघु । (अ.ह.सू. 3/45-46)

One should undergo purifactory therapies (Panchakarma). After that the person should also be administered Asthapana Basti (decoction enema therapy). He should use old grains for food, meat juice processed with spices etc. Meat of animals of desert-like lands, soup of pulses , wine prepared from grapes and fermented decoctions, which are old or Mastu (whey, thin water or curds) processed with more of Souvarcala (Sochal salt) and powder of Panchakola, should be used. Rain water or water from deep wells, well boiled should be used for drinking. On days of no sunlight at all, the food should predominantly Amla, Lavan and Fatty, dry, mixed with honey and easily digestible.

अपादचारी सुरभिः सततं धूपिताम्बरः ॥ इर्म्यपृष्ठे वसेदाप्यशीतशीकरवर्जिते ॥ (अ.ह.सू. 3/47)

Person should not move about on foot (move only on vehicles), should use perfumes, expose his clothes to fragrant fumes and dwell in upper stories of the house, devoid of heat, cold and snow.

नदिजलोदमन्थाहः स्वप्नायासातपांस्त्यजेत । (अ.ह.सू. 3/48)

**Avoid** : River water, Udamantha (beverage prepared with flour of corns mixed with ghee), sleeping at daytime, exertion and exposure to Sun should be avoided.

**Pravrt Rutu Charya (Ref. Su. U. 64/46-54, Su.Su. 6/31-32)**

During Tapatyaya (end of summer or early rainy season) things of three heavy tastes (Madhra, Amla and Lavana) are always beneficial. So also warm milk, meat soup, oil and ghee, things which stouten the body and increase moisture inside the body are beneficial to mitigate Vata aggravated during summer. It should be mitigated by resorting to other therapies by the physician knowing procedures.

River water things which are dry and hot, dilute butter milk, exposure to sunlight, physical activities, day sleep, sexual intercourse should be avoided. So also freshly harvested grains, dry and cold foods, cold water and flour of grains are avoided.

Persons should partake food prepared from Yava, Shastika, Godhuma, and Shali, reside inside a house devoid of breeze, or in shade which is soft and comfortable; since in this season rain water is contaminated by excreta, urine, saliva and spittle of poisonous animals, since it is also polluted with poisonous breeze, it similar t poison; hence this water should be avoided for all kinds of use; Arishta, Asava and Maireya may be consumed along with condiments during day and nights even these should be avoided.

The aggravated Vata should be mitigated by administering decoction enema and other therapy mitigates Vata and adopting the regimen of Varsha Rutu.

**Sharad Rutucharya (Autumn Season) (Ref. Cha.Su.6/41-48, Bha. Pra. 5/326, Su.Su. 6/35-36)**

वर्षाशीतोचिताङ्गानां सहसैवार्करश्मिभिः । तप्तानां सञ्चितं वृष्टौ पित्तं सरदि कुप्यति ॥
तज्जयाय घृतं तिक्तं विरेको रक्तमोक्ष्जणम । (अ.ह.सू. 3/49)

The person becomes accustomed to the cold of Varsha Rutu (rainy season). When he gets suddenly exposed to the warm rays of Sun, the Pitta, which has undergone increase in Varsha (rainy season) becomes greatly aggravated during Sharad (autumn). In order to get over it, Tikta-Ghrita (medicated ghee recipe described in the treatment of Kustha chapter 19 of Chikitsa Sthana), purgation therapy and bloodletting should be resorted to.

तिक्तं स्वादु कषायं च क्षुधितोऽन्नं भजेल्लघु । शालिमुद्र सिताधात्रीपटोलमधुजाङ्गलम ॥
(अ.ह.सू. 3/50)

When hungry, the person should take foods which are of bitter, sweet and astringent tastes, and easily digestible such as Shali(Rice), Mudga(green gram), sheeta (sugar), Amalaki, Patola, Madhu(honey) and meat of animals of desert-like lands.

**Hamsodaka**

तप्तं तप्तां शुकिरणैः शीतं शीतांशुरश्मिभिः । समन्तादपुअहोरात्रमगस्त्योद्यानिर्विषम ।
शुचि हंसादकं नाम निर्मल मलजिज्जलम ॥ नाभिष्यन्दि न वा रुक्षं पानादिष्वमृतोपमम ॥
(अ.ह.सू. 3/51-52)



The water which gets heated by the hot rays of the sun during day cooled by the cool rays of the moon during night, for many days continuously, which has been de-poisoned (detoxicated) by the rise of the star Agastya, which is pure, uncontaminated and capable of mitigating the malas (doshas) is known as Hamsodaka. It is neither Abhisyandi (producing more secretion or moisture inside the minute channels so as to block them) nor dry, such water is like Amrita (nectar) for drinking and other purpose.

चन्दनोशीरकर्पूरमुक्तास्त्रग्धसनोज्ज्वलः ॥ सौधेषु सौधधवलां चन्द्रिकां रजनीमुखे । (अ.ह.सू. 3/53)

**Evening** should be spent on the terraces of houses which are white (by painting), anointing the body with the paste of Chandana, Ushira and Karpura, wearing garlands of pearls and shining dress and enjoying the moonlight.

तुषारक्षारसौहित्य दधितैलवसातपान ॥ तीक्ष्णमद्यादिवास्वप्नपुरोवातान परित्यजेत । (अ.ह.सू. 3/54)

**Avoid** : Exposure to snow (mist), indulgence in Kshara (alkaline substances), satiation with hearty meal, use of Dadhi (curds), oil, Vasa (muscle fat), exposure to sunlight, strong liquors, sleeping at day time and the eastern breeze.

**Amshudakam**

दिवसेऽर्ककरैर्जुष्टं निशि शीतकरांशुमिः । ज्ञेयमंशूदकं नाम स्निग्धं दोषत्रयापहम ॥
(भा.प्र. दिनचर्या 5/348)

Water is exposed day time in sun ray and in right moon light called Amshudakam. It is Snigdha and Tridoshanashaka property.

**Use of taste as per season in different Rutus**

शीते वर्षासु चाद्यां स्त्रीन वसन्तेऽन्त्यान रसान्भजेत । स्वादं निदाघे, शरदि स्वादु तिक्त कषायकान ।
शरद्वसन्तयो रुक्षं शीत घर्मगनान्तयोः । (अ.ह.सू. 3/56)

During winters (Hemanta and Sisira) and varsa (rainy season), Madhura, Amla and Lavan tastes should be especially used.

Katu, Tikta and Kashaya Rasa should be used more during Vasanta (spring season).
Madhura Rasa should be used more during Nidagha or Grishma (summer).
Madhura, Tikta and Kashaya Rasa should be used during Sharad (autumn).

**Qualities of food as per season**

अन्नपानं समासेन विपरीतमतोऽन्यदा ॥ (अ.ह.सू. 3/56)

The food and drink should be dry (moisture less, fat-less) during Sharad and Vasanta (autumn and spring) and food should be cold during Gharma (Grishma or summer) and Ghnanta (Varsha or end of rainy season) and should be hot in other seasons.

नित्यं सर्वरसाभ्यासः स्वस्वाधिक्यमृतावृतौ । (अ.ह.सू. 3/57)

The habit of using all the six tastes every day is ideal for maintenance of health. Except, during particular special seasons, when the particular tastes suitable to the respective seasons.

**Rutusandhi (Inter-Seasonal Period)**

ऋत्वोरन्त्यादिसप्ताहावृतुसन्धिरिति स्मृतः । तत्र पूर्वो विधिस्त्याज्यः सेवनीयोऽपरः क्रमात ॥
असात्मजा हि रोगाः स्युः सहसा त्यागशीलनात ॥ (अ.ह.सू. 3/58-59)

The seven days at the end and commencement of a season is known as Rutu Sandhi (inter seasonal period). During this period, the regimen of the preceding season should be discontinued gradually and that of the succeeding season should be gradually adopted; sudden discontinuance or sudden adoption gives rise to diseases caused by Asatmya (non-habituation).

**Yamadamsthra**

कार्तिकस्य दिनान्यष्टवष्टावाग्रयणस्य च । यमद्रंष्ट्रा समाख्याता स्वल्पभुक्तो हि जीवति । (शा.सं. 2/29)

The eight days of Kartika Masa (third week of November) and first eight days of Agrahayana (fourth week of November) are known as Yamadamstra Kala. During this period one can be healthy if he takes only small quantities of food.

**Rutuharitaki**

सिंधूत्थशर्कराशुण्ठीकनामधुगुडैः क्रमात । वर्षादिष्वभया प्राश्या रसायनगुणाषिणा ॥

(भा.प्र.नि. हरितक्यादिवर्ग 34)

It is classically recommended as Rutu Haritaki for using the drug during the course of different season's viz.,

Varsha (rains) - Saindhava Lavana (Rock salt)
Sharad Rutu (autumn) - Sarkara (sugar)
Hemanta (cold/winter) - Shunti (Dry Ginger)
Sishira (late winter & early spring) - Pippali (long pepper)
Vasanta (spring) - Madhu (honey) and
Grishma (summer) - Guda (Jaggery)

**Rutuviparyaya**

चयकोपशमान्दोषा विहाराहारसेवनैः । समानैर्यान्त्यकालेऽपि विपरीतैर्विपर्ययम ॥

(भा.प्र. दिनचर्या प्रकरण 326)

Doshas undergo Caya, Prakopa and Prashamana by indulgence in foods, activities etc. which are similar to them even apart from the seasons, and indulgence in foods, activities of dissimilar qualities produce opposite effect even during right time.



**Relation of Agni Bala and Rutu**

According to Ayurveda, at the beginning and end of Visharga and Adana periods respectively, the Agni of the individual will be weak. During middle of Adana Kala and middle of Visharga Kala Agni will be moderate/medium. During the end and beginning respectively the Agni of individual will be best.

| Ayana | Rutu | Month | Hindi Month | Agni |
|---|---|---|---|---|
| Uttarayana/ | Shishira | Jan-Feb | Magha-Falguna | Teekshnagni |
| Adana kala | Vasanta | Mar-April | Chaitra-Vaishakh | Madhyamagni |
| | Grishma | May-June | Jyeshtha-Ashadha | Mandagni |
| Dakshinayana/ | Varsha | July-Aug | Sravan-Bhadrapada | Mandagni |
| Visharga Kala | Sharada | Sep-Oct | Ashwina-Kartika | Madhyamagni |
| | Hemanta | Nov-Dec | Margashisha-Pausha | Teekshnagni |

# CHAPTER 5 Sadvritta

**Sadvritta the Personality of a Person is Enhanced by Good Conduct**

Sad means good and Vritta means regimen. This is code of conduct for keeping good or balanced condition of body and mind. This also can be called as health promoting conduct.

Sadvritta is basically for keeping the mind healthy. A healthy mind is as important as a healthy body. When the body possesses Satvik quality of mind, it directs all actions for the welfare of an individual. Rajas and Tamas qualities are harmful qualities of mind. Unhealthy mind generates wrong judgments and misconceptions by the intellect. It is responsible for producing disease. So every attempt should be made to increase the Satvik quality of mind.

The personality of a person is enhanced by good conduct. This could be a personal conduct or social conduct. A self-review could help to judge one's conduct. Ayurveda has discussed conduct, under the topic "Sadvritta" or ethical regimen.

Ayurveda describes certain rules for maintaining a healthy state of body and mind. This code of conduct can be classified into following five types.

They are the principals of right conduct that are applicable to all people. If an individual will practice these principles, he or she will have balance and peace of mind.

1. Ethical Conduct (Vyavaharika Sadvritta) :
2. Social Conduct (Samajik Sadvritta)
3. Mental Conduct (Manasik Sadvtitta
4. Moral Conduct (Dharmika Sadvritta)
5. Physical Conduct (Sharirik Sadvritta)

**Principles of preventing Psychic Disturbances**

तत्रेन्द्रियाणांसमनस्कानामनुपतप्तानामनुपतापायाप्रकृतिभावेप्रयतितव्तप्रेभिर्हेतुभिः तद्यथा--सात्म्येन्द्रियार्थ संयोगेनबुध्यासम्यग वेक्ष्यावेक्ष्यकर्मणां सम्यक प्रतिपादनेत, देशकालात्मगुण विपरीतोपासनेनचेति । तस्मादात्महितंचिकीर्षतासर्वेणसर्वसर्वदास्मृतिमास्थायसदवृत्तमनुष्ठेयम ॥

(च.सू. 8/17)

The normal condition of sense faculties and mind can maintain by certain therapeutic devices. Performance of acts includes avoidance of harmful acts as well as performance





of beneficial once. Such efforts are following to prevention of abnormal condition of sense faculties and mind.

Abnormal condition already been created, they can be cured by acting, in contradistinction with the Desha, Kala and one's constitution including temperament, so the positive health can be maintained by performance of acts as prescribed in scriptures.

One desirous of his own wellbeing should perform noble acts (Sadvritta) with proper care.

**Practices Preventing Psychosomatic Disturbances**

तद्धयनुतिष्ठानयुगपतसंपाद्यत्यर्थव्दयमारोग्यमिन्द्रियविजयंचेति; तत सद्धत्तमखिलेनोपदेक्ष्यामोऽग्निवेश! तद्यथा-देव गोब्राह्मणगुरुवृद्ध सिद्धाचार्यानर्चयेतअग्निमुपाचरेत ।

औषधीः प्रशस्ताः धारयेतद्वौकालावुपस्पृशेत ॥ (च.सू. 8/18)

One observes these principles simultaneously fulfills both the objectives,

1. Maintenance of positive health
2. Control of sense faculties

One should respects to the God, cow, Brahmin, preceptors, elderly peoples, spiRutual perfection peoples and teachers. One should offer oblation to the fire, wear auspicious herbs. One should perform Sandhya (Vedic Rutuals in morning and evening twice).

मलायनेष्वभीक्ष्णंपाद्योश्चवैमल्यमादध्यात, त्रिः पक्षस्यकेशश्मश्रुलोमनखानसंहारयेत, नित्यमनुपहतवासाः सुमनाः सुगन्धिः स्यात, साधुवेशः, परसिद्धकेशः, मूर्धश्रोत्रघ्राणपादतिअलनित्यः, धूमपः, पूर्वाभिभाषी, सुमुखः, दुर्गष्वभ्युपपत्ता.... । (च.सू. 8/18)

One should clean excretory passages and feet frequently; one should cut hair, shave and nails thrice in fifteen days. One should wear good cloth, be happy, apply scent, wear good dress, comb the hair. Always apply oil to head, ears, nostrils and feet, one should smoke, take initiative in wishing, have a delightful face, protect people in affliction etc.

होता, यष्ट, दाता, चतुष्पथानांनमस्कर्ता, बलीनामुपहर्ता, अतिथीनांपूजकः, पितृभ्यःपिण्डदः, कालेहितमितमधुरार्थवादि, वश्यात्मा, धर्त्मात्मा, हेतीवीर्ष्युः, फलेनेर्ष्युः, निश्चिन्तः, निर्भीकः, ह्रीमान, धीमान, महोत्साहः, दक्षः, क्षमावान, धार्मिकः, आस्तिकः, विनयबुद्धि विद्याभिजलवयोवृद्ध सिद्धाचार्याणामुपासिता, छत्री दण्डी मौलीसोपानत्कोयुगमात्रदृग्विचरेतमङ्गलाचारशीलः .... ।

(च.सू. 8/18)

One should offer oblation, perform religious ceremonies, donate, respect to cross roads, offer Balis, honour the guests, offer Pinda Dana to fore fathers, has control the senses, measures sweet words, religious, desirous of work but not on the fruit, fearless,

intelligent, enthusiasm, able forgive, pious, have faith in gods obedient, cleaver, learned, devoted to teachers, elders and sages, to prevents psychological disturbance. One who uses an umbrella, a stick, wears turban, shoes, person sees six feet forward while walking, who practices auspicious way can prevents many problems.

कुचेलस्थिकण्टकामेध्यकेशतुषोत्करभस्मकपालस्नानबलिभूमीनां परिहर्ता ..... । (च.सू. 8/18)

One should avoid places with dirty cloths, bones, thorns, impure hair, grass, garbage, ash, broken pieces of earthen pot and the place of bath and worship.

प्राक श्रमाद्व्यायामवर्जीस्यात, सर्वप्राणिषुबन्धुभूतः स्यात, क्रुद्धानामनुनेता, भीतानामाश्वासयिता, दीनानामभ्युपपत्ता, सत्यसंघ;, सामप्रधानः, परपरुषवचनसहिष्णुः, अमर्षघ्नः, प्रशमगुणदर्शी, रागद्वेशहेतूनांहन्ताच ॥ (च.सू. 8/18)

One should stop exercise before exertion, be friendly to all creatures, settle the angry, console the frightened, care for poor , always speak truth, he should be compromising nature and tolerant towards unpalatable words by others, controller of intolerance, be of peaceful disposition and conquer the very roots of attachment and hatred.

**Practices regarding code of general ethics**

नानृतंब्रूयात, नान्यस्वमाददीत, नान्यस्त्रियमभिलषेन्नान्यश्रियं, नवैरंरोचयेत, नकुर्यातपापं, नपापेऽपिपापिस्यात; नान्यदोषानब्रूयात, नान्यरहस्यमागमयेन, नाधार्मिकैर्न नरेन्द्रविद्दिष्टैः सहासीतनोन्मत्तैर्नपतितैर्नभ्रूणहन्तहन्तृभिर्न क्षुद्रैर्न दुष्टैः, न दुष्टयानान्यारोहेत, नजानुसमंकठिन-मासनमध्यासीत, नानास्तीर्णमनुपहितमविशालमसमंवाशयनंप्रपद्येत, नगिरिविषममस्तकेष्वनुचरेत, नद्रुममारोहेत, नजलोग्रवेगमवगाहेत, नकूलच्छायामुपासीत, नाग्न्युत्पातमभितश्चेरत .... । (च.सू. 8/19)

One should not tell a lie nor should take over other properties nor should long for others wives or property, should not indulge in hatred or sinful activities, one should never be vise even to the vicious, one should not disclose others defects, one should not disclose others secrets, one should shun the company of the unvirtuous, traitors, lunatics, fallen persons, abortionists, mean minded and crooked persons.

One should not ride dangerous vehicles, sit on a hard seat of knee height, sleep on the bed not well covered or without a pillow, small or uneven, one should not walk on the uneven slopes of the mountain, climb a tree, take bath in river having turbulent flow, one should not stamp on the shadow of kings or those born of noble families, one should not move around of fire.

नोच्चैर्हसेत, नशब्दवन्तंमारुतंमुञ्चेत, नानावृतमुकोजृमम्भां क्षवथुंहास्यंवाप्रवर्तयेत, ननासिकांकुष्णीयात, तदन्तानविघट्टयेत, ननखान, वादयेत, नास्थीन्यभिहन्यात, नभुमिंविलिखेत, नछिन्द्यात्तृणं, न लोष्टं मृन्दियात, नविगुणमङ्गैश्चेष्टेत, ज्योतीष्यनिष्टममेध्यमशस्तं चनाभिवीक्षेत,



नहुंकुर्याच्छवं, नचैत्यध्वजगुरुपूज्याशस्तच्छायाक्रामेत, न क्षपास्वमरसदनचैत्यचत्वरचतुष्पथोपवन-श्मशानाघातनान्यासेवेत, नैकः शून्यगृहंनचाटवीमनुप्रविशेत, नपापवृत्तान, स्त्रीमित्रभृत्यानभजेत, नोत्तैर्विरुध्येत, नावरानुपासीत .... । (च.सू. 8/19)

One should not laugh loudly, one should not release flatus with sound, one should not yawning, sneezing, laughing without covering his mouth, one should not itch the nostrils, grind the teeth, make sound the nails, strike the bones, scrape the earth, cut the straw, grind the clod of mud, maintain improper position of different parts of the body, one should not see the planets or an undesirable, impure object, produce 'hum' sound in front the dead body. One should not cross the shadow of sacred tree, a flag, teacher, a respectable person or an undesirable person; during nights, one should not enter the premises of temple, a sacred tree, public court yard, cross road, garden, cemetery and slaughter house, one should not similarly enter a deserted house or forest alone, one should not have relations with women, friends or servants of bad conducts, there should be no enmity with good men nor friend with bad ones.

न जिह्मंरोचयेत, नानार्यमाश्रयेत, नभयमुत्पादयेत, नसाहसातिस्वप्नप्रजागरस्नानपानाशनान्यासेवेत, नोर्ध्वजानुश्चिरंतिष्ठेत, न व्यालानुपसर्पेन्न दंष्ट्रिणोनविषणिनः, पुरोवातातपावस्यायातिप्रवाताञ्जह्यात, कलिंनारभेत, नासुनिभृतोऽग्निमुपासीत नोच्छिष्टः, नाधः कृत्वाप्रतापयेत, नाविगतक्लमोनाना-प्लुतवदनोननग्नउपस्पृशेत, नस्नानशाट्यास्पृशेदुत्तमाङ्गं, नकेशाग्राण्यभिहन्यात, नोपस्पृश्यतेएववा-ससीबिभृयात, नास्पृष्ट्वारत्नाज्यपूज्यमङ्गल सुमनंसोऽभिनिष्कामेत, नपूज्यामङ्गलान्यपसव्यं गच्छेन्नेतराण्यनुदक्षिणम ॥ (च.सू. 8/19)

One should not take interest crooked acts, should not take shelter with the uncivilized person, should not create fear, undue courage, excessive sleep, keeping awake at night in excess, bath, drink or food in excess quantity, one should not sit for long time with his knees up, one should not approach snakes or animals with dangerous teeth and horns, one should avoid easterly wind, sunlight, snow fall and storms, one should not initiate a quarrel, one should not worship fire except in lonely and when person is impure, one should not heat his body by keeping fire below, one should take bath unless he is free from exertion or without a gurgle or in a naked condition, one should not touch his head with the apparel worn at the time of bath or strike the tip of the hair. After taking bath one should not wear the same cloth worn before. One should not go out without touching gems, ghee, feet of respectable persons, auspicious objects and flower; one should not pass through by keeping respectable persons or auspicious objects in left or keeping other in right side.

**Practice regarding taking diet**

नारत्नपाणिर्नास्नातोनोपहतवासानाजपित्वानाहुत्वादेवताभ्योनानिरुप्यपितृभ्योनादत्त्वागुरुभ्योनांतर्धि-

भ्योनोपाश्रितेभ्योनापुण्यगन्धोनामालीनाप्रक्षालित पाणिपादवदनोनाशुद्धमुखोनोदद्युखोनविमना नाभक्ता-शिष्टाशुचि क्षुधित परिचरोनपात्रीष्वमेध्यासुनादेशेनाकालेनाकीर्णेनादत्त्वाऽग्रमग्नयेनाप्रोक्षितंप्रोक्षणोद-कैर्नमन्त्रैरनभिमन्त्रितंन कुत्सयन्न कुत्सितंन प्रतिकूलोपहितमन्नमाददीत, नपर्युषितमन्यत्रमांस-हरितकशुष्कशाकफलभक्ष्येभ्यः नाशेषभुकस्यादन्यत्र दधिमधुलवणसक्तुसर्पिर्भ्यः, ननक्तंदधिभुञ्जीत, न सक्तूनेकानश्नीयात्र निशिनभुक्त्वान बहून्न द्वीर्नोदकान्तरितान, नछित्त्वाद्विजैर्भक्षयेत ॥ (च.सू. 8/20)

One should not take food without wearing precious stones in hand or without taking bath or with torn apparel or without reciting Mantra or without offering oblation to the gods or without making offering to the fore- fathers, teachers, guests, dependents and applying sacred scents or without garlands or without washing hands, feet's and face or without cleaning the mouth or with face turned towards the north or with disturbed mind or surrounded by the insincere uncultured, dirty or hungry persons or in unclean dishes, or at improper place and time or in a place surrounded by many persons or without first offering the fire or without sprinkling with sacred water or without sanctifying it with sacred Mantras or with contemptuous disposition towards food. One should not take food which is dirty or which has been served by opponents.

Except in case of meat, roots, dry vegetables, fruits and sweets, one should not take staled food. One should not consume the entire food except in the cases of curd, honey, salt and roasted grain flour and ghee. One should not take curd at night. One should not take roasted grain flour without mixing it up with ghee and sugar, in night, after meals, in large quantity , twice daily, in between water intake, should not eat by tearing with teeth.

**Practice regarding natural urges**

नानृजुः क्षुयान्नाद्यान्न शयीत, नवेगितोऽन्यकार्यः स्यात, नवाय्वग्निसलिलसोमार्कद्विजगुरु-प्रतिमुखंनिष्ठिविका( वात ) वर्चोमूत्राण्युत्सृजेत, न पन्थानमवमूत्रयेन्न जनवति नान्नकाले, नजपहोमाध्यनबलिमङ्गलक्रियासु श्लेष्मसिङ्घाणकंमुञ्चेत ॥ (च.सू. 8/21)

One should not sneeze, eat and sleep in prone position, one should not attend to any other work while under the pressure of natural urge, one should not let out sputum, excreta or urine in front of the wind, fire, water, moon, sun, Brahmanas and teachers. One should not urinate on the roadside, public place, at the time of taking food, one should not let out oral or nasal excreta during chanting sacred mantras , religious rites, studies, religious offerings and auspicious activities.

**Practice regarding relation with women**

नस्त्रियमवजानीत, नातिविश्रन्भयेत, न गुह्यमनुश्रावयेत, नाधिकुर्यात। नरजस्वलांना-तुरांनामेध्यांनाशस्तां नानिष्टरुपारोपचारां नादक्षांनादक्षिणांनाकामांनान्यकामांनान्यस्त्रियंनान्ययोनिनायोनौन चैत्यचत्वर चतुष्पथोपवन श्मशानाघातनसलिलौषधिद्विजगुरुसुरालयेषु नसन्ध्योएनातिथिषु नाशुचिर्नाजग्ध



भेषजोनाप्रनीत सङ्कल्पोनानुपस्थितप्रहर्षो नाभुक्तवान्नात्यशितो नविषनस्थोनमुत्रोच्चार पीडितोन श्रम व्यायामोपवासक्लमाभिहतोनारहसिव्यवायं गच्छेत ॥ (च.सू. 8/22)

Women should not be insulted, should not have too much faith in women, should not disclose secrets to women, should not endow her with authority, one should not perform sexual intercourse with women who is menstrual period, diseased, impure, having skin disorders, having undesirable features, actions and habits; unskilled, not favorable, not desire of sex and who is desirous of another person and others wife. Sexual intercourse in contraindicated other than vagina, not in place such as holy tree, Catvara, meeting of four roads, garden, burial ground, place of slaughter, reservoirs of water and herbs, house of Brahmana, teachers. Sexual acts should not be done in Sadhyakala, on prohibited days, not being clean, not eating medicine (Vajikara Dravya), without desire, without erection of penis, without taking food, after taking heavy meals, not keeping proper posture, under the pressure of urges of urine and faeces, when having exhaustion from physical exercise, fasting etc and at place devoid of privacy.

**Practice regarding study**

नसतोनगुरुनपरिवदेत नाशुचिरभिचारकर्मचैत्यपूज्यपूजाध्ययनमभिनिर्वर्तयेत ॥ (च.सू. 8/23)

Person should not lie to his teacher. While without being clean one should not perform acts of sorcery, worship of holy tree, holy objects and study.

नविद्युत्स्वनार्तवीषुनाभ्युदितासु दिक्षु नाग्निसंप्लवेनभूमिकम्पेनमहोत्सवेनोल्कापातेनमहाग्रहोपगमनेन नष्टचन्द्रायां तिथौनसन्ध्ययोर्नामुखाह्नुरोर्नावपतितं नातिमत्रंनतान्तंनविस्वरंनानवस्थितपदंनातिद्रुतंन-विलम्बितंनातिक्लिबं नात्यच्चैर्नातिनी चैः स्वरध्ययनमभ्यस्येत ॥ (च.सू. 8/24)

Study should not be during at the time of unseasonal lighting, quarters appears as though burning, not during outbreak of fire, during earthquake, great festivals, fall of meteors, eclipses of great planets, when moon is absent and during Sandhyakala. One should not study before teacher's initiation, one should not chants few words nor the large number of words, not with harsh words, not with improper words, not with words not forming sentences, not very slow, not very feeble voice, not very high pitch nor in very low pitch.

**General Principles - (Samanya Niyama)**

नातिसमयं जह्यात, ननियमंभिन्द्यात, ननक्तंनादेशेचरेत, नसन्ध्यास्वभ्यवहाराध्ययनस्त्रीस्वप्न-सेवीस्यात, नबालवृद्धलुब्धमूर्खक्लिश्टक्लिबैः सहसख्यंकुर्यात, नमद्यद्यूतवेस्याप्रसङ्गरुचिः स्यात, न गुह्यं विवृणुयात, नकञ्चिदवजानीयात, नाहंमानी स्यान्नादक्षो नादक्षिणोनासूयकः, न ब्राह्मणान परिवदेत, नगवांदण्डमुद्यच्छेत, नवृद्धान्न गुरुन्न गणान्न नृपानवाऽधिक्षिपेते, नचातिब्रूयात, न बान्धवानुरक्तकृच्छ्रद्वितीयगुह्याज्ञान बहिष्कुर्यात। (च.सू. 8/25)

One should not waste time, one should not break rules. One should not wander in prohibited places at nights. One should not indulge in partaking meals, study, sexual intercourse and sleep during Sandhya. One should not be in the company of children persons, who are very greedy, idiots, despised and poor mind. One should not be greatly interested in wine drinking, gambling, and prostitutes. One should not expose his genital/ sexual organs greatly. One should not insult anybody, should not show him self as proud inefficient, uncivilized and jealous. One should not scandalize Brahmins should not drive the cows by beating with a stick. One should not insult old persons, preceptors, soldiers and king; one should not talk too much, should not abandon relatives, affectionate, who have helped in times of difficulty and who know the secrets of family.

नाधारोनात्युच्छ्रितसत्त्वः स्यात, नाभृतभृत्य; नाविश्रब्धस्वजनः, नैकः, सखी, नदुःखशीलाचारोपचारः, नसर्वाविश्रम्भी, नसर्वाभिशङ्की, नसर्वकालविचारी । (च.सू. 8/26)

One should not be ignorant and over bold, should not neglected dependents, one should not give up confidence in his own relatives, one should not enjoy alone, one should not have innate nature, learned behaviors and customs which cause discomfort to others, should not be confident in all, should not be suspicious on all, should not be always thoughtful.

**Practice regarding self-control (Mano Vyaparaniyama)**

नकार्यकालमतिपातयेत, नापरीक्षितमभिनिविशेत, नेन्द्रियवशगः स्यातनचञ्चलंमनोऽनुभ्रामदत, नबुद्धीन्द्रियाणामतिभारमादध्यात, नशोकमनुवसेत, नसिद्धावुत्सेकं यच्छेन्नासिद्धौ दैन्यं, प्रकृतिमभीक्ष्णंस्मरेत, हेतुप्रभावनिश्चितः स्याद्धेत्वारम्भनित्यश्च, नकृत्यामित्याश्वसेत, नवीर्यं जह्यात, नापवादमनुस्मरेत ॥ (च.सू. 8/27)

One should not neglect too much of the proper time of actions, not undertake action without examining it, not become a salve to the all sense organs, not allow the mind to wander unsteadily; not impose too much of work to sense organs, not be thinking very far in all matters, not to do any activity in fit of anger or joy; not harbor sorrow for long time, not exhibit a great elation during success nor great dejection during failure.

One should always remember normal mode of events happening, faith in cause and effect. One should feel relieved that the work is complete; one should not lose spirit or remember the insults done earlier.

**Practice regarding fire worship**

नाशुचिरुत्तमाज्याक्षततिलकुशसर्षपैरग्निजुहुयादात्मानमाशीर्भिराशासानः, अग्निर्मेनापगच्छेच्छरीराद्वायुर्मेप्रानानाद धातुविष्णुर्मेबलमादधातुइन्द्रोमेवीर्य शिवामांप्रविशन्त्वापआपोहिष्ठेत्यपः स्पृशते, द्विः परिमृज्योष्ठौ पादौचाभ्युक्ष्यमूर्धनिखानिचोपस्पृशेदब्भिरात्मानं हृद्यं शिरश्च ॥ (च.सू. 8/28)



Without being clean, the person should not worship the fire by offering cow ghee, Akshata (unbroken and colored rice), Tila, Kusha grass and Sarshapa (mustard seeds); he should get himself blessed with benedictory hymns and then chant Mantra.

He should touch water and then touch twice the two lips, feet, head and opening of the head (eyes, ears, nostrils and mouth), heart and head.

**Practice regarding social relations**

ब्रह्मचर्यज्ञानदानमैत्रीकारुण्यहर्षोपेक्षाप्रशमपरश्च स्यादिति ॥ (च.सू. 8/29)

Person should follow Brahmacharya (abstinence), Jnana (good knowledge), Dana (charity), Maitri (friendship), Karunya (kindness), Harsha (joy), Upeksha (detachment) and Prashamana (peaceful of mind).

According Vagbhatacharya Sadavritta one should avoid the ten sins pertaining to the body, speech and mind:

Himsa (causing injury, torture etc.),
Steya (stealing, robbing),
Anyathakama (unlawful sex activity),
Paisunya (abusive or harsh speech),
Antra Vacana (scolding, speaking untruth),
Sambhinna Alapa (speech causing dissent, separation, breaking of company),
Vyapada (quarrel, intention of harming),
Abhidya (jealousy, not tolerating good of others) and
Drgviparyaya (finding fault, misunderstanding, faithlessness etc. with scriptures, elders etc.)

One sh. ld not engage himself in occupations which are devoid of the three pursuit's Dharma (righteousness), Artha, (wealth) and Kama (pleasures). The personality of a person is enhanced by a good conduct. This could be a personal conduct or social conduct. A self-review could help to judge one's conduct. Ayurveda has discussed conduct, under the topic "Sadvritta". Here we find an elaborate discussion about personal and social behavior, one need to maintain.

A good personal conduct awards us good health and a control over our senses and desires. It includes a regime of bathing, cleaning of eyes, nose, ears, teeth, oral cavity, nails etc. Have a bath once or twice daily, as the season may be. Keep the nails and hair clean and well trimmed each fortnight or as the need be. Do not use unwashed clothes dirty or uncomfortable clothes, clothes worn by others, not appropriate to the season, occasion or clothes made from unnatural fiber. The footwear should be selected as per

our physical structure, geographic condition, season and the type of job. One should have sufficient sleep, not over sleep or have late nights, have meals at regulated times which helps to have a pleasant mind set.

Do not cook food or serve food in unhygienic kitchen, utensils, without having a bath, with ill-thoughts or in grief. Do not have stale food or food not appropriate to the season. Do not make repulsive sounds with your mouth while talking or eating.

Now let's discuss about the conduct to be maintained while interacting in the society.

Do not accumulate garbage on streets, functions, places of worship, near water sources, public places like hospitals, parks, schools etc. Cover your mouth while laughing, coughing, sneezing, belching or yawning. Avoid combing hair in a public place. Do not pick your teeth or finger the nose or ear in the presence of people.

Don't be a witness to an unknown person. Respect the elders, forefathers, teachers, preachers, scholars etc Have a respectable, courteous and protective attitude towards elderly people, women, children those ailing, weak, physically challenged etc.

Avoid confronting those who are in a position to execute their power. Always share your joys and achievements with your well-wishers also don't be envious of others. Don't give authority to any unknown person that is don't rely on anyone completely, also don't be distrustful. Don't disclose anyone's secrets in public. Speak only when it's your turn, that too within the context and possibly the truth. Allow another person to express his views first in conversation. In case of disagreement, politely convey it.

Abstain from lies, anger, in extreme grief, jealousy, greed and sins that could be a result a lack of control of the above mentioned emotions. Do not indulge in gossip, ill-commenting, unhealthy criticism, enmity towards others. Do not mingle in the company of ill-mannered people or people with evil thoughts. In short we can say that these rules have been laid down to ensure personal hygiene, mental peace and good interpersonal relations.

**Importance of Sadvritta**

पञ्चपञ्चकमुद्दिष्टंमनो हेतुचतुष्टयम । इन्द्रियोपक्रमेऽध्याये सद्धृत्तमखिलेन च ॥
स्वस्थवृत्तं यथोद्दिष्टं यः सम्यगनुतिष्ठति । ससमाः शतमव्याधिरायुषानवियुज्यते ॥ (च.सू. 8/30-31)

Those who follows description of sense organs five pentads, mind, four etiological factors and good conducts for maintenance of positive health devoid of all diseases, lives for hundred years and does not meet with an untimely death.



आचाररसायन—

सत्यवादिनमक्रोधंनिवृत्तं मद्यमैथुनात । अहिंसकमनायासंप्रशान्तंप्रियवादिनम ॥
जपशौचपरंधीरंदाननित्यंतपस्विनम । देवगोब्राह्मणाचार्यगुरुवृद्धार्चने रतम ॥
आनृशंस्यपरंनित्यंनित्यंकरूणवेदिनम । समजागरणस्वप्ननित्यं क्षीरघृताशिनम ॥
देशकालप्रमाणज्ञंयुक्तिज्ञमनहङ्कृतम । शस्ताचारमसंकीर्णमध्यात्मप्रवणेन्द्रियम ॥
उपासितारंवृद्धानामास्तिकानांजितात्मनाम । धर्मशास्त्रपरं विद्यान्नरं नित्यरसायनम ॥
गुणैरैतैः समुदितैः प्रयुङक्तेयोरसायन । रसायनगुणातसर्वानयथोक्तानससमश्नुते ॥

(च.चि. 1/4/30-35)

The Achara Rasayana significance physical and mental conducts of a man. Achara Rasayana described code of conducts which are equal to Rasayana therapy and been mentioned that those who follow Achara Rasayana they will get benefits of the Rasayana therapy.

Persons should speak always Satya (truth), should free from Krodha (anger), should not drink Madya (alcohol) and should not hurt no one physically, mentally. Should avoid Maithuna (sex indulgence), who do not indulge in violence (Himsa), Should away to Peaceful (Prashanta) and pleasing in their speech (Priyavadana).

Practice of Japa (one should devote himself chant), practices of Shouchadhari (always clean externally and internally), regularly practice of charity (Dana) and Tapas (penance). Regular offer prayers to gods, cows, Brahmans, teachers, perceptions and old people, Absolutely free from Barbarous acts, which are compassionate, Period of awakening and sleep are regular, habitually take milk and ghee, who are acquainted with the measurement of the country and the time, who are experts in the knowledge of rationality, who are free from ego, whose conduct is good, who are not narrow minded, who have love for spiritual knowledge, who have in excellent sense organs are conditions, who have reverence for old age persons, Astika (those who believe in the existence of God and validity of knowledge of the Vedas), and persons having self-control and who regularly study scriptures, gets the best out of rejuvenation therapy. Those are following these this person can like taking of Rasayana Sevana.

# CHAPTER 6 Trayopastambha

The Trayopasthmbhas are the subsidiary pillars, which support the body throughout the life span, by providing the qualities like Bala, Varna, Upachaya etc. they are considered as subsidiary or secondary as principal pillars of life are the three Doshas. But their importance in normal functioning of the body cannot be over looked. The Trayopastmbhas are Ahara, Nidra and Brahmacharya. Each one of these deserves due importence because these factors are concerned with the basic needs of living system and over indulgence or total abstinence of any of these may be harmful to life. The Ahara is mainly concerned with the energy production and maintenance of living tissues. The Nidra is the one which provide complete relaxation to the body and mind and there it restores the potentials of the individual. The Brahmacharya is concerned with disciplined mode of sexual life and reproduction.

The maintenance of health and prevention from diseases can be achieved through food and lifestyle specific to individual needs and in line with the seasons and cycles of nature. Food and habits which are conducive to the body are known as Pathya. Food is referred as 'Mahabhaisajya' by Ayurvedic classics. Ayurveda described a large number of food and drinks, their method of preparation and the code and discipline of taking the food.

त्रयउपस्तम्भाइति--आहारस्वप्नोब्रह्मचर्यामिति । (च.सू. 11/35)

The three supports of life are Ahara, Nidra(Swapna) and Bramhacharya, these supports are designed as Upastambha, which literally means sub-supports, posts mainly support a house but there are certain sub posts, which add to the supporting strength of such pillars.

Ahara, Nidra and Brahmacharya are the three factors which play an important role in the maintenance of a living organism. In the Ayurvedic literature, these factors i.e. Ahara, Nidra and Brahmacharya have been compared with the three legs of sub-support and have been termed as the three Upastambhas.

उप–सहायक, hearer, accessory.

स्तम्भ–अवलम्बन, support, pillar

शरिरंबलवर्णोपचयोपचितम्नुवर्तते । (च.सू. 11/35)





These Upasthambha are necessary source to get strength. This is the reason why Trayaupastambha immediately follow description of Trividha Bala.

It continues well-endowed with strength, complexion and development till the completion of life span provided one abstains from harmful practices which will be explained here itself.

**Ahara ( आहार )**

आहियतेइतिआहारः अन्नपादादि सर्व । शब्दकल्पद्रम

The substance which is to be taken in or swallowed in through the throat is called Ahara.

Derivation of Ahara-

हनेहरणे means to be taken in.

Shabdastoma Mahanidhi - The Ahara is substances which build up the body.

Vaidyaka Shabdashindhu - Any substance which passes through the throat is called as Ahara.

Vachaspatyam - "आहियतेइत्याहार" means which is to be swallowed is called Ahara.

Anna is a popular and widely used synonym of Ahara. The word Anna meaning "to be taken in" or "which nourishes the body".

आहियतइत्याहारोभेषजमपि । (चक्रपाणि टिका च.सू. 26/85)

While commenting on the description of Ahita, Chakrapani has said that Ahara means which is ingested and thus it includes in itself both diet and drugs.

जिह्वा ह्याहरणमाहारः । (गगांधार टिका च.सू. 11/15)

Which ingested by the tongue down to the throat is called Ahara.

यजुर्वेद–अन्नपतेऽन्नस्यनोदेहि अतमिवस्यशुष्मिण ।

"Oh, God, Give us food which does not cause any disease and also gives us strength."

In Bhagavata Purana-नाश्नत: पथ्यमेवान्नं व्याधयोभिभवाभि: ।

The importance of Pathya is told.

पुजयेदशनंनित्यमद्याचैतकुत्स्ययन । (मनुस्मृति)

One should respect the food every day and one should not criticize it.

नभुञ्जितोदघृतस्नेहंनातिसौहितमाचरेत । नतिपगेनतिसायंनसायंप्रातरशित ॥ (मनुस्मृति)

Manu tells that food should not be taken without Ghrita and Taila and also should not over food; one should not eat food before sunrise, after sunset and also not eat in Sandhyakala. If somebody has taken heavy food at noon, he should not eat in the evening.

जठरं पुरण्येदर्धमन्नै जलेनच । वायोः संचरणार्थायचतुर्थभवशेषयेत ॥ (विष्णुपुराण)

One should take half part of stomach with solid foods, one fourth part with liquid and remaining one fourth parts should be kept empty for Vata.

In Bhagavat Geeta, the description of Satvika, Rajasika, Tamasika Ahara.

सात्विकः–

आयुः सत्वबलारोग्यसुखप्रितिविवर्धनाः रस्याः । स्निग्धाः स्थिराः हद्याआहारासात्विकप्रियाः ।
(भ.गी. 17/8)

राजसिक–

कटवाम्ललवणात्युष्णाति क्षार तक्षविदाहिनः । आहारराजस स्येष्टा दुःख शोकाभयप्रदा ॥
(भ.गी. 17/9)

तामसिक–

नामसिकः यातयामगतरसंपुतिपर्युषितंचव्यत । ऊच्छिष्टम्पिचा मेध्यंभोजनतानमप्रियम ॥
(भ.गी. 17/10)

In Ramayana, diet has been classified into two groups. 1. Satvika 2. Tamasika

**Importance of Ahara**

आहारसंभवंवस्तुरोगश्चाहारसंभवः । हिताहितदिशेषात्तुविशेषोसुखदुःखयोः ॥ (च.सू. 28/45)

Human body is born from food and diseases are also produced by food; happiness and unhappiness depend on the use of suitable and unsuitable foods respectively.

अन्नं वृत्तिकराणां श्रेष्ठः । (च.सू. 25/40)

Anna is best among things which help to do work.

न च आहारसमंकिञ्चितभैषज्यामुपलभ्यते । शक्यतेऽप्यन्नमात्रेण नरः कर्तुनिरमय ॥ (का.खि. 4/5)

No medicine is equivalent to food. It is possible make person diseases free with just proper diet.

आरोग्यंभोजनाधीनं ..... । (का.खि. 5/9)



Health is dependent on food.

आहारः प्रीणनोसद्योबलकृद्देहधारकः । आयुस्तेजः समुत्साहस्मृत्योजोऽग्निविवर्धनम ॥ (सु.चि. 24/68)

The food enhances vitality, strength and makes the body study. Food increases enthusiasm memory, Agni, life span, luster and Ojus.

त्रयः ओपस्तम्भाः इत्याहारः स्वप्नो ब्रह्मचर्यमिति । (च.सू. 11/23)

Food is one among the three sub pillars supporting life.

प्राणाः प्राणभृतामन्नमन्नं लोकोऽभिधावति । वर्णः प्रसादः सौस्वर्यंजीवितंप्रतिभासुखम ॥
तुष्टिः पुष्टिर्बलं मेधा सर्वमन्ने प्रतिष्ठितम । लौकिकंकर्मयद्धुत्तौस्वर्गतौयच्चवैदिकम ॥
कर्मापवर्गेयच्चोक्तंतच्चाप्यन्ने प्रतिष्ठितम ॥ (च.सू. 27/349-350)

For all living beings foods is the sustainer of life, the whole world of living beings craves for food only; color, complexion, tranquility, good voice, span of life, ingenuity, happiness, contentment, nourishment, strength, intelligence all these are dependent on food. Social and vocational activities, Vedic Rituals, leading to heaven and salvation even these are dependent in food itself.

हिताशिस्याम्मिताशिस्यातकालभोजीजितेन्द्रियः । पश्यनरोगानबहून कष्टान बुद्धिमानविषमाशनात ॥
(च.नि. 6/11)

Most of the incurable diseases are produced duo to improper food. So intelligence and self-controlled man should consume conducive food in right quality, at the right time to prevent diseases.

इष्टवर्णगन्धरसस्पर्श विधिविहितमन्नपानं प्राणिनां प्राणिसंज्ञकानां प्राणमाचक्षते कुशलाः, प्रत्यक्ष-फलदर्शनात; तदिन्धना ह्यन्तरग्नेः स्थितिः, तत सत्वमूर्जयति, तच्छरीरधातुव्यूहबलवर्णेन्दिर्य प्रसादकरं व्थोक्तमुपसेव्यमानं, विपरितमहिताय संपद्यते ॥ (च.सू. 27/3)

Food and drinks with desirable smell, taste and touch and have been taken according to prescribed method is said as vital strength by the experts on the basis of observing their results directly; because the condition of internal fire depends on their fuel. They produce energy in mind, constitution of Dhatus, strength, complexion and clarity of the sense organs, if properly taken, otherwise they become harmful.

**Ahara Dravya Vargikaranam**

परमतोवर्गसंग्रहेणाहरद्रव्याण्यनुव्याख्यास्यामः ॥
शूकधान्यशमीधान्यमांसशाकफलाश्रयान । वर्गानहरितमद्याम्बुगोरसेक्षुविकारकान ॥
दशब्दौचापरौवर्गौ क्रुतान्नाहारयोगिनाम् । रसवीर्यविपाकैश्चप्रभावैश्चप्रचक्ष्महे ॥ (च.सू. 27/6-7)

Categories of food substances, Shuka Dhanya, Sami Dhanya, Mamsa, Shaka, Phala, Harita, Madya, Ambu, Gorasa, Ikshu Vikara, Krutanna, Ahara Yogi Varga are described in respect of their Rasa, Virya, Vipaka and Prabhava.

शालिधान्यंव्रीहिधान्यंशुकधान्यंतृतीयकम । शिम्बिधान्यं क्षुद्रधान्यमित्युक्तंधान्यपञ्चकम ॥

(भा.प्र. 6/9/1)

| Sr. no. | Bhava Prakasha Chapter-6 | Asthanga Sangraha 5th and 6th Chapter Dravadravya Vijnaneeya | Asthanga Hrudya 6th& 7th Chapter Annasvarupa Vijnaneeya | Sushruta Samhita Dravadravyavidhiadhyaya | Caraka Samhita Annapanavidhi adhyaya |
|---|---|---|---|---|---|
| 1. | Shakavarga | Jalavarga | Shukadhanya | Paneeyavarga | Shuka Dhanya |
| 2. | Mamsavarga | Ksheeravarga | Shimbhidhanya | Ksheeravarga | Sami Dhanya |
| 3. | Kritannavarga | Ikshuvarga | Kritanna | Dadhivarga | Mamsa |
| 4. | VariVarga | Madhuvarga | Mamsa | Takravarga | Shaka |
| 5. | DadhiVarga | Tailavarga | Shaka | Ghritavarga | Phala |
| 6. | TakraVarga | Madyavarga (A.H.) | Phala | Tailavarga | Harita |
| 7. | NavanitaVarga | Mutravarga (A.S.) | Aoushadhavarga (A.H.) | Madhuvarga | Madya |
| 8. | GhritaVarga | | | Ikshuvarga | Ambu |
| 9. | Mutravarga | | | Madyavarga | Gorasa |
| 10. | Tailvarga | | | Mutravarga | IkshuVikara |
| 11. | Sandhanavarga | | | Mudgadivarga | Kritanna |
| 12. | Ikshuvarga | | | Mamsavarga | Ahara Yogi |
| 13. | | | | Phalavarga | |
| 14. | | | | Shakavarga | |
| 15. | | | | Pushpavarga | |
| 16. | | | | Kanda varga | |
| 17. | | | | Lavanavarga | |
| 18. | | | | Kritannavarga | |
| 19. | | | | Bhakshyavarga | |
| 20. | | | | Anupanavarga | |



**Ahara Vidhi Vidhana**

Ahara is not only needed for the continuity of life, but for Bala, Varna, Upacaya etc. also. The proper diet, taken in proper manner can lead to better health. On the contrary, proper diet if not taken in proper manner can lead to diseases. Ahara, as well as the method of its intake both have equal importance, according to Ayurveda. In other medical sciences, food is considered important, but not the manner of eating. In Ayurveda, proper methods of intake food as well as effects of improper methods of intake on body are also stated.

तत्रेदाआहारविधिविधानमरोगाणांचापिकेषाञ्चितकालेप्रकृत्यैवहिततमंभुञ्जानांभवति-उष्णं, स्निग्धं, मात्रावत, जीर्णेवीर्याविरुद्धम इष्टे देशे इष्टसर्वोपकरणं नातिद्रुतंनातिविलम्बितम अजल्पन् अहसन् तन्मनाभुञ्जीत, आत्मानमभि समीक्ष्यसम्यक । (च.वि. 1/24)

Healthy individuals as well as some of the patients should follow the things stated after. One should eat only that food which is

1. Ushna (Warm)
2. Snigdha (Unctuous)
3. Matravata (In proper quantity)
4. Jeerna Ahara (After the digestion of the previous meal)
5. Viruddha Ahara (Not contradictory in potency)
6. Ishta Desha and Ishtasrvapakarana (In proper place equipped with all the accessories)
7. Without talking
8. Without laughing
9. With concentration of mind
10. With paying due regard to oneself.

**Ushna (Warm)**

तस्यसादागुण्यमुपदेक्ष्यामः—उष्णमश्नीयात; उष्णंहिभुज्यमानंस्वदते, भुक्तंचाग्निमौर्द्यमुदीरयति, क्षिप्रंजरांगच्छति, वातमनुलोमयति, श्लेष्माणंच परिहासयति; तस्मादुष्णमश्नीयात् ॥ (च.वि. 1/25/1)

One should take warm food. Advantages of taking Ushna Ahara are:

- When taken warm, it is delicious
- Provokes the factors (enzymes) in the abdomen responsible for digestion
- Gets digested quickly because it helps secretion of saliva and secretion of Gastric juice.
- Helps in the downward passage of Vata and detachment of Kapha
- Helps in detachment of Kapha

- Lightness in body

**Snigdha (unctuous)**

स्निग्धमश्नीयत; स्निग्धंहिभुज्यमानंस्वदते, भुक्तंचानुदीर्णमग्निमुदीरयति, क्षिप्रंजरांगच्छतिवातामनुलोमयति, शरिरमुपचिनोति, दृढीकरोतिन्द्रियाणि, बलाभिवृद्धिमुपजयति, वर्णप्रसादंचाभिनिर्वर्तयति; तस्मातस्निग्धमश्नीयात। (च.वि. 1/25/2)

One should take unctuous food. Advantages of taking Snigdha Ahara are:

- Unctuous food is delicious
- Provokes the subdued power of digestion; it gets digested quickly
- Helps in the downward movement of Vata
- Increases the plumpness of the body
- Strengthens the sense faculties
- Brings out the brightness of complexion
- Promotes strength

**Matravata (In Proper Quantity)**

मात्रवश्नीयात; मात्रावद्धिभुक्तंवातपित्तकफानपीडयदायुरेवविर्धयतिकेवलं, सुखंसुदमनुपर्येति, नचोष्माणमुपहन्ति, अव्यथंचपरिपाकमेति; तस्मान्मात्रावदश्नीयात। (च.वि. 25/3)

One should take food in proper quantity. Advantages of taking food in proper quantity are :

- Promotes longevity in its entirety without afflicting Vata, Pitta and Kapha.
- Easily passes downward
- Does not impair the power of digestion
- Gets digested without any difficulty.

**Intake after digestion of previous meal**

जीर्णेऽश्नीयात; अजीर्णहि भुञ्जानस्याभ्यवहृतमाहारजातं पूर्वस्याहारस्य रसमपरिणतमुत्तरेणाहार रसेसेनौपसृजतसर्वानदोषानप्रकोपयत्याशु, जीर्णेतुभुञ्जानस्य स्वस्थानस्थेषु दोषेष्वग्नौचोदीर्णे जातायं च बुभुक्षायां विवृतेषुचस्त्रोतसां मुखेषुचोद्गारे विशुद्धे, विशुद्धेच हृद्ये वातानुलोम्ये विसृष्टेषु च वातमुत्रपुरिषवेगेष्वभ्यवहृतमाहारजातं सर्वशरिरधातूनप्रदूषयदायुरेवाभिवर्धयतिकेवलंतस्मादज्जीर्णेऽश्नीयात। (च.वि. 1/25/4)

If the food is taken after the digestion of the previous food at a time when Doshas are at their proper places and Agni is provoked, there is good appetite, the entrance of the channels of circulation are open, proper cardiac function, downward passage of wind and proper manifestation of the urges for voiding flatus, urine and stool, then the product



of food does not vitiate the Dhatus of the body, but on the other hand promotes longevity in its entirety.

**Ideal Matra (Quantity) of Ahara for a person:**

There is no such fix quantity of food which an ideal quantity of food. Ayurveda believes that every human being is unique and different from others; hence the needs for everything are different from one to another. The hunger or the quantity of food needed also differs from one person to other. So, it is not possible to decide a specific quantity of food, which will be applicable to all. Because quantity of food for a person is depend on Agnibala (digestive power) of a person which vary according to the person and also the nature of food he is taking. The stomach should be imagined to be divided in three equal parts and the food items should be taken accordingly.

**Ideal time for meal**

A) **Lunch :** Ideal time for lunch is between first and second Yama i.e. between 3-6 hrs after sunrise (beginning of day).

B) **Dinner** : Ideal time for dinner is after the end of first Prahara i.e. after 3 hrs after the beginning of night (after sunset).

**Virya-aviruddha (No Contradictory Potencies)**

वीर्याविरुद्धमश्नीयात; अविरुद्धवीर्यमश्ननहिविरुद्धवीर्याहारजैर्विकारैर्नोसृज्यते; तस्माद्विर्यादिरुद्धमश्नीयात। (च.वि. 1/25/5)

One should take food having no contradictory potencies. By taking such food one does not get afflicted with such diseases as may arise from the intake of food having mutually contradictory potencies. Therefore, one should take food having no contradictory potencies.

**Ishta Deshe, Ishta Sarvopakarane (in Proper place and with all accessories)**

इष्टे देशे इष्टसर्वोपकरणं चाश्नीयात; इष्टे हिदेशेभुञ्जानो नानिष्टदेशजैर्मनाविघातकरैर्भावैर्मनोविघातं प्राप्नोति, तथैवेष्टैः सर्वोपकरणैः तस्मादिष्टे देशे तथेष्ट सर्वोपकरणंचाश्नीयात। (च.वि. 1/25/6)

One should take food in proper place equipped with all the accessories. By doing so a person does not get afflicted with such of the factors as would result in emotional strain which occurs when one takes his food in improper places without the required accessories.

**Na Atidrutam (Not in hurry)**

नातिद्रुतमश्नीयात; अतिद्रुतंहिभुञ्जानस्योत्स्नेहनमवसादनं भोजनस्याप्रतिष्ठानंच, भोज्यदोषसाद गुण्योपलब्धिश्चननियता; तस्मादन्नातिद्रतश्नीयात॥ (च.वि. 1/25/7)

One should not take food too hurriedly. Disadvantages of taking food hurriedly:

- Enters into a wrong passage
- It gets depressed and it does not enter into the stomach properly.
- One can never determine the taste of food articles and detect foreign bodies like hair etc., mixed with them.
- One can't decide the things to be eaten first
- Doesn't get complete perspicuity of Indriyas
- Doesn't get downward passage of Vata

**Na Ativilambitam (not too slowly)**

नातिविलम्बितमश्नीयातः अतिविलम्बितंभुञ्जानोनतृप्तिमधिगच्छति, बहुभुङ्क्ते, शीतीभवत्याहारजातं, विषमंचपच्यते; तस्मान्नाति विलम्बितमश्नीयात ॥ (च.वि. 1/25/8)

One should not take food very slowly. Disadvantages of slow intake of food:

- Do not give satisfaction to the individual.
- In this situation, he would take more than what is required.
- The food would become cold.
- There will be irregularity in digestion.

**Ajalpana, Ahasana, Tanmana (With concentration):**

अजल्पन्नहसन तन्मनाभुञ्जीत; जल्पतोहसतोऽन्यमनसोवाभुञ्जानस्यतएवहिदोषाभवन्ति, यएवतिदृत-मश्नतः तस्मादजल्पन्नहसंस्तन्मना भुञ्जीत ॥ (च.वि. 1/25/9)

One should not talk or laugh or taking food. Disadvantages are same as intake hurriedly. A person taking Tanmana Bhojana i.e. with full concentration knows about quantity, digestive power and procedure. Now days this is the most common reason for Agnimandya. People do not concentrate on the food. Instead of that, they are busy in Watching TV, Phone calls, Computer operations, Chatting, Talk and Laugh etc. Due to this, they can't decide the exact quantity of food needed. Overeating badly affects their digestive power which leads to Agnimandya and ultimately many diseases like Obesity etc.

**Atmanam Abhisamikshya (With paying due regard to oneself)**

आत्मानमभिसमीक्ष्यभुञ्जीतसम्यक; इदं ममोपशेते इदं नोपशेतेइत्येवंविदितं ह्यस्यात्मन आत्मसात्म्यंभवतितस्मादात्मानमभिसमीक्ष्यभुञ्जीतसम्यगिति ॥ (च.वि. 1/25)

One should take food in a prescribed manner; with due regard to his own self. Considering his own body constitution, he should be able to decide usefulness or Harmfulness of a substance.



**Satmya (Conduciveness)**

सात्म्यंनामयदयदात्मन्युपशेतेसात्म्यार्थो ह्युपशयार्थेः । (च.वि. 1/20)

A substance conducive to an individual is called Satmya. Satmya and Upashaya have same meaning.

तत्रसात्म्यंनामसहात्मनाभवत्यभ्यस्तंतदौचित्यातउपशेतेइत्येके । (अ.सं.सू. 10/27)

Satmya is the one which conducive or suitable to one self.

सात्म्यंनामंसुखंयतकरोतिततदुच्यते । (डल्हण टिका सु.सू. 35/39)

Satmya is that which can be consumed for long duration in diet.

**Types of Satmya**

सात्म्यानितुदेशकालजात्यर्तुरोगव्यायामोदकदिवास्वप्नरसप्रभृतीनिप्रकृतिविरुद्धन्यापियान्यबाधकराणिभवन्ति । (सु.सू. 35/39)

Satmya is the regimen and diet use of such things which do not cause harm or injury to the body even though they are opposite quality of ones Desha, Kala, Jati, Rutu, Roga, Vyayama, Udaka, Divaswapna, Rasa etc.

तत्त्रिविधंप्रवरावरमध्यविभागेन । सप्तविधंतुरसैकैकत्वेनसर्वरसोपयोगाच्च । तत्र सर्वरस प्रवर अवरमेकरसं मध्यंतु प्रवरावरमध्यस्तं । (च.वि. 1/20)

Satmya is three types, Pravara, Madhyama, Avara and seven types according to six Rasas individually and collectively. Among them use of all Rasa is Pravara, use of only one Rasa is Avara and use of 2 to 5 Rasa is Madhyama.

1. देशसात्म्य–

तत्रदेशसात्म्यंयथा–देशोहिद्विविधः–भूमिः, आतुरशरिरंच । भूमिसात्म्यमपिसमुदायैकदेशभेदेनद्विविधं तत्रसमुदायस्ययथा–जाङ्गलदेशेयौआहाराचारौतौअनूपेविपरीतौ ।

देशावयवानामपियथा–बाल्हिकपल्लवचीनादिनांमाषगोधूममार्द्वीकादिभिः सात्म्यम । तत्रातुरशरिरसात्म्यंद्विविधं–समुदायस्यैकम, अन्यदवयवस्य । तत्रसमुदायस्ययथा– मधुरोरसः सर्वधातुवर्धन;, अवयवसात्म्यंयथाचक्षुष्यकेश्यकण्ठादिद्रव्यम । (डल्हण टिका सु.सू. 35/39)

Desha Satmya divided into two types Bhumi and Atura Sharira.

Bhumi Satmya Samudaya- Jangala, Anup, Sadharana Desha.

Bhumi Satmya Avayava–बाल्हिकदेश-माष, पल्लवदेश–गोधूम, चीनदेश-मार्द्वीका

Atura Sharira Satmya-

Atura Sharira Satmya Samudaya- Madhra Rasa Sarva Dhatu Vardhana.

Atura Sharira Satmya Avayava- Stamya to one organ of the body i.e. Chakshushya, Keshya, Kantha etc.

2. **Kala Satmya-** Time is divided into two

A. Avasthika Kala –conditional use of diet in Avasthika Kala i.e. in Roga use of Pathya Ahara and in healthy condition according age use of diet. i.e. Bala, Vrudha etc.

B. Nityaga Kala- daily regimens and seasonal regimen are used; the person should consume food according to seasons, age, diseased condition, while consuming food.

3. जातिसात्म्यं–

जातिसात्म्यंयथा–मनुष्यजातेः सात्म्यंशाल्याद्याः, मृगपक्षिजातीनांचतृणपतङ्गदीनि ।

(डल्हण टिका सु.सू. 35/39)

The food Satmyafor Jati i.e. for human – Shali Dhanya (Rice) are Satmya, for animals Truna (Grass) and Birds Patanga (Insects) is Satmya.

4. ऋतुसात्म्यं–

ऋतुसात्म्यंयथा–ऋत्वभिहितमन्नपानादि । (डल्हण टिका सु.सू. 35/39)

Diet are Satmya to particular Rutus is Rutu Satmya.

5. रोगसात्म्य–

रोगसात्म्यंयथा–गुल्मिनां क्षीरम्, उदावर्तिनांघृतं, प्रमेहिणां क्षौद्रमित्यादि । (डल्हण टिका सु.सू. 35/39)

In Roga Satmya same Diet are Satmya like Ksheera is Satmya in Gulma Roga, Ghrita is Satmya in Udavarta and Madhu is Satmya in Prameha Roga.

6. व्यायामसात्म्यं–

व्यायामस्त्रिविधः–कायवाङ्मनोभेदात । (डल्हण टिका सु.सू. 35/39)

Vyayama is three types i.e. related to Kaya, Vaka, Mana. Vyayama enhance the strength of body and immunity of the person.

7. उदकसात्म्यं–

उदकग्रहनमाहारोपलक्षणं, तेनेचतुर्विधोऽप्याहारः संगृहीतः । (डल्हण टिका सु.सू. 35/39)

Water is Satmya in all types of Ahara. According to nature of intake Ahara into four types, Ahita, Pita, Khadita, Lehya.

8. दिवास्वप्नसात्म्यं–

दिवास्वप्नप्रभृतीनीतिप्रभृतिग्रहणाज्जागरणादीनांग्रहणम् । दिवास्वप्नप्रभृतीनी-तिकेचिद्रसशब्दंपठन्ति ।

(डल्हण टिका सु.सू. 35/39)

Divaswapna is Satmya in the condition of Grahani, Ratrijagarana etc.

9. रससात्म्यं–

तेषांमते रसोदकग्रहणाद्रसनेन्द्रियग्राह्यं दुग्धदधिघृतसलिलाद्यन्नपानं गृह्यते ।

(डल्हण टिका सु.सू. 35/39)

Regular Satmya Rasa like Dugdha, Dadhi, Ghrita etc. are called as Rasa Satmya.



10. प्रकृतिसात्म्यं–

प्रकृतिविरुद्धान्यपीतिस्वभावेनविरुद्धानीत्यर्थः । अन्येतुप्रकृतिः स्वभावतोवाता-दिभेदेन भिन्नेत्याचक्षते । (डल्हण टिका सु.सू. 35/39)

One should be uses of Ahara is opposite to the Prakruti. The person is having Kapha Prakruti person should consume food having Katu, Tikta and Kashaya Rasa, Ruksha and Sheeta quality. Vata prakruti person should consume food having Amla, Lavan, Madhra Rasa and Snigdha and Ushna quality.

**According to Carakacharya**

11. ओकसात्म्यं–

इत्युक्तमृतुसात्म्यं यच्चेष्टाहारव्यपाश्रयम । उपशेतेयदौचित्यादोकः सात्म्यंदुच्यते । (च.सू. 6/39)

Regimens and diets which have been non-injurious to the body by habitual use are known as Okasatmya. Okasatmya is nothing but developed due to continuous intake of particular substances, even though it is not good for the health of body.

## Dwadashashana Pravicharana

अतऊर्ध्वद्वादशाशनप्रविचारानवक्ष्यामः । तत्रशीतोष्ण स्निग्ध रुक्ष द्रव शुष्कैककालिक द्विकालिकौषधयुक्त मात्राहीन दोषप्रशमनवृत्त्यार्थाः ॥ (सु.उ. 64/56)

Sushruta Acharya describes the twelve kinds of food such as Sheeta, Ushna, Snigdha, Ruksha, Drava, Shushka, Eka Kala, Dvikala, Aushadhayukta, Matra Hina, Doshaprashamana and Vrtyartha.

**Sheeta Guna Ahara**

तृष्णोष्णमददाहार्तानरक्तपित्तविषातुरान ॥ मूर्च्छार्तानस्त्रीषुच क्षीणान शीतैरन्नैरुपाचरेत ॥

(सु.उ. 64/57)

Person suffering from thirst, heat, alcoholism, burning sensation, bleeding disease, poison, fainting and emaciated from copulation should be treated by cold foods.

**Ushna Guna Ahara**

कफवातामयाविष्टान विरिक्तानस्नेहपायिनः । अक्लिन्नकायांश्च नरानुष्णैरन्नैरुपाचरेत ॥ (सु.उ. 64/58)

Those suffering from diseases produced by Kapha and Vata, who have had purgation, who are drink Sneha, are very dry should take food with warm foods.

**Snigdha Ahara**

वातिकान्रुक्षदेहांश्चव्यवायोपहतांस्तथा । व्यायामिनश्चापिनरान स्निग्धैरन्नैरुपाचरेत ॥ (सु.उ. 64/51)

Persons with Vata Prakruti, dry skin, exhaustion by sexual intercourse, performing lot of physical exercise should be treated with Snigdha Ahara.

**Ruksha Ahara**

मेदसाऽभिपरीतांस्तुस्निग्धान्मेहातुरानपि । कफाभिपन्नदेहांश्च रुक्षैरन्नैरुपाचरेत ॥ (सु.उ. 64/60)

Peoples suffering from Medaroga, have been Snehana, suffering from Prameha, who have Kapha in the body should be treated with Ruksha Ahara.

**Drava Ahara**

शुष्कदेहानपिपासार्तानदुर्बलानपिचद्रवैः । (सु.उ. 64/61)

Persons who are having dryness of the body, suffering from thirst, debility should be treated with Drava Ahara.

**Shushka Ahara**

प्रक्लिन्नकायानव्रणिनः शुष्कैर्मेहिनएवच ॥ (सु.उ. 64/61)

Person having lots of Kleda, suffering from wound, and Prameha should treat with Shushka Ahara.

**Eka Kala Ahara**

एककालंभवेद्देयोदुर्बलाग्निविवृद्धये । (सु.उ. 64/62)

Person having weak digestive fire eat once in a day.

**Dvikala Ahara**

समाग्नयेतथाऽऽहारोद्विकालमपिपूजितः ॥ (सु.उ. 64/62)

Person having normal digestive fire should eat twice a day.

**Aushadhayukta Ahara**

औषधद्वेषिणेदेयस्तथौशधसमायुतः । (सु.उ. 64/63)

If the patient has aversion for particular medicine, it should be mixed with food and given to him.

**Matra Hina Ahara**

मन्दाग्नयेरोगिणेचमात्राहीनः प्रशस्यते ॥ (सु.उ. 64/63)

Patients having low digestive fire and sick should eat small quantity of food.

**Doshaprashamana Ahara**

यथर्तुस्त्वाहारोदोषप्रशमनः स्मृतः । (64/57-64)

Foods consumed appropriate- suitable to season and place is Dosha Prashamana.

**Vrtyartha Ahara**

अतः परमतुस्वस्थानांवृत्त्यर्थसर्वएवच । प्रविचारानिमानेवंद्वादशात्रप्रयोजयेत ॥ (सु.उ. 64/57-64)

All food consumed by the healthy person is meant to maintain health and life. Considering these twelve aspects ingestion of food should be planned.



## Ashta Ahara Vidhiviseshayatanani

Ahara may be Hitakara as well as Ahitakara. The Hitakara Ahara depends upon the variation in Matra (dose), Kala (time), Kriya (method of preparation), Bhumi (place), Deha (body), Vyadhi (disease) and Vaya (age) of an individual.

हिताहितानामाहारजातानालक्षणमनपवादमभिजानीमहेः हितसमाख्यातानामाहारुजातानामहितसमाख्यातानांच मात्रा काल क्रिया भूमि देह दोषपुरुषवस्थान्तरेषुविपरितकारित्वमुपलभामह इति ।

(च.सू. 25/32)

Due to above reason Ayurveda classics have laid down some examination methods, rules, regulations, for taking diet, even though a man takes wholesome food, he should have be examine the following point to achieve the proper digestion, assimilation and nourishment to the body.

The Ahara Vidhi Viseshayatanana means the causative factors which are responsible for the wholesome and unwholesome effect of the food or of the methods for the diet intake.

For the maintaining health every person should consume only Hitakara Ahara.

Charakacharya explains total eight factors. Vagbhatacharya explain seven factors.

तत्र खल्विमान्यष्टावाहार विधि विशेषायतनानि भवन्ति; तद्यथा प्रकृति करण संयोग राशि देश कालोपयोगसंस्थापयोक्त्रष्टमानि । (च.वि. 1/21)

Prakruti, Karana, Samyoga, Rashi, Desha, Kala, Upayokta, Upayoga Samstha are eight factors are associated with useful and harmful effects and condition by one another. One should try to understand them and resort to useful things to maintain health of the person.

**Prakruti/ Svabhava (Nature of the substance)**

तत्रप्रकृतिरुच्यतेस्वभावोयः, सपुनराहारौषधद्रव्याणांस्वाभाविकोगुर्वादिगुणयोगः, तद्यथा–माषमुद्रयोः शूकरैणयोश्च । (च.वि. 1/21(1)

Prakruti means Svabhava-natural quality of the food and medicine. Nature of substance like Guru, Laghu etc. As Masha is Guru and Mudga is Laghu. Shuka (pork) is Guru and Mruga(deer) flesh is Laghu.

**Karana/Samskara (processing of food substance)**

करणंपुनः स्वाभाविकानांद्रव्याणामभिसंस्कारः । संस्कारोहिगुणान्तराधानमुच्यते । तेगुणास्तोयाग्नि सन्निकर्ष शौचमन्थनदेशकालवासनभावनादिभिः कालप्रकर्षभाजनादिभिश्चधीयन्ते ॥ (च.वि. 1/21(2)

Processing results in the transformation of the substance and their attributes. Transformation of attributes is affected by dilution, application of heat, cleaning, washing, churning, storing, place, time, maturing, flavoring, preservation in container etc.

By processing there is change in qualities an example of the transformation of attribute is red variety of Shali, which is nature by light becomes lighter when heated, or curd by nature aggravates Shotha, but when churned and turned into butter milk, it alleviates Shotha. This illustrates the transformation of attributes by churning.

**Samyoga (combination)**

संयोगः पुनर्द्वयोबहूनांवाद्रव्याणांसंहतीभावः, सविशेषमारभते, यंपुनर्नैकैकशोद्रव्याण्यारभन्ते; तद्यथा– मधुसर्पिषोः मधुमत्स्यपयसांचसंयोगः । (च.वि. 1/21(3)

Samyoga means combination of two or more substances. Due to Samyoga some new properties are seen which otherwise are not seen in individual substances. Individually fish and milk cannot cause Skin diseases (Kushtha) but their combination causes skin diseases (Kushtha) or combination of honey and ghee also is harmful.

**Rashi (quantity of food substance)**

राशिस्तुसर्वग्रहपरिग्रहौमात्रामात्रफलविनिश्चयार्थः । तत्रसर्वस्याहारस्यप्रमाणग्रहमेकपिण्डेनसर्वग्रहः परिग्रहः पुनः प्रमाणग्रहणमेकैकत्वेनाहारद्रव्याणाम । (च.वि. 1/21(4)

Rashi is quantity of food substance to be taken. Which determine the result of their administration in adequate and inadequate quantity. Two types of Rashi Sarvagraha and Parigraha. The quantity of food taken in entirely is Sarvagraha and quantity of each of its ingredients is Parigraha.

**Desha (relates to the habitat)**

देशः पुनः स्थानं, सद्रव्याणामुत्पत्तिप्रचारौदेशसात्म्यं चाचष्टे । (च.वि. 1/21(5)

Desha denotes place relating to growth as well as distribution of the substance and also the suitability in respect of place.

**Kala (Time)**

कालोहिनित्यगश्चावस्थिकश्चः तत्रावस्थिकोविकारमपेक्षते, नित्यगस्तुऋतुसात्म्यापेक्षः ।

(च.वि. 1/21(6)

Kala stands for both the form of day and night and the states of individual i.e condition of health and age. Nityaga (Daily) in the form of day, night and time to take food, Rutucharya etc. Conditional (Avasthika) according to diseases one should consume food which is conducive to the disease, age etc.



**Upayoga Samstha (rules for dieting)**

उपयोगसंस्थातूपयोगनियमः, सजीर्णलणापेक्षः । (च.वि. 1/21(7)

Upayoga Samstha denotes the rules for dieting. This depends on the symptoms of digestion.

**Upayokta-(who consumes the food)**

उपयोक्तापुनर्यस्तमाहारमुपयङ्क्तेयदायत्तओकसात्म्यम ।

इत्यष्टावाहारविधिविशेषायतनानि व्याख्यातानि भवन्ति । (च.वि. 1/21(8)

Upayokta is that who consumes the food. He is the one responsible for the habitual intake of things i.e. Okasatmya. Thus the eight factors which determine the utility or otherwise of various types of food are explained.

## सन्तर्पणजन्य व्याधी एवं अपतर्पणजन्य व्याधी

सन्तर्पणजन्य रोगाणां निदान–

संतर्पयतियः स्निग्धैर्मधुरैर्गुरुपिच्छिलैः । नवान्नैर्नवद्यै मांसैश्चानूपवारिजैः ॥ गोरसैगौडिकैश्चान्नैः पैष्टिकैश्चातिमात्रशः ।

चेष्टाद्वेषी दिवास्वप्नशय्यासनसुखेरतः । रोगास्तस्योपजायन्तेसम्तर्पणनिमित्तजाः । (च.सू. 23/3-4)

Person indulging in over nourishment with Snigdha , Guru, Madhura, Picchila, Navanna (newly harvested rice), Navamadya, Mamsa (Meat of Anupa and Varija animals), Cow's milk and its preparations, food preparations made of Jaggery, flour preparations, averse to physical activity, sleep during daytime, keeps lying on the bed or sitting at ease all the time caused by over saturation.

सन्तर्पणजन्य रोग–

प्रमेहपिडकाकोठकण्डूपाण्ड्वामयज्वराः । कुष्ठान्यामप्रदोषाश्चमूत्रकृच्छ्रमरोचकः ।
तन्द्राक्लैब्यमतिस्थौल्यमालस्यंगुरुगात्रता । इन्द्रियस्त्रोतसांलेपोबुद्धेर्मोहः प्रमीलकः ।
शोफाश्चैवंविधाश्चान्येशीघ्रमप्रतिकुर्वतः । (च.सू. 23/5-7)

Prameha, Prameha Pidika, Kotha (Urticaria), Kandu (ithcing), Pandu (Anaemia), Jwara, Kustha, Amapradosha (diseases due to Ama), Mutrakruccha (difficulty in micturation), Arochaka (loss of appetite), Tandra (drowsiness), Klaibya (sterlity), Atisthaulya (excessive obesity), Alasya (laziness), Gurugatrata (heaviness of body), Indriyastrotasm (coating of channels in sensory organs), Buddhermoha (confusion), Pramilaka (continuous thinking), Sopha (Swelling) and such diseases may occur if it is not managed properly.

सन्तर्पणजन्य रोगस्य चिकित्सा–

शस्तमुल्लेखनंतत्रविरेकोरक्तमोक्षणम । व्यायामश्चोपवासश्चधूमाश्चस्वेदनानिच ॥
सक्षौद्रश्चाभयाप्राशः प्रायो रुक्षान्नसेवनम् । चूर्णप्रदेहायेचोक्ताः कण्डूकोठविनाशनाः ॥ (च.सू. 23/8-9)

Vamana (Emesis), Virechana (Purgation), Raktamokshana (Bloodletting), Vyayama (physical), Upavasa (fasting), Dhumapana, Svedana (fomentation), intake of Abhyaprasha with honey, Ruksha Ahara, application of Churna Pradeha indicated in Kandu, Kotha in 3rd chapter are recommended.

त्रिफलारग्वधंपाठांसप्तपर्णसवत्सकम । मुस्तंसमदनंनिम्बंजलेनोत्क्कथितंपिबेत ।
तेनमेहाद्योयान्तिनाशमभ्यस्यतोध्रुवम । मात्राकालप्रयुक्तेनसंतर्पणसमुत्थिताः । (च.सू. 23/10-11)

Triphala, Aragvadha, Patha, Saptaparna, Vatsaka, Musta, Madanaphala, Nimba these should be decocted in water. Continuous intake of decoction according to dose and time diseases caused by over nutrition like Meha, are alleviated certainly.

मुस्तामारग्वधः पाठात्रिफलादेवदारुच । श्वदंष्ट्राखदिरोनिम्बोहरिद्रेत्वक्चवत्सकात ।
रसमेषांयथादोषंप्रातः प्रातः पिबन्नरः । संतर्पणकृतैः स्नवैर्व्याधिभिः संप्रमुच्यते ।
एभिश्चोद्वर्तनोद्धर्षस्नानयोगोपयोजितैः । त्वग्दोषाः प्रशमंयान्तितथास्नेहोपसंहितैः ॥ (च.सू. 23/12-14)

Musta, Aragvadha, Patha, Triphala, Devadaru, Svadamstra, Khadira, Nimbi, Haridra and Daruhardra, Vatsakatvak by using the decoction of these drugs in morning according Dosha one is relieved of all the diseases caused by over nutrition. Same drugs with or without oil substances used in the form of Udvartana, Udgharashana and Snana cures skin diseases.

कुष्ठंगोमेदकोहिङ्गु क्रौञ्चास्थि त्र्यूषणंवचा । वृषाकैले श्वदंष्ट्राच खराह्वा चाश्मभेदकः ॥
तक्रेणदधिमण्डेनबदराम्लरसेनवा । मूत्रकृच्छ्रंप्रमेहंच पीतमेतदव्यपोहति ॥ (च.सू. 23/15-16)

Kustha, Gomedaka, Hingu, Krauncasthi, Tryushana, Vacha, Vrushak, Ela, Svadamshtra, Kharahva, Ashmabhedaka the powder of these drugs taken along with butter milk, curd-water, or Badaramla juice consumed. This will cure Mutrakruccha and Prameha.

तक्राभयाप्रयोगैश्चत्रिफलायास्तथैवच । अरिष्टानां प्रयोगैश्चयान्तिमेहाद्याः शमम ॥

By administration of Abhaya along with Takra, Triphala along with Takra and uses of Arishta is beneficial in Prameha.

त्र्यूषणंत्रिफला क्षौद्रंक्रिमिघ्नमजमोदकः । मन्थोऽयंसक्तवस्तैलंहितोलोहोदकाप्लुतः ॥

Tryushan, Triphala, Kshaudra, Krimighna, Ajamodaka are mixed with roasthed grain flour and Mantha is prepared adding some oil and decoction of Aguru, is beneficial in Meha.

व्योषंविडङ्गंशिग्रूणित्रिफलांकटुरोहिणीम । बृहत्यौद्वेहरिद्रेद्वेपाठामतिविषांस्थिराम ॥
हिङ्गुकेबुकमूलानियवानीधान्यचित्रकान । सौवर्चलमजाजींचहपुषांचेतिचूर्णयेत ॥
चूर्णतैलघृतक्षौद्रभागाः स्युर्मानतः समाः । सक्तूनाण्षोडशगुणोभागः संतर्पणंपिबेत ॥



प्रयोगादस्यशाम्यन्तिरोगाः संतर्पणोत्थिताः । प्रमेहामूढवाताश्चकुष्ठान्यर्शांसिकामलाः ॥
प्लिहापाण्ड्वामयः शोफोमूत्रकृच्छ्रम्रोचकः । हृद्रोगो राजयक्ष्माचकासः श्वासोगलग्रहः ॥
क्रिमयोग्रहणीदोषाः श्रैथ्र्यंस्थौल्यमतीवच । नराणांदिप्यतेचाग्निः स्मृतिर्बुद्धिश्चवर्धते ॥
व्यायामनित्योजीर्णाशीयवगोधूमभोजनः । सम्तर्पनकृतैर्दोषैः स्थलौल्यंमुक्त्वाविमुच्यते ॥
उक्तंसंतर्पणोत्थामानपतर्पणमौषधम । (च.सू. 23/15-25)

Vyosha, Vidanga, Shigru, Triphala, Katurohini, Bruhati Dvaya, Haridra Dvaya, Patha, Ativisha, Sthira, Hingu, Kebukamula, Yavani, Dhanya, Citraka, Sauvarcala, Ajaji, Hapusa, the powder prepared from drugs it taken along with quantity of taila, Ghruta, Kshaudra added with sixteen times of Saktu (roasted barley). It is useful in the treatment of diseases like, Prameha, Mudhavata, Kustha, Arsha, Kamala, disease of Spleen, Pandu, Sopha, Mutrakruccha, Rajayakshma, Hrudroga, Kasa, Swasa, Galagraha, Krimiroga, Grahani, Switra and Atisthoulya. It also increases Agni, Smrti, Buddhi, Vyayamanitya (Habitual exercise), intake of food like barley and wheat only after the digestion of previous meal. By Apatarpana Aushadha management using under nourishment for Santarpanottha Vyadhi are explained.

अपतर्पणजन्य रोग–

वक्ष्यन्तेसौषधश्चोधश्चोर्ध्वमतर्पणजागदः ॥ देःआग्निबलवर्णौजः शुक्रमांसपरिक्षयः ।
ज्वरः कासानुबन्धश्चपार्श्वशूलमरोचकः ॥ श्रोत्रदौर्बल्यमुन्मादः प्रलापो हृद्व्यथा ।
विण्मूत्रसंग्रहः शूलंजङ्घोरुत्रिकसंश्रयम ॥ पर्वास्थिसन्धिभेदश्चयेचान्येवातजागदाः ।
उर्ध्ववाताद्याः सर्वेजायन्तेतेऽएतर्पणात ॥ (च.सू. 23/26-29)

The diseases caused by under nutrition will describe along with their treatment. Loss of body reduced Agni, Bala, Varna, Ojas, Shukra, Mamsa etc. Person suffers from Jwara, Kasa, Parswashula, Arocaka, Shrotradaurbalya (weakness in the power of hearing), Unmada, Pralapa, Hrudayatha, obstruction in excretion of urine and stool, pain in legs, thigh and calf. Pain in body parts, bones, joints and other disease due to vitiation of Vata, upward movement of Vata.

तेषांसंतर्पणतज्ज्ञैः पनराख्यातमौषधम । यत्तदात्वेसमर्थस्यादभ्यासेवातदिष्यते ॥ (च.सू. 23/30)

The treatment of Apatarpana Roga is said to be Santarpana therapy which should be administered in long run by habitual use.

अपतर्पणजन्य व्याधी चिकित्सा–

सद्यः क्षीणोहिसद्योवैतर्पणएनोपचीयते । नर्तेसंतर्पणाभ्यासच्चिरक्षीणास्तुपुष्यति ॥
देहाग्निदोषभैषज्यमात्राकालानुवर्तिना । कार्यमत्वरमाणेनभेशजम्चिरदुर्बले ॥
हितामांसरसास्तस्मैपयांसिचघृतानिच । स्नानानिबस्तयोऽभ्यङ्गास्तर्पणाश्चये ॥ (च.सू. 23/31-33)

Sadyakshina person who is suffering from fresh attack of emaciation can soon be cured by the administration of Sadyatarpana. Chirakshina person suffering from chronic type of emaciation would require habitual intake of nourishing therapy. Treatment should be administered slowly depending upon Deha (physical constitution), Agni, Doshas, Kala, Matra etc. for such patients Mamsa Rasa, Dugdha, Ghruta, Snana, Basti, Abhyanga, Tarpana Manth(thin gruel which give nourishment).

ज्वरकासप्रसक्तानांकृशानांमूत्रकृच्छिणाम । तृष्णायतामूर्ध्ववातानांवक्ष्यतेतर्पणाहिताः ॥

शर्करापिप्पलतैलिघृतक्षौद्रैः समांशकैः । सक्तुद्विगुणितोवृष्यस्तेषांमन्थः प्रशस्यते ॥ (च.सू. 23/34-35)

Mantha prepared with equal quantity of sugar, Pippali, Taila, Ghruta and Kshaudra along with double the quantity Saktu is aphrodisiac and recommended Jwara, Kasa, Krusha, Mutrakrucchra, Trushna, Udhvavata etc.

सक्तवोमदिरा क्षौद्रंशर्कराचेतितर्पणम । पिबेन्मारुतविण्मूत्रकफपित्तानुलोमनम ॥ (च.सू. 23/36)

Saktu, Madira, Kshaudra, Sharkara prepared Tarpana used in elimination of Maruta, elimination of faeces, urine, Kapha, Pitta.

फाणितंसक्तवः सर्पिर्दधिमण्डोऽम्ललाञ्जिकम । तर्पणंमूत्रकृच्छ्रघ्नमुदावर्तहरंपिबेत ॥ (च.सू. 23/37)

Tarpana prepared from Saktu, Phanita, Sarpi, Dadhimanda and Amlakanjika is useful in Mutrakrucchra and Udavarta.

मन्थः खर्जूरमृद्विकावृक्षाम्लाम्लीकदाडिमैः । परुषकैः सामलकैर्युक्तोमद्यविकारनुत ॥ (च.सू. 23/38)

Manth prepared from Kharjura, Mrdvika, Vrkshmls, Amlika, Dadima, Parushaka and Amalaka is useful in Madyavikara.

स्वादुरम्लोजलकृतः सस्नेहो रुक्ष एववा । सद्यः संतर्पणोमन्थः स्थैर्यवर्णबलप्रदः ॥ (च.सू. 23/39)

Manth prepared from water by adding Swadu, Amla, like Dadima with or without Sneha refreshes immediately promotes Sthairya, Varnaand Bala.

## Viruddhahara (Contradictory or Incompatible Diet)

यत्किञ्चिद्दोषमांस्त्राव्यननिर्हरतिकायतः । आहारजातंतत्सर्वहितायोएपद्यते ॥ (च.सू. 26/85)

विरुध्दमपि चाहारं विद्याद्विषगरोपमम । (अ.ह.सू. 7/29)

यत किञ्चित दोषमुत्क्लेष्य न हरेत तत समासतः विरुद्धं ॥ (अ.ह.सू. 7/45)

यत किञ्चित दोषमुत्क्लिश्य भुक्तं कोपान्न निहरित रसादीष्वयथार्थ वा तद्विकाराय कल्पते ॥ (सु.सू. 20/20)

The foods, drinks or drugs which aggravates Doshas but do not expel out of the body called Viruddhahara (incompatible).

### Types of Viruddhahara

यच्चापिदेशकालअग्निमात्रासात्म्यानिलादिभिः । संस्कारतोवीर्यतश्चकोष्ठावस्थाक्रमैरपि ॥



परिहारोपचराभ्यांपाकातसंयोगतोऽपिच । विरुद्धंतच्चनहितं हृत्संपद्विधिभिश्च यत ॥ (च.सू. 26/86-87)

Desha, Kala, Agni, Matra, Satmya, Dosha, Samskara, Veerya, Koshtha, Avastha, Krama, Parhara, Upacara, Paka, Samyoga, Hruda, Sampat, Vidhi Viruddha total eighteen types of Viruddhahara.

**1. Desha Viruddha-**

विरुद्धंदेशतस्तावद्रूक्षतीक्ष्णादिधन्वनि । आनूपेस्निग्धशीतादिभेषजं यन्निषेव्यते ॥ (च.सू. 26/88)

Intake of Ruksha and Tikshna substance in Jangala Desha and Sheeta and Snigdha substance in Anupa Desha is Desha Viruddha.

Jangala Desha is dry with less water, so all living animals, human in that area are Vata predominant in nature if consume Ruksha, Tikshna food and drugs it leads aggravation of Vata.

Anup Desha is excessive water, Snigdha Guna is more, and so people are afflicted with Kapha disorder. If they consume more Snigdha, Sheeta food and medicine it leads Kapha diseases.

**2. Kala Viruddha**

कालतोऽपिविरुद्धंयच्छीतरुक्षादिसेवनम । शीतेकाले, तथेष्णेचकटुकोष्णादिसेवनम ॥ (च.सू. 26/89)

Consuming Sheeta and Ruksha food in winter season, Katu and Ushna Food in summer season is Kala Viruddha.

**3. Agni Viruddha**

विरुद्धमनले तद्वदन्नपानं चतुर्विधे । (च.सू. 26/90)

Intake of Guru Ahara when there is Mandagni, Laghu Ahara when Agni is Teekshnagni (strong) is Agni Viruddha.

**4. Matra Viruddha**

मधुसर्पिः समघृतंमात्रयातद्विरुध्यते । (च.सू. 26/90)

Taking of honey and ghee in equal quantity is Matra Viruddha.

**5. Satmya Viruddha**

कटुकोष्णादिसात्म्यस्यस्वादुशीतादिसेवनम । यत्ततसात्म्यविरुद्धं ... । (च.सू. 26/91)

The use of Madhura, Sheeta food for a person, who is accustomed to Katu, Ushna food, it is contradictory.

**6. Dosha Viruddha**

तुविरुद्धंत्वनिलादिभिः ॥ (च.सू. 26/91)

Use of diet, drug and behaviour similar to Doshas in properties but adverse to the person's practice is antagonistic to Doshas.

**7. Samskara Viruddha**

या समानगुणाभ्यासविरुद्धन्नौषधक्रिया ॥
संस्कारतोविरुद्धंतद्यद्भोज्यंविषवद्भवेत ॥ एरण्डसीसकासक्तंशिशिमांसंयथैवहि । (च.सू. 26/93)

Drugs and diet when prepared in particular way produce poisoning effects like in case peacock' meat attached to castor stick, it is known as antagonistic in processing.

**8. Virya Viruddha**

विरुद्धंवीर्यतो ज्ञेयंवीर्यतः शीतलात्मकम ॥ ततसंयोज्योष्णवीर्येनद्रव्येणसहसेव्यते । (च.सू. 26/94)

Antagonism in potency is that when Sitavirya and Ushnavirya combined together are taken. Chilacima variety of fish with milk.

**9. Koshtha Viruddha**

क्रूरकोष्ठस्यचात्यल्पंमन्दवीर्यमभेदनम ॥
मदुकोष्ठ गुरुचभेदनीयंतथाबहु । एततकोष्ठविरुद्धंतु, .... (च.सू. 26/95)

Administration mild laxative in small dose in Krura Koshtha person. Administration of strong laxative in large dose in Mrudu Koshtha.

**10. Avastha Viruddha**

विरुद्धंस्यादवस्थया ॥
श्रमव्यवायव्यायामसक्तस्यानिलकोपनम् । निद्रालस्यालस्यभोजनं श्लेष्मकोपनम ॥ (च.सू. 26/96)

When Vata vitiating substance is given to the person, indulge excessive physical work, sexual intercourse and Kapha vitiating substance and indulge in oversleep and laziness it is antagonism is respect of health condition.

**11. Krama Viruddha**

यच्चानुत्सृज्यविण्मूत्रंभुङ्क्तेयश्चाबुभुक्षितः । तच्च क्रमविरुद्धंस्याद्यच्चातिक्षुद्वशानुगः ॥ (च.सू. 26/97)

Antagonism in order is that where one takes food before elimination of faeces, urine and without appetite or excessive hunger.

**12. Parihara Viruddha**

**13. Upachara Viruddha**

परिहारविरुद्धंतु वाराहादीन्निषेव्य यत । सेवेतोष्णंघृतादेश्चपीत्वाशीतंनिषेवते ॥ (च.सू. 26/98)



Eating hot things after intake of pork etc. Cold things after intake of ghee etc. It is known as antagonism in indication and contraindication.

**14. Paka Viruddha**

विरुद्धंपाकतश्चापि दुष्टदोर्दारुसाधितम । अपक्वतण्डुलात्यर्थपक्वदग्धंचयद्भवेत ॥ (च.सू. 26/99)

Caused by variance with Paka etc. Preparation of food with bad or rotten food under cooling or ever cooling or burning during the process of preparation.

**15. Samyoga Viruddha**

Caused by combination of two or more substance is called Samyoga Viruddha.

संयोगतोविरुद्धंतद्यथाऽम्लंपयसासह । (च.सू. 26/99)

This combination results in the manifestation of specific toxic properties, which cannot be manifested by individual substances. Intake of Amla Ahara with milk is an example of Samyoga Viruddha.

**16. Hrudaviruddha**

अमनोरुचितंयच्च हृद्विरुद्धं तदुच्यते ॥ (च.सू. 26/100)

Any substance which is not pleasant in taste causes Hruda viruddha. Here Hruda one should take Mana.

सौमनस्यं बलं पुष्टिमुत्साहं हर्षणं सुखम । स्वादु संजनयत्यन्नमस्वादु च विपर्ययम ॥ (सु.सू. 46/481)

Sushruta mentioned Asvadu and Svadu Ahara and told that tasty foods beast pleasantness of mind, Bala, Pushti, Utsaha, Harshana and Sukha. Whereas food which are not tasty gives rise to the opposite qualities.

**17. Sampat Viruddha**

संपद्विरुद्धंतद्विद्यादसंजातरसंतुयत ॥ अतिक्रान्तरसंवाऽपि विपन्नरसमेव वा । (च.सू. 26/101)

The food substances which are not matured or over matured or putrefied are the example of Sampat Viruddha.

**18. Vidhi Viruddha**

ज्ञेयंविधिवेरुद्धंतुभुज्यतेनिभृतेनयत । तदेवंविधमन्नं स्याद्विद्धमुपयोजितम ॥ (च.सू. 26/86-101)

The rules of diet not following called Vidhi Viruddha. Example- taking meals in unhygienic place or while talking or laughing etc.

**Incompatible foods**

आनूपमामिषं माषक्षौद्रक्षीरविरुढकैः । विरुध्यते सह बिसैर्मूलकेन गुडेन वा ॥
विशेषात्पयसा मत्स्या मत्स्येष्वपि चिलीचिमः । (अ.ह.सू. 7/30)

The use of Masha, Madhu, Ksheera, Virudhaka, Bisa, Mulaka, Guda is incompatible with the meat of marshy land. Especially the use of fish meat with milk is incompatible, and among fish the Cilicima varety of fish is most incompatible.

विरुद्धमम्लं पयसा सह सर्वं फलं तथा ॥ तद्वत् कुलत्थवरकङ्गुवल्लमकुष्टकाः ॥ (अ.ह.सू. 7/31)

The use of all sour substances is incompatible with milk. Similarly the fruits too are incompatible with milk. The Kulattha, Varaka, Kangu, Valla and Makusthaka are also incompatible with it.

भक्षयित्वां हरितकं मूलकादि पयस्त्यजेत ॥ (अ.ह.सू. 7/32)

After eating Mukaladi and green leafy vegetables, drinking of milk should be avoided.

मत्स्यनिस्तलनस्नेहे साधिताः पिप्पलीस्त्यजेत । कांस्ये दशाहमुषितं सर्पिरुष्णं त्वरुष्करे ॥

(अ.ह.सू. 7/37)

The Pippali processed with the residual oil or ghee of frying fish should not used in any work. The ghee placed ten days in bronze vessel and warm potent substances with Arushkara (Bhallataka) should be avoided.

ऐकध्यं पायससुराकृशराः परिवर्जयेत । मधु सर्पिर्वसातैलपानीयानि द्विशस्त्रिशः ॥
एकत्र वा समांशानि विरुध्यन्ते परस्परम ॥ (अ.ह.सू. 7/38)

The milk, wine, and Krshara should not be taken together. The honey, ghee, fat, oil, water etc. used in equal proportion together in their association of two, three or all of them is incompatible with each other.

**Diseases Occurs by Intake of Viruddha Ahara**

षाण्ढ्यान्ध्यवीसर्पदकोदराणांविस्फोटकोन्मादभगन्दराणाम । मूर्च्छामदाध्मानगलग्रहाणांपाण्ड्वाम-यस्यामविषस्यचैव ॥ किलासकुष्ठग्रहणीगदानांशेथाम्लपित्तज्वरपीनसानाम । सन्तानदोषश्यतथैव मृत्योर्विरुद्धमन्नं प्रवदन्तिहेतुम । (च.सू. 26/102-103)

Antagonistic food causes impotency, blindness, Visarpa, Jalodara, Visphota, Unmada, Bhagandara, Mada, Adhmana, Galagraha, Pandu, Amaya, Kilasa, Kushtha, Grahani, Gada, Shotha, Amlapitta, Jwara, Peenasa, Santana Dosha and even death.

एषांखल्वपरेषांचवैरोधिकनिमित्तानंव्याधीनामिमेभावाः प्रतिकारभवन्ति । तद्यथा–वमनंविरेचनंच, तद्विरोधिनांचद्रव्याणांसंशमनार्थमुपयोगः, तथाविधैश्चद्रव्यैः पूर्वमभिसंस्कारः शरिरस्येति ॥ (च.सू. 26/104)

These are measures, which are used to counteract the above and the disorder caused by antagonistic- such are emesis, purgation, use of antidotes for pacification and prior conditioning of the body with similar substances.



**Treatment for diseases occur due to Viruddha Ahara**

विरुद्धाशनजानरोगानप्रतिहन्तिविरेचनम । वमनंशमनंचैवपूर्ववाहितसेवनम ।
सात्म्यतोऽल्पतथावाऽपिदीप्ताग्नेस्तरुणस्यच । स्निग्धव्यायामबलिनांविरुद्धंवितथंभवेत ॥

(च.सू. 26/105-106)

Virechana, Vamana, pacification or prior use of wholesome substance alleviates the disorder caused by Viruddha Ahara. Viruddha Ahara no has any effect on suitability, small quantity, strong digestive power, in young age and person having unction, physical exercise and strength.

**Affectlessness of incompatible**

व्यायामस्निग्धदीप्ताग्रिवयः स्थबलशालिनाम । विरोध्यपि न पीडाये सात्म्यमल्पं च भोजनम ॥

(अ.ह.सू. 7/30)

The incompatible food does not affect the people who regularly do exercise, who take Sneha in food and who have good digestive power, who are young and stout. The person who is acclimatized to incompatible food or has taken that food in little quantity does not get affected.

## Pathyahara and Apathyahara

Ayurveda prescribes specific diet patterns in the diseased conditions which are known as Pathya. According to the principles of Ayurveda, derangement of the digestive power (Agni) occurs in many diseases which is the prime reason for the formation of vitiated Dosha, Ama (toxic substances) and malformation of Dhatus (body tissues). Hence it is important to restore normalcy of the digestive power. This objective can be attained by using a properly managed diet regimen according to condition of Doshas and type of the disease.

पथ्यं पथोऽनपेतं यद्यच्चोक्तं मनसः प्रियम । यच्चाप्रियमपथ्यं च नियतं तत्र लक्षयेत ॥
मात्राकालक्रियाभूमिदेहदोषगुणान्तरम । प्राप्य तत्तद्धि दृश्यन्ते ते ते भावास्तथा तथा ॥
तस्मात् स्वभावो निर्दिष्टस्तथा मात्रादिराश्रयः । तदपेक्ष्योभयं कर्म प्रयोज्यं सिद्धिमिच्छता ॥

(च.सू. 25/45-47)

The word Pathya derives its origin from root word Pathya which literally means a way or channel. In Shabdakalpadrumam it is said that Pathya is beneficial for patients while Apathya harms them. The food characteristics and properties will change according to season, place and person hence Pathya also changes accordingly. Pathya not only advocates intake of wholesome food but also it directs to follow a certain regimen to fasten the process of recovery from the diseased state. In Charaka Samhita while explaining about Chikitsa, Charaka has used Pathya as a synonym for the Chikitsa.

पथ्यम रोगिणाम हितकारम अपथ्यं संहारः । (शब्दकल्पद्रुमम)

Sharangdhara explains about some Pathya Kalpana like Manda, Peya, Vilepi, Yavagu etc. These Kalpanas are generally used in different diseases according to state of disease and capacity to digest the food in that disease. It also helps to maintain proper Agni (digestive fire) so as to digest food properly and give needed nutrition to tissues of body. It will also help to avoid formation of Ama which is often triggered when Agni (digestive fire) becomes low. Below table explains in short about Pathya Kalpana, their preparation method and uses in therapeutic diet.

आहारं षडिवधं चूष्यं पेयं लेह्यं तथैव च । भोज्यं भक्ष्यं तथा चर्व्यं गुरु विद्याद्यथोत्तरम ॥

(भा.प्र. 5/134)

Food is of six kinds, Cushya (suck ables), Peya (drinks), Lehya (lick able), Bhojya (eatable), Bhakshya (eatables snacks) and Carvya(chewable) each succeeding one harder for digestion than proceeding.

| Pathya Kalpana | Method for preparation | Uses |
|---|---|---|
| Manda | The filtered liquid portion obtained after boiling one Carminative, Digestive part of rice and fourteen parts of water | Carminative, digestive. |
| Peya | One part of rice and fourteen parts of water, boiled into Quickly digestible, Stops loose watery consistency | Quickly digestible, stops loose motions, Nourishes the tissues. |
| Vilepi | One part of rice and four parts of water, cooked into Strengthening, Nourishing, Good for thick paste | Strengthening, nourishing, good for heart, Delicious, Diuretic |
| Yavagu | One part of grain rice etc. and six parts of water, Strengthening, Nourishing cooked into thick paste | Strengthening, nourishing |

आलोक्य वैद्यतंत्राणि यत्नादेव निबध्यते । व्याधितानां चिकित्सार्थं पथ्यापथ्यविनिश्चयः ।
निदनौषधपथ्यानि त्रीणि यत्नेन चिन्तयेत । तेनैव रोगाः शीर्यन्ते शुष्के नीर इवाडकुरा ॥ (योगरत्नाकर)

In Yogaratnakara it is said that for the treatment of diseases aetiology, drug treatment and Pathya are three important factors which should be studied thoroughly before starting the treatment. Judicious planning of treatment by proper understanding of these



three factors always yields a successful eradication of disease. Yogaratnakara uses the metaphor of Ankura (seedling) is used for progressive form of disease. This Ankura will dry and be destroyed if it is not nourished by water; similarly disease will be destroyed if a patient does not consume Apathya Ahara.



रुक्षु सर्वास्वपथ्यानि तथास्वं परिवर्जयेत । तास्वपथ्यैर्विवर्धन्ते तोयदैरिव वीरुधः ।
विनाऽपि भेषजैर्व्याधिः पथ्यादेव बिलीयते । न तु पथ्यविहीनस्य भेषजानां शतैरपि ॥ (योगरत्नाकर)

In all diseases Apathya should be avoided because Apathya is predisposing factor for various diseases and helps in fast progression of patho-physiology. As climbers and plants grow in rainy season similarly diseases will increase due to Apathyas. Only Pathya also can cure diseases but one who does not follow Pathya cannot be cured by the use of hundreds of drugs.

Bhela Samhita also explains about merits of Pathya and demerits of Apathya in the Sutrasthana. Pathya Ahara nourishes all Dhatus and Srotasa leading to complete nutrition of body. Pathya Ahara also helps to detoxify the body by getting rid of vitiated dosha. Contrary to this, Apathya Ahara helps in vitiation of Vata etc. doshas. Hence for maintenance of health and treating diseases Pathya Ahara should be consumed.

एवमेव च भोज्येन पथ्येन आप्यायते नरः हीयते चाप्यपथ्येन प्रदुष्टैः मारुतादिभिः ॥
स्वस्थस्यान्नेन वर्धन्ते धातवः शोणिताद्यः । व्याधितस्यापि दोषाय भोज्यं परिणमत्यथ ॥
यथा ह्यकालवृष्ट्या चभूमौ बीजं विपद्यते । वर्धते कालवृष्ट्या च देहिनोऽपि तथा रसैः ॥

(भेलसंहिता सूत्र 5/14-16)

All these benefits of Pathya Ahara can be ripped off with the help of Kritanna Varga described in various ancient texts. Properties of these Kritanna differ from each other depending upon the method of preparation even if material used is the same. In case of Manda, Peya, Yavagu and Vilepi, the amount of water used for cooking and then amount of liquid and solid content is different for each of them. This determines qualities like heaviness or lightness of food for digestion etc. If all the Kritanna Varga is used judiciously along with the Pathya Ahara then it will help to treat and nourish patient effectively.

भोजनाग्रे सदा पथ्यं लवणार्द्रक भक्षणम् । अग्निसंदीपनं रुच्यं जिह्वाकण्ठ विशोधनम ॥

(भा.प्र.पू. 5/130)

These Pathya Ahara are described specific to a particular disease condition as well as there are some Pathya mentioned which can be followed regularly for healthy individuals irrespective of disease condition. According to Bhavaprakasha taking ginger and salt before food is always good and it enhances Agni. Taste, clears tongue and

throat. Charaka and Vagbhata also describe some regularly consumable food articles. Rakta Shali, Mudga, rain water, Saindhava (rock salt), Jivanti, meat of Aina, Godha, Rohita Matsya, cow's ghee, cow's milk, Tila Taila, ginger, grapes, pomegranate and sugar are considered as most conducive among food articles. Disease specific Pathya (wholesome diet) and Apathya (unwholesome diet) are explained in various classical texts like Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya etc. but there are detailed descriptions about them in other texts like, Sharangdhara Samhita, Pathyapathya Vibodhika, Bhaishajyaratnavali and Chakradatta etc.

| Ahara | Properties | Used in disorders |
|---|---|---|
| Dugdha | Madhur, Dhatuvardhak, Kaphakara, Vatpittaghna | Raktapitta, Mutrakruccha. |
| Takra | Amla, Vatkaphaghna, Dipana | Arsha, pandu |
| Ghurt | Sneha, Vranaghna, Pittaghna | Karnaroga, Shiroroga |
| Madhu | Madhur, Lekhan, Kaphaghna | Kasa, Shwasa |
| Tail | Snigdha, Vataghna | Skin disorders, Vatagata rogas. |
| Lavan | Pachak, Rochanam, vataghna | Malavastambha, adhmana |

**Vihara**

Walking, travelling, exercise, control on emotions, supresing urges, sleeping time in this way, according to properties of Ahara and Vihara, we can maintain the equilibrium od Dosha, Dhatu and Mala to treat and prevent diseases.

## Ahara Dushparinama & Tajjanyavyadhaya

Madagni, Vishamagni, Tikshanaagni may leads to Agnimadya which again results in various types of Ajirna. The consequences of Ajirna are presented as Alasaka, Visuchika etc. disorders. Ahara Dushaparinama denotes that the improper transformation of food and defective metabolism of food.

**Jeerna Ahara Lakshana**

उद्गारशुद्धिः उत्साहोवेगोत्सर्गोयथोचितः । लघुता क्षुतपिपासाचजीर्णहारस्यलक्षणः ॥

(मा.नि. 6/24, भा.प्र. 5/109)

The clarity in belching, cheerfulness, proper movement of natural urges, lightness in the body feeling hunger and thirst are the sign and symptoms of completion of digestion of food.



**Verities of digestive fire**

मन्दस्तीक्ष्णोऽथविषमः समश्चेतिचतुर्विधः । कफपित्तानिलाधिक्यात्तत्समाज्जाठारोऽनलः ॥

(मा.नि. 6/1)

The Jatharagni is four types, Manda due to predominance of Kapha, Tikshna due to Pitta, Vishama due to Vata and Sama due to equilibrium of Tridosha.

**Causative factors for Dushparinama**

1. Hinamatra Bhojana (Insufficient Quantity of food)
2. Atimatra Bhojana (Excessive intake of food)
3. Untimely food habits
4. Viruddashana (incompatible food)
5. Not follow the Ahara Vidhi Vidhana Niyana
6. Ahita Ahara Sevana
7. Improper cooked, heavy food, Dry, Excessive cold.
8. Contaminated
9. Unhygienic food etc.

मात्राशीसर्वकालंस्यान्मात्रा ह्यग्नेः प्रवर्तिका । मात्रांद्रव्याण्यपेक्षेन्तेगुरुण्यपिलघून्यपि ॥ (अ.ह.सू. 8/2)

Person should always take food proper quantity. The quantity of food varies with time, seasons and with healthy or diseased state of the person etc. it never always remains same, so one should judge proper quantity of food before taking it.

Acharya Charaka says that proper quantity of food is that which should be digested timely without causing harm to body constitution. The proper quantity too expects Agni, so strength of Agni should be noticed timely.

**Quantity of food**

गुरुणामर्धसौहित्यंलघूनांनातितृप्तता । मात्राप्रमाणं निर्दिष्टं सुखंयावद्विजीर्यति ॥ (अ.ह.सू. 8/3)

The desire for food plays a specific role in deciding quantity of food. There are three levels of desire for food i.e. half, full and more than full. The quantity should be judged by seeing heavy and light nature of food materials. Very heavy food materials should be taken in very low quantity even less than half desire for them. Finally Acharya Charaka said that the quantity that digests easily without causing any harm to body constitution is only right dose of food.

**Hina Matra (Insufficient food)**

भोजनंहीनमात्रंतुनबलोपचयौजसे । सर्वेषांवातरोगाणांहेतुतांचपपद्यते ॥ (अ.ह.सू. 8/4)

The food taken in low quantity does not provide strength, nourishment of the body and Ojus, it becomes causes of all types of Vata disorders.

**Atimatra (Excess food)**

अतिमात्रांपुनः सर्वानाशुदोषान्प्रकोपयेत । पीड्यमानाहिवाताद्यायुगपत्तेनकोपिताः ।
आमेनान्नेन दुष्टेन तदेवाविश्यकुर्व्वे । विष्टम्भयन्तोऽलसकं च्यावयन्तोविसूचिकाम ।
अधरोत्तरमार्गाभ्यांसहसैवाजितात्मनः ॥ (अ.ह.सू. 8/4-5)

The food taken in heavy quantity produces Ama that vitiates Food, aggravated Tridosha get associated with that vitiated food and causes blockage in alimentary canal and produces a diseases known as Alasaka. When these Doshas expel out that vitiated food and Ama from lower as well as upper tract that time the disease known as Visuchika gets developed in person who are not self-controlled.

अलसक–

प्रयातिनोर्ध्वनादस्तादाहारोनचपच्यते । आमाशयेऽलसीभूतस्तेनसोऽलसकः स्मृतः । (अ.ह.सू. 8/6)

Indigested food does neither move upward or downward nor gets it digested. That remains in stomach without any movement, that why is known as Alasaka.

विशेषाददुर्बलस्याल्पवह्नेर्वेगविधारिणः । पीशितं मारुतेनान्नं श्लेष्मणारुद्धमन्तरा ॥
अलसं क्षोभितंदोषैः स्लल्यत्वेनैवसम्स्थितम । शूलादीनकुरुतेतीव्रांश्छर्द्यतीसारवर्जितान ॥
सोऽलस ..... । (अ.ह.सू. 8/10-11)

Alasaka disease because of Vata and Kapha the food remains in stomach inactively and remain there like an obstruction by being vitiated more by three Doshas and produces above described symptoms like pain, vertigo etc. Vomiting and diarrhoea these two symptoms do not occur in it. It especially occurs in weak persons, this disease is known as Alasaka.

दण्डकालसकं–

.....अत्यर्थदुष्टास्तु दोषा दुष्टामबद्धखाः । यान्तस्तिर्यक्तनुंसर्वादण्डवत्स्तम्भयन्तिचेत ॥
दण्डकालसकंनामतंज्यतेदाशुकारिणम । (अ.ह.सू. 8/12)

By vitiated indigested food(Ama), channels gets obstructed, thereafter excessive vitiated Doshas by doing Tiryak movement make whole body stiff like a wood stick, this condition is critical in effect and disease is known as Dandalasaka.

**Treatment of Alasaka**

अथाममलसीभूतंसाध्यंत्वरितमुल्लिखेत । पीत्वासोग्रापटुफलंवार्युष्णंयोजयेत्ततः ।
स्वेदनंफलवर्तिचमलवातानुलोमनीम । नाम्यमानानिचाङ्गानिभृशं स्विन्नानि वेष्टयेत ।
(अ.ह.सू. 8/15-16)



Alasaka disease is curable condition then indigested food should be expelled out soon by vomiting. For vomiting the water medicated with Vacha, Patu (salt) and Madanaphala should be used to drink. After this, sudation should be done followed by use of Phalavarti for alleviation of Malas and Vata. Besides this the properly sedated body parts should be covered with cloth.

विसूचिका–

विविधैर्वेदनओद्भेदैर्वाय्वादिभृशकोपतः । सुचीभिरिवगात्राणिविध्यतीतिबिसूचिका । (अ.ह.सू. 8/7)

By excessive aggravation of Vata and other Doshas various tribulations emerge and they produce needle like pain in body, thus known as Visucika.

तत्रशूलभ्रमानाहकम्पस्तम्भाद्योऽनिलात । पित्ताज्वरातिसारान्तर्दाहतृट्प्रलापाद्यः ।
कफाच्छर्द्यङ्गगुरुतावाक्सङ्गष्ठीवनाद्यः ॥ (अ.ह.सू. 8/8)

In Visucika disease of Vata Dosha various symptoms like Shula, Bhrama, Anaha, Kampa, Stambha get produced. Pitta Dosha produces symptoms like Jwara, Atisara, Daha, Trushna and unconsciousness. Kapha Dosha produces symptoms like Chardi, Guruta, vocal obstruction, excess expectoration etc.

**Treatment for Vishucika**

विसूच्यामतिवृद्धायाम्पाष्णर्योर्दाहः प्रशस्यते । तदहश्चोपवास्यैनंविरिक्तवदुपाचरेत ॥ (अ.ह.सू. 8/2)

In excessive increased Visucika the burn treatment at the hell is consider as best. Fasting should do in patient on the same day when Visucika occurs and treatment similar to that of purgation therapy should be followed.

आमविष–

विरुद्धध्यशनाजीर्णशीलिनोविषलक्षणम । आमदोषंमहाघोरंवर्जयेद्विषसंज्ञकम ॥
विषरुपाशुकारित्वाद्विरुद्धोपक्रमत्वतः ॥ (अ.ह.सू. 8/13-14)

A person who indulge in taking of incompatible and untimely food habits, who frequently suffer from indigestion, the Amadosha similar in features to that of poison develops in them and is excessive painful, should not be treated, because that is similar to poison, and is critical in action and requires opposite treatment.

आमाजीर्ण–

अजीर्णचकफादामंतत्रशोफोऽक्षिगण्डयोः । सद्योभुक्तइवोद्गारः प्रसेकोत्क्लेशगौरवम ॥ (अ.ह.सू. 8/25)

The indigestion occurred by Kapha is termed as Amajirna, in it oedema of eyes and cheeks takes place and belching similar to that after meals occrs and other symptoms like excessive salivation, nausea heaviness of body appear.

विष्टब्धाजीर्ण एव विदग्धंजीर्ण–

विष्टब्धमनिलाच्छूलविबन्धध्मानसादकृत । पित्ताद्विदग्धंतृण्मोहभ्रमाम्लोद्गारदाहवत ॥ (अ.ह.सू. 8/26)
लङ्घनंकार्यमामेतु, विष्टब्धे स्वेदनंभृशम । विदग्धेवमनं, यद्वायथावस्थंहितंभवेत ॥ (अ.ह.सू. 8/27)

Vata Dosha causes Vistabdhajirna and symptoms like pain in abdomen, constipation, flatulence with gurgling sound and body ache occurs in it. Pitta Dosha causes Vidagdhajirna and symptoms like Thirst, delusion, vertigo, acidic belching and burning sensation appear.

विलम्बिका–

गरीयसोभवेल्लीनादामादेवविलम्बिका । कफवातानुबद्धाऽऽमलिङ्गातत्समसाधना ॥ (अ.ह.सू. 8/28)

The excessive indigestion due to accumulation of Ama in channels causes Vilambika. It has association of Kapha and Vata, its symptoms and treatment are similar that of Amajirna.

रसशेषाजीर्ण–

अश्रद्धाहृद्व्यथाशुद्धेऽप्युद्गारेरसशेषतः । शयीतकिञ्चिदेवात्रसर्वश्चानाशितोदिवा ॥
स्वप्यादजीर्णे, सञ्जातबुभुक्षोऽद्यान्मितंलघु । (अ.ह.सू. 8/29)

In Rasasheshajirna due to residual presence of Rasa, lack of enthusiasm in food and discomfort in heart occurs in spite of belching. In this all patients should sleep for some time during day hours without eating anything. This patient should sleep and take lesser and low diet whenever he feels hungry.

**Samashana, Adhyashana, Vishamashana**

मिश्रंपथ्यमपथ्यंचभुक्तंसमशनंमतम । विद्यादध्यशनंभूयोभुक्तस्योपरिभोजनम ॥
अकालेबहुचाल्पंवाभुक्तंतुविषमाशनम । त्रीण्यप्येतानिमृत्यंवाघोरानव्याधीनसृजन्तिवा ॥
(अ.ह.सू. 8/33-34)

The difference in features and time of ingestion of food causes disorder. Acharya had divided these features into three type's viz. Adhyashana, Samashana, Vishamashana.

Adhyashana is intake of meals before complete digestion of previously taken meal.

Samashana is consumption of suitable and unsuitable food together.

Overtaking, lesser eating and eating untimely is said as Vishamashana. Vishamashana is divided into two parts i.e. untimely food and taking meal in improper quantity. Taking food untimely is too of two types, one is taking food before time of meal, a person should not take his meal before time even if digestion of previously taken meal has completed. If the digestion of meal taken in morning has not do completed even then person can takes his evening meal. But person should not do this regularly; he should take meal in evening



only in case of little indigestion. Indigestion of food after normal time of meal is comes in category of untimely meals. The second type Vishamashana is taking meals in improper quantity i.e. taking very low diet or overtaking. All these four described above are part of Vishamashana.

**Shadrasabhojanasyamahatwam**

रसाः स्वाद्वम्ललवणतिक्तोषणकषायकाः । षड्द्रव्यामाश्रितास्तेचयथापूर्वंबलावहाः ॥ (अ.ह.सू. 1/1)

There are six types of Rasa present in substances Swadu, Amla, Lavan, Tikta, Katu, Kashya and their strength increases in order of precedence. Different Rasa always substances are used to increase or to decrease Dosha. Qualities always exist in these substances and on taking a substance its qualities are automatically inherited.

तत्त्रिविधंप्रवरावरमध्यविभागेन । सप्तविधंतुरसैकैकत्वेनसर्वरसोपयोगाच्च । तत्रसर्वरसप्रवरअवरमेकरसंमध्यंतु प्रवरावरमध्यस्तं । (चि.वि. 1/20)

Satmya is three types, Pravara, Madhyama, Avara and seven types according to six Rasas individually and collectively. Among them use of all rasa is Pravara, use of only one Rasa is Avara and use of 2 to 5 Rasa is Madhyama.

सर्वरसाभ्यासोबलकराणां । (च.सू. 25/40)

Intake of all six Rasa is the best among strength enhancing factors. Even this has been mentioned in the context of order of intake of Rasa while taking meals.

अश्नीयाततन्मनीभूत्वापूर्वंतुमधुरंरसं । मध्येऽम्ललवणैपश्चातकटुतिक्तकषायकम ॥ (भा.प्र.पू. 5/132)

One should consume food in following order, so that there is proper digestion of food. One should consume food with full concentration begin with Madhura, Amla and Lavan Rasa in the middle and Kashaya, Katu and Tikta at the end, to pacify physiologically aggravated Vata, Kapha, Pitta respectively.

## Nutrition

**Introduction and definition of food and nutrition**

Nutrition is a science of food and its relationship to health. Nutrition refers to nourishment that sustains life. The study of nutrient requirements and the diet providing these requirements is also known as 'nutrition'. Pike and Brown, 1984 defined it as "the science that interprets the relationship of food to the functioning of living organism. It includes the uptake of food, liberation of energy, elimination of wastes and all the processes of synthesis essential for maintenance, growth and reproduction".

The word nutrient or food factor is used for specific dietary constituents such as protein, vitamins and minerals. Dietetics is the practical application of the well and the

sick. The Proximate principles present in the food are the proteins, carbohydrates, fats, vitamins, and minerals. The protein, carbohydrates & fats are known as macro nutrients (energy giving nutrients), which are required by the body in large amounts and the vitamins & minerals are considered as the micro nutrients, which are required by the body in less quantity.

**Macro Nutrient**

**1. Carbohydrates :** Carbohydrates provide maximum energy to our body. Therefore it is required in large amount. There are 3 types of carbohydrates is sugars (also called simple carbohydrates), starches (also called complex carbohydrates), and fiber. Except fiber & starch only carbohydrates cause more & faster blood glucose rises than the other macro nutrients. Carbohydrate is an instant & quick source of energy. The sources of carbohydrates are all cereals & cereals based products.

**2. Protein :** It is an essential macro nutrient, vital for the structure of our body & its functions. In human body protein is present in the outer & inner membranes of every living cell, muscles, RBC (Red Blood Cell), nails, hair etc. The sources of proteins are milk & milk products, meat, fish & egg, chicken, legumes & pulses.

**3. Fats :** Fat is the major storage form of energy in the body. Liquid fats are called as oils & solid fats are called as fat. Fat is a macro nutrient, it is added flavor & texture in food. But sometimes fat can also be a bad to our health. The sources of fats are butter, oil, nuts, meat, fish, and some dairy products.

**Micro Nutrients**

**4. Vitamins :** Vitamins regulate many functions in the body. They are essential for building body tissues such as bones, skin, glands, nerves & blood. They help in digesting proteins, fats & carbohydrates, so that we can get energy from food. They prevent nutritional deficiency diseases, promote healing & encourage good health. Sources of vitamins are all fruits & vegetables, milk & milk products, non-vegetarian food & cereals.

**5. Minerals :** Minerals are vital to our existence because they are the building blocks that make up muscles, tissues, and bones. They also are important components of many life-supporting systems, such as hormones, oxygen transport, and enzyme systems. There are 2 types of minerals such as major (macro) which includes calcium, phosphorus, magnesium, sodium, potassium, sulfur, and chloride & Trace minerals are zinc, iodine, copper, manganese, fluoride, chromium, and selenium. & the sources of minerals are all fruits & vegetables, milk & milk products, non-vegetarian food & cereals & nuts.



**Factors determining food acceptance/choice**

Food choice is an important determinant of health and nutritional status of a person. Various complex blend of factors affecting the personal food acceptance/choices/ habits which varies from individual to individual are as follows :

1. Environmental influences: Economic, lifestyle, cultural, religious beliefs & traditions.
2. Sensory: flavor (taste & smell), texture & appearance.
3. Cognitive: learned food habits, emotional requirements, social factors & advertising.
4. Genetics: preferences for certain tastes & sensitivity
5. Health status: any restriction due to disease or due to age (e.g. declining taste sensitivity).

**Regulation of body temperature**

It is known that humans beings are warm blooded and thus are able to regulate its internal temperature. This is done by the heat/energy by the metabolism of food in the body. The ability to keep the body temperature within certain limits despite changes in external environment is called thermoregulation. There may be differences in the heat production and heat loss in different parts of the body, the circulating blood helps to bring it to a mean temperature. Two ways of thermo regulation used by mammals is:

1) Physiological regulation: during cold weather the body adapts to different mechanisms to regulate body temperature- like constriction of surface capillaries or shivering which raises the metabolic rate. In hot weather the body sweats to lower the body temperature.
2) Behavioral regulation: a person after sitting in the sun to warm up may want to cool down and thus may shift into the shaded area.

Some variations observed in body temperature in relation to food are :

- Specific food intake- may cause increase or decrease in body temperature.
- Alcohol intake- produces a fall in body temperature.

**Classification of foods-**

There are many ways of classifying foods

1. Classification by origin-
   a. Food of animal origin
   b. Foods of vegetable origin
2. Classification by chemical composition-
   a. Protein

b. Fats
c. Carbohydrates
d. Vitamins
e. Minerals

3. Classification by predominant function-

a. Body- building foods- e.g. milk, meat, poultry, fish, eggs, pulses, ground nuts etc.
b. Energy giving foods- e.g. cereals, sugar, roots tuber, fats and oil.
c. Protective foods- e.g. vegetables, fruits, milks

4. Classification by nutritive value-

a. Cereals and millets
b. Pulses
c. Vegetables
d. Nuts and oil seeds
e. Fruits
f. Animal foods
g. Fats and oils
h. Sugar and jaggery
i. Condiments and spices
j. Miscellaneous foods

**1. Proteins**

Protein is also one of the major macronutrients. It contains carbon, hydrogen, oxygen and nitrogen. Some proteins also contain sulphur and phosphorus. The basic structure or building unit of protein is amino acid. It has an amino group-NH2 and carboxyl group-COOH. The amino acids are joined by peptide linkages to form protein. Amino acids are water soluble, crystalline and insoluble in organic solvents.

**Classification**

There are about 20 amino acids present in the body. Nine amino acids are essential for humans, as humans cannot synthesize them. These are isoleucine, leucine, lysine, methionine, phenylalanine, threonine, trytophan, valine and histidine. Infants require two more essential amino acids (arginine and histidine). The nonessential amino acids are glycine, alanine, serine, cysteine, cystine, aspartic acid, glutamic acid, arginine, hydroxylysine, tyrosine, proline, and hydroxyproline.

There are two types of proteins- animal and vegetable protein. Examples of animal proteins are milk, meat, egg, etc. These are better digested and absorbed than the vegetable protein sources (dals & legumes) as the essential amino acids present are



similar to those present in the tissues of the body. Animal proteins are completely utilized for tissue synthesis. Vegetable proteins are relatively low in or lack lysine, methionine and tryptophan.

**Metabolism**

Digestion of protein starts from stomach and finally completes in small intestine. Proteins on hydrolysis break down to polypeptides and finally into amino acids. The amount as well as the type of protein taken in diet is equally important as the digestibility and absorbability vary between different proteins.

Biological Value (BV) of proteins is defined as, "the percentage of absorbed protein nitrogen that is retained in the body". A high BV thus indicates a high degree of utilization of the amino acids of the protein. Animal protein foods have higher BV as compared to vegetable protein foods. Net Protein Utilization (NPU) is defined as, "the percentage of protein eaten that is retained.

**Functions**

It is the most important constituent of food since it is

1. Required for general growth, maintenance & repair of body tissues.
2. Secondary role as energy source.
3. Maintenance of osmotic pressure
4. Essential for synthesis of protoplasm, antibodies, hemoglobin, enzymes e.g. globular proteins and hormones.
5. For production and maintenance of body proteins
6. Required for the supply of the essential amino acids which cannot be synthesized in the body

**Deficiency** - Low protein diets cause anemia, hypo-albuminemia and edema. Infants with improper weaning and fed on low protein diets suffer from physical and mental retardation along with anemia, hypoprotenemia, cheilosis, stomatitis, conjunctivitis edema and fatty liver. This is known as 'kwashiorkor'. These infants are frequently prone to infection and the mortality is high in such untreated children. Protein deficiency is generally observed with calorie deficiency and this condition is called 'protein calorie malnutrition'. Some studies have suggested that deficiency or imbalance of essential amino acids in the diet may produce profound depression of immune responses.

**Recommended Dietary Allowance** - For maintenance of nitrogen balance, the minimum protein requirement is 0.51-0.66g (av. 0.57g) per kg body weight. ICMR has recommended an allowance of 1.0 g per Kg for adults to provide 0.57g protein as an Indian vegetarian diet has a lower biological value of about 60 (net utilization of vegetable

protein will be about 65% only. The requirement for infants and children is 1.5-2.0g/Kg. During pregnancy and lactation an additional 10-20g-protein is recommended. It has been recommended that the diet should have at least 1/3 to ½ of total proteins from animal sources.

**Dietary Sources** - Protein rich foods are widely present in nature; from animal and vegetable sources. Animal sources are liver, meat, egg & milk and the vegetable sources include legumes, soybean and nuts.

**Protein Energy Malnutrition**

Protein Energy Malnutrition (PEM) is a deficiency disease caused in the infants due to 'Food Gap' between the intake and requirement. It affects children under 5 mostly belonging to the poor underprivileged communities. PEM is particularly serious during the post-weaning stage and is often associated with infection.

The term PEM covers a wide spectrum of clinical stages ranging from the severe forms like kwashiorkor and marasmus to the milder forms in which the main detectable manifestation is growth retardation.

**Etiology of PEM**

There are many causes which contribute to PEM: -

**Diet**

1. A diet which is deficit in protein and energy or calories results in PEM.
2. Through prolonged breastfeeding of children should be the rule, the amount of breast milk secreted in poor Indian mothers is lower.

**Social and Economic factors**

1. Poverty is one of the major causes of PEM, which leads to low food availability and unsanitary living condition which is the root cause infections and other diseases. Improper distribution of food among the family members.
2. Improper child care, neglect etc. may also lead to PEM. Misconceptions, about food, lack of knowledge, lack of adequate feeding during illness may all lead to PEM.

**Environmental Factors**

1. Overcrowding of living space along with unsanitary living conditions lead to frequent infections like diarrhoea.
2. Infection and diarrhoea are the common diseases that cause severe PEM and death.

**Biological factors**

1. Maternal malnutrition before and during pregnancy may already make the child vulnerable to under nutrition and proper care and nutrition if not provided post birth may cause PEM.
2. Infectious diseases are major contributing cause of PEM. Diarrhoeal diseases, measles, respiratory and other infections decrease the body's immunity. Lack of adequate nutrition further hinders the nutritional status. As the needs of the child are not fulfilled and the child becomes deficit in Energy and protein primarily along with many other micronutrient deficiencies.



**Role of free Radicals and Aflatoxins**

Free oxygen radicals potentially are toxic to all cell membranes and are produced in the body during infections. These free radicals are not combatted well when the diet of the child is deficit in micronutrients like Vitamin A, C and E. There is thus an accumulation of toxic free radicals and aflatoxins in the body which harm the liver cells and may cause kwashiorkor.

**Age of the host**

1. Adequate food is the most important requisite for growth. While it is important throughout childhood, it is more crucial during the first 5 years of a child's life especially during the first 3 years when the growth is rapid.
2. PEM in pregnant and lactating women can affect the growth of the baby.
3. Elderly population may also suffer from PEM due to alteration in their gastrointestinal system as they age.

**PEM classification**

There are many methods that have been suggested to classify. New WHO Child Growth Standards Currently, the new Growth Standards are being used across the country for monitoring and promotion of young child growth and development within the National Rural Health Mission (NRHM) and the Integrated Child Development Services (ICDS)

**Acute malnutrition Classification**

| |
|---|
| Moderate Acute Malnutrition (MAM) is defined by WHO/UNICEF as: |
| Weight-for-Height Z-score <-2 but >-3 |
| Severe Acute Malnutrition (SAM) is defined by WHO/UNICEF as: |
| MUAC<11.5cm |
| Weight-for-Height Z-score <-3 |
| Bilateral pitting oedema |
| Marasmic-kwashiorkor (both wasting and oedema) |

| Diagnostic criteria for SAM in Children aged 6-60 months Indicator Measure Cut-off | | |
|---|---|---|
| Indicator | Measure | Cut-off |
| Severe wasting (2) | Weight-for-height (1) | < -3 SD |
| Severe wasting (2) | MUAC | < 115 mm |
| Bilateral oedema (3) | Clinical sign | |

1-based on WHO Standards (www.who.int/childgrowth/standards)

2, 3 independent indicators of SAM that require urgent action

**Indian Academy of Pediatrics**

The classification provided by the IAP (Indian Academy of Pediatrics), is also based on weight for age but the cut off level to separate the malnourished children is 80 % of the standard. Severely malnourished children are classified into grade III and grade IV malnutrition.

| Malnutrition | Body Weight ( % of standard)* |
|---|---|
| Grade I | 71-80 |
| Grade II | 61-70 |
| Grade III | 50-60 |
| Grade IV | <50 |

**Marasmus**

Repeated infections and inadequate food consumption leads to protein energy malnutrition. Marasmus is a form of PEM, where growth is severely retarded. Marasmus usually occurs in the first 2 years of life.

**Symptoms of Marasmus**

1. The child has very less subcutaneous fat and muscle however there is no oedema.
2. The head of the child seems larger than the body, and has very little hair.
3. The child is below 60% of her weight for age, and the height of the baby is also affected.
4. The skin has some pigmentation or peeling skin lesions.
5. The ribs of the child are visible because of the absence of tissue under the skin and the rib cage is prominent which gives the appearance of rickety rosary a symptom of calcium deficiency.



6. The abdomen of the child appears extended and protruding due to the weakness of abdominal walls and wasting.
7. The child suffers and is more prone to infections.
8. The child is irritable and whines a lot.
9. The child loses interest in her/his environment and is inactive.
10. The fat on the face is last to go, post which the child gives the appearance of an old man. The child has shrivelled body, wrinkled skin and bony prominences.
11. Moderate degree of anemia and other deficiencies are also there in the child.
12. The appetite of the child lowers considerably and when adequate food is given catch up growth is seen.

**Kwashiorko**

Kwashiorkor is another form of PEM, is it uncommon in the children under one year of age.

**Symptoms of Kwashiorkor**

1. The three essential features of kwashiorkor are growth failure, edema and mental changes.
2. The weight of the child depends upon the extent of edema in the body and it is usually less than 60% of the expected weight for age of the child.
3. The height of the child is affected more and the retardation is more pronounced than Marasmus.
4. Pitting edema appears first on the feet and legs and later spreads to the whole body.
5. The face looks puffy with sagging cheeks and swollen eye lids.
6. Abdomen is distended but ascities is rare.
7. The liver is enlarged due to fatty infiltration.
8. The symptoms include apathy (laziness), a moon face appearance due to edema, unlustrous and less hair.
9. Loss of hair results in patchy alopecia. The texture of the hair is dull and can be pulled out easily.
10. There are some changes seen in the skin as well, like pigmented or de-pigmented patches, peeling leading to crazy pavement dermatosis and even ulcers.
11. Anorexia is common.

12. Diarrhoea may occur due to defective digestion and absorption as a result of secondary infection.
13. Associated iron and folate deficiencies may lead to anemia.

**Marasmic Kwashiorkor**

Marasmic Kwashiorkor is the third form of PEM, where the child displays the symptoms of both Marasmus and Kwashiorkor. A child who does not have edema first may develop it later down the years. Since lack of adequate energy is common to both the conditions, the term PEM is more apt than Marasmus or Kwashiorkor.

**Symptoms of Marasmic Kwashiorkor**

The symptoms of Marasmic Kwashiorkor include signs of both conditions.

1. There is varying degree of muscle wasting, edema along with hair and skin changes.
2. There is the presence of moderate anemia, and along with it more than one vitamin deficiencies are also found.
3. Vitamin A deficiency is associated with severe malnutrition and may cause blindness.

**Biochemical and Metabolic changes during PEM**

1. Alteration in hormone levels can also lead to fluid retention.
2. Plasma levels of aldosterone are elevated in kwashiorkor but not in Marasmus.
3. Increased levels of ADH are seen in Kwashiorkor.
4. There are raised levels of plasma cortisol in PEM. The levels are higher in Marasmus than kwashiorkor.
5. Somatomedin activity is also reduced on kwashiorkor but not in Marasmus.
6. Plasma growth hormone levels are raised in kwashiorkor.

**PEM affect Protein Metabolism-**

1. Serum Concentration of total proteins is decreased
2. Infections may leads to increased concentration of globulins altering the A/G (Albumin/ Globulins) ratio.
3. Total serum amino acid is reduced particularly the branched chain amino acid.
4. Non-essential amino acids are normal or raised.
5. Serum concentration of many enzymes are reduced which reflects the low rate of protein synthesis.



6. Urinary output of nitrogen is low in malnourished children due to reduction in urea excretion.
7. There is a reduction in muscle mass.

**PEM affect Lipid Metabolism**

1. Varying degree of fat mal-absorption is seen in children with kwashiorkor.
2. There is a reduction in the activity of pancreatic enzyme, lipase.
3. In kwashiorkor, plasma levels of free fatty acids are raised while the levels of triglycerides, phospholipids and cholesterol are reduced.
4. There is a decrease in the concentration of conjugated bile acids.
5. The concentration of beta lipoprotein is decreased while that of the alpha lipoprotein is variable.
6. There is a reduction in the level of carnitine and there is impaired transport of fatty acids across the mitochondrial membrane for oxidation.
7. In Marasmus, the plasma levels of lipoproteins, triglycerides ad free fatty acids are normal.

**PEM affect Carbohydrate Metabolism**

1. Fasting blood sugar levels are lower.
2. Severe hypo-glycaemia is seen.
3. The glycogen stores are depleted which leads to fluctuation in the blood sugar levels.
4. Rate of gluconeogenesis is altered.

**PEM affect Electrolyte and Water balance in the body**

1. In kwashiorkor there is retention of fluid in the body in the extracellular compartments due to the inability of kidney to excrete sodium. This may occur due to altered renal function during PEM.
2. Hypo-albuminaemia is one of the important factors contributing to oedema.
3. Serum concentration of sodium is low, there is an excess of total sodium concentration in the body.
4. Potassium concentration of serum is reduced in kwashiorkor.

**Hematological changes during PEM**

1. There is moderate anemia, which is a common feature.
2. Protein deficiency leads to a reduction in hemoglobin synthesis and total red cell mass.

3. Associated iron deficiency leads to microcytic anemia.
4. Serum Vitamin B 12 levels are actually increased in PEM.
5. The red cell life is shortened in PEM along with various abnormalities of the red cell membrane, cell metabolism and composition.
6. The neutrophil leucocyte response to infection is often impaired.
7. Purpura and bleeding manifestations are seen in PEM.

**Pathological changes that occur in PEM**

1. Abnormalities in the organs may be seen in children suffering from PEM.
2. The gastro-intestinal tract is affected; there is atrophy of mucosa particularly in the jejunum.
3. There is marked cellular infiltration, of the lymphocytes and the plasma cells.
4. There is poor digestion and absorption due to mucosal changes associated with decreased enzyme activity in the body.
5. In kwashiorkor, liver is infiltrated with fat and hepatomegaly is common.
6. There is marked atrophy in severe PEM. Acinar cells shrink and the nuclei become pyknotic.
7. There is varying degree of duct proliferation.
8. Muscle wasting is a characteristic feature with severe reduction in individual fibers and increase in interstitial connective tissue. There is muscle wasting in other organs like intestines and heart.
9. The myocardial changes may lead to reduced cardiac output and electrocardiographic changes.
10. There is a reduction in brain size, a decrease in the number of cells in the cerebellum and brain stem.
11. The thymus is greatly reduced in size in children with PEM.

**Dehydration be treated in PEM**

Due to diarrhoea, dehydration may often be fatal if not treated on time. Assessment of hydration status is difficult in malnourished children. Skin elasticity is poor in children with Marasmus and their eyes are normally sunken. In kwashiorkor, the altered skin elasticity may be masked by oedema. Dryness of the mouth and skin, scanty urine and depressed fontanelle are more reliable signs in such cases.

Children with mild to moderate dehydration can be treated by oral or nasogastric.



administration of fluids. Severely mal nourished children are deficient in potassium and have abnormally high levels of sodium. WHO has recommended a modified solution for severely malnourished children (ReSoMal).

**ReSoMal prepared**

ReSoMal can be prepared by diluting the standard WHO ORS solution in 2 litres of water instead of 1 litre and adding 50g of sugar. Between 70 and 100 ml of ReSoMal/ Kg body weight is usually enough to restore normal hydration. This should be given in small quantities at frequent intervals in the first 12 hours.

For children with severe dehydration, intravenous fluid therapy is required to improve the circulation and expand plasma volume rapidly. By providing 15 ml/kg/he I.V. drip of Ringer's lactate solution with 5% glucose.

Re assessment of the child every hour and switching to ReSoMal as soon as the child's condition's improves is advisable. When the urine flow is established, potassium supplements can be given orally (1-2 g/kg/day). It is recommended to start the feeding as early as possible.

**PEM be treated with dietary management**

Severe malnutrition or PEM require intensive care and should be referred to a hospital for initial treatment. Nutrition intervention is the primary consideration. The child should be given a diet providing sufficient quantities of calories and proteins, with an increase in amounts gradually without provoking vomiting or diarrhea. 170 – 200 kcal per kg of body weight and 3-4 g/ kg of body weight should be provided to the child.

It is suitable to initiate the feeding with a liquid formula gradually changing the consistency. The child may refuse the feed due to lack of appetite. Both proteins and calories are needed in large quantities. Sugar and vegetable oil should be added to increase the energy content.

Milk intolerance may be seen in severely malnourished children. In such cases, formulation should change to include buttermilk or dal based formulas. A mixed cereal based diet can be given with added oil to increase the energy.

Vitamin and mineral supplementation should be done to meet the increased requirements. These can be added to the diet or can be provided separately to the child. Vitamin A deficiency is quite common in children with severe PEM, hence a dose of 2 lakh IU of vitamin A should be provided to the child. Daily supplement of 60 mg/day of iron and 100 microgram/day of folic acid should be introduced in the diet.

**Preventive measures in PEM**

Malnutrition is a multifaceted problem and a variety of measures should be taken to prevent it. Since the effects of under nutrition are cumulative, entry point into the life cycle should be adolescents who will be future mothers and should be given adequate attention. Their nutrition should be ensured and the family should be educated against the false practices. Special intervention measures like supplementary feeding and nutrition education programmes can help in alleviating the problem. Preschool children are being provided supplementary nutrition at the Anganwadi centers. Several nutritious recipes have been developed by Food and Nutrition Board, National Institute of Nutrition and other home science colleges. Amylase rich food prepared from wheat or maize can also be used to reduce the bulk of the cereal mixture.

Government of India has prepared National Plan of Action, to bring down the prevalence of moderate and severe malnutrition. The essential components of any control programme are supplementary feeding, immunization, control of minor infections, promoting food security, nutrition communication, poverty alleviation and empowerment of women.

**Nutrition Education**

Nutrition education can help strengthen the various strategies formulated by the government for the eradication of PEM. These include –

1. Laying stress on breast feeding and especially exclusive breastfeeding for 6 months.
2. Mothers should be advised to give supplementary foods post 6 months based on the household foods like cereal and pulses. Oil or ghee can be added to increase the energy density of the food.

**2. Fats**

Fats are solid at 20 deg. C they are called oils. Fats are triglycerides of fatty acids and glycerol. Fatty acids have a fundamental structure of CH3(CH2)nCOOH. Fat is a concentrated source of energy providing 9kcal/g.

**Classification**

Based on the linkage between the carbon atoms, they are classified as saturated (carbon atoms linked by a single bond, e.g. denoted as 14:0); Monounsaturated (one double bond in the carbon chain, e.g. 16:1, n-9 denotes fatty acid with 16 carbon atoms); Polyunsaturated (more than one double bond, e.g. 20:4n- 6, denotes carbon atom with first of four double bond in 6 carbon atoms from methyl group).

The degree of unsaturation affects the properties of the fat /oil. All double bonds are usually in cis forms. The trans fatty acids are unsaturated fatty acids having double bond in the trans form, which is found to be more stable. But number of studies has indicated the association between adverse effects of trans fatty acids and coronary heart disease and lipoproteins profile. It is emphasized that the food industry reduces the trans fatty acids in its products. Fatty acids in food have even number of carbon atoms and have a mixture of fatty acid triglycerides. Due to the hydrophobic nature of fatty acids containing more than 8 atoms, it is insoluble in nature. Fats are solid at room temperature and contain more percentage of saturated fatty acid. Oils are liquid at room temperature containing more of unsaturated fatty acids. Animal fats predominantly have saturated fatty acids whereas the vegetable oils have unsaturated fatty acids.



**Metabolism**

The digestion of fat takes place in small intestine with the help of bile and lipase enzyme into fatty acids and glycerol. These are again re-synthesized into triglyceride in the intestinal cell. The triglyceride is transported by lipoproteins, via lymph to blood where the small- chain triglycerides are absorbed directly into capillaries. Fats release 9 kcal per gm of fat.

Vegetable oils are extracted of from seeds, nuts and kernels. It is done either with the help of solvents or by mechanical pressure. The vegetable oils obtained may have some impurities such as gums, resins, coloring matter, free fatty acid etc. These are removed with the help of refining process, including a number of processes like degumming, neutralizing, washing and drying, bleaching and deodorizing. Care needs to be taken to prevent air contact as it causes deterioration due to oxidation.

Rancidity- The spoilage of oils and fats resulting in unpleasant odors and flavors is called rancidity. Two types of rancidity are known - hydrolytic and oxidative. Hydrolytic rancidity is the result of moisture in the oil; whereas oxidative rancidity is due to oxygen reaction with the unsaturated fatty acids. Naturally some antioxidants (like vitamins E) are present in vegetable oils to retard the rancidity. Hydrogenation is the conversion process of oil into fat to increase their melting point; the process of conversion is in the presence of catalyst (Nickel) e.g. vanaspati. This process converts the unsaturated fatty acids to saturated fatty acids and also converts the cis forms of unsaturated fatty acids to trans forms of unsaturated fatty acid. The latter are harmful for the heart. Animal fats contain Vitamin A & D, whereas Vitamin. E is present in vegetable oils.

**Functions**

1. Fat is a concentrated source of energy providing 9kcal/g.;
2. Provides palatability to diet;

3. They are building blocks for synthesis of biologically important lipids such as phospholipids, sphingolipids and cholesterol esters having many metabolic regulatory roles.
4. Helps in absorption of fat-soluble vitamins.
5. Essential fatty acids (EFA) are important for the function and structure of body cells membranes, for hormones like prostaglandin, for specific function of CNS and vision. They can't be synthesized by the body and are available from vegetable sources. The two essential fatty acid linoleic acid (LA-n6) and alpha-linolenic acid (ALA-n3) are important for body.
6. Numbers of studies have suggested the beneficial effect of monounsaturated fatty acids (MUFA) such as lowering risk of coronary heart disease, cancer, cataract, and other inflammatory disorders.
7. Fats as adipose tissue act as an insulator and padding for vital organs.
8. The different fats and oils having varied physical properties due to different number of triglycerides present, affects its melting point, thus affecting their use in various food manufacturing application of cake, mayonnaise, ice cream etc.

**Deficiency**

1. The essential fatty acid deficiency known as phrynoderma is seen along with malnutrition.
2. Obesity- a diet rich in fat can pose a threat to human health by encouraging obesity. In fat people, adipose tissue may increase upto 30 percent.
3. Coronary heart disease- high intake (i.e. dietary fat representing 40 per cent or over of the energy supply and containing a high proportion of saturated fats) has been identified as major risk factor for CHD.
4. Cancer- in recent years, there has been some evidence that diets high in fats increase the risk of colon cancer and breast cancer.

**Recommended Dietary Allowance**

A minimum amount of fat is required to meet the requirement of essential fatty acids. As per the American Heart Association guidelines 20% or less of total energy from fats is recommended.

Fat from varied sources is preferred than from any single kind. Saturated fatty acids should provide 8-10% of total caloric intake, polyunsaturated fatty acids should provide 5-8% & monounsaturated fatty acid should provide 3-7% of total calories intake.



In an Indian diet, it is recommended to use either groundnut, rice bran, seasame or sunflower, corn, cottonseed oil along with palm oil or any other oils mixed with mustard or soybean oil.

**Dietary sources :** Fat is present in food as visible or invisible form. It is present in small percentage in cereals and legumes as invisible form. Butter, vanaspati etc. from animal sources and oils (e.g. groundnut, mustard, coconut, sanflower etc.) from vegetable sources are the visible sources

**3. Carbohydrates**

Carbohydrates Cx(H2O)y/(CH2O)n is one of the macronutrients- a major energy source to the body. It provides 4kcal/g. Carbohydrates in food are present in the form of sugars and starch (polymers of sugar) and cellulose (non-starch polysaccharide). The simplest component of carbohydrate is glucose.

**Classification**

Carbohydrates are classified into mono, di, oligo and polysaccharides. There are six naturally occurring carbohydrates of interest in foods-glucose, fructose (monosaccharaides are simplest form of carbohydrate and cannot be hydrolyzed further); sucrose, maltose and lactose (disaccharides) and starch (polysaccharide). Simple carbohydrates (sugars) are crystalline solids and water-soluble.

**Glucose** (also called Dextrose /grape sugar/ corn sugar) is the simplest monosaccharide and is widely available in nature. It is the major energy fuel for the human body.

**Fructose** (also known as Levulose / fruit sugar) is about twice sweeter than sucrose. It is used as sweetener by diabetics or obese people. It is also observed that fructose does not requi . insulin hormone for utilization.

**Maltose** (Malt sugar) - is an intermediate product of starch digestion. It is also present in malted and fermented grains. Maltose (malt sugar) on hydrolysis yields two glucose units.

**Sucrose** on hydrolysis yields equal parts of glucose and fructose.

**Lactose** (milk sugar) provides equal quantities of glucose and galactose on hydrolysis.

Polysaccharides (starch, glycogen) provide a number of monosaccharide units on hydrolysis. But the uncooked starch in food is not easy to digest, as the digestive juices can't penetrate the cell wall of plant, which contains the starch. Gelatinization of starch

(powdered form) occurs when it is mixed with water and heated to 850 C, and this on cooling leaves a semisolid gel.

**Glycogen** is the reserve carbohydrate in man and animals present in liver and muscles and is synthesized from glucose.

**Pectin** found in soft fruits and in plant cell walls is a mixture of polysaccharides. Cellulose on hydrolysis by acids yields high number of ß-D glucose.

**Starch** (polymers of sugar-having a high molecular weight) is non-crystalline, insoluble in water and tasteless. Cereals have about 70% whereas legumes seeds have 40%of starch. Starch present in seed and roots of plants is composed mainly of two components amylose and amylopectin. Glucose units (á1, 4 linked) in a long unbranched chain are called amylose whereas highly branched unit with á1, 6 linked glucose units is amylopectin. Amylose starch produces blue colour on reaction with iodine. Starch is readily hydrolyzed by acids to glucose.

**Metabolism**

The digestion of carbohydrates starts in the mouth by the action of saliva and is finally broken down to the simplest unit which is absorbed in the small intestine. Carbohydrate digestion involves hydrolysis of disaccharide and polysaccharide to simple sugars. The monosaccharaides are transferred across epithelial cells and enter portal vein, with faster absorption of glucose and galactose than fructose. The series of reactions involving assimilation, utilization of glucose by body, is controlled by hormone insulin.

Ribose, xylose and arabinose are present in fruits and root vegetables. These are 5 carbon sugars (Pentoses- monosaccharides) and are of significance as are constituent of riboflavin (Vitamin B), RNA and DNA. These are not required in diet as these can be synthesized by all animals.

The non-digestible carbohydrates - cellulose, hemi cellulose, gums, mucilage, pectin and lignin in plant foods is called 'dietary fiber'. This is now also referred to as 'non-starch polysaccharide (NSP). They are classified as soluble and insoluble dietary fiber. They do not provide any nutritive value, but are helpful in many ways. Cellulose has a high molecular weight, is non-crystalline, insoluble in water and tasteless.

A normal value for blood glucose is 80-120mg/dl. Depending on the type of carbohydrate it has effect on the blood glucose levels. Glycaemic Index (GI) is the blood glucose response after having a carbohydrate meal. GI is affected by number of factors such as physical characteristics of food (intact or ground form), cooked or uncooked food, fibre content of food, presence of fat and protein in the diet.



**Functions**

1. Major energy providing nutrient in the diet. Has protein sparing action;
2. The dietary fiber non-digestible carbohydrate help in various ways -stimulates contraction of digestive tract, add bulk to the stool; retards gastric emptying. Soluble fibers help on lowering the blood cholesterol and blood glucose levels;
3. Different starches are used as thickening agents e.g. corn flour; arrowroot powder;
4. Helps in growth of desirable bacteria eg. lactose;
5. Pentose's are components of DNA and RNA.

**Deficiency**

In case total energy requirement is not met by the diet, especially in young infants and children, malnutrition occurs.

**Recommended Dietary Allowance**

It has been recommended that carbohydrate in the diet be 55-65% of total energy with emphasis on complex carbohydrate. 40gm of dietary fiber in the daily adult diet is recommended (FAO/WHO, 1998).

**Dietary Sources**

It is present in variable amount in nearly all foods except fats and oils. Starch, sugar, grain foods, roots and tubers are the main carbohydrate source. For dietary fiber bran is the richest source. In addition whole grains cereals, legumes, nuts, fruits and vegetable are good fiber source.

**4. Vitamins**

Vitamins are organic compounds. Although they are required in small amounts, but are essential for many important functions of the body. They cannot be synthesized by the body. Due to shortage of specific vitamins various deficiency diseases could occur. The vitamins were designated by letters A, B and so on before their structures were determined. Foods contain small quantities of these vitamins.

**Classification**

They are categorized into two groups- fat soluble vitamins-Vitamin A, D, E, K and water fat soluble vitamins-several B Vitamins and vitamin C.

**Fat soluble Vitamins**

**Vitamin A or Retinol :** Vitamin A is the general term used for several chemically related compounds such as retinol, retinaldehyde, retinoic acid and retinyl esters. Out of

these retinol is the major natural occurring form (Vitamin A alcohol). Retinol is a pale yellow solid, which dissolves freely in oils and fats and is slightly soluble in water. It is relatively heat and alkali stable and unstable in light and to acid. It is found in fatty parts of foods especially animal foods. Retinol is a complex unsaturated alcohol of molecular formula C20H29OH. In animal tissues it is stored and transported as an ester formed with a long-chain fatty acid.

**Metabolism**

Vegetables contain no retinol. They have yellow pigments called carotenes, chemically related to vitamin A. Carotenes can be converted to retinol in the wall of the small intestine during absorption. Several carotenes are known; but the most important is beta-carotene, which is often referred to as 'pro-vitamin A'. The molecule of beta-carotene is almost exactly twice as big as that of vitamin A. It is an unsaturated hydrocarbon, not an alcohol. In the body, conversion of beta- carotene to retinol is less that is yields only 50% retinol. In addition, carotenes from vegetable food are not completely absorbed and the availability is 25-50 % depending on the diet and fat content in the diet. Thus based on the absorption and physiological conversion, a unit of beta carotene yields only 0.25 units of retinol in the body. . Retinol and carotenes are highly unsaturated and get easily destroyed by oxidation especially at high temperatures. As they are insoluble in water, there is no loss by extraction during boiling of vegetables. As retinol is not soluble in water the excess is accumulated in the liver, but excessive intake is to be avoided and may prove to be injurious.

**Functions**

1. Retinol has an important function in the visual process; necessary for vision in dim light.
2. Is necessary for maintaining the integrity of healthy epithelium especially the membrane line of eyes, mouth, gastrointestinal, respiratory and genitourinary tract.
3. Is required for normal skeletal growth and tooth development.
4. Vitamin A also facilitates other functions such as for reproductive cycle, in iron metabolism.
5. Beta-carotene is a powerful antioxidant. It helps to protect the easily oxidized nutrients, such as PUFAs, from oxidation. It is also able to protest the body from the harmful effects of the free radicals in the body.

**Deficiency**

One of the earliest signs of vitamin A deficiency is known as 'night blindness'



1. **Night blindness-** A condition when it is difficult to see in dim light. It is caused by shortage of retinol derivative called 'rhodopsin'. Vitamin-A is essential for the maintenance of healthy skin and mucous membranes.
2. **Conjunctional Xerosis-** this is the first clinical sign of vitamin A deficiency. The conjunctiva becomes dry and non- wettable. Instead of looking smooth and shiny, it appears muddy and wrinkled. It has been well described as "emerging like sand banks at receding tide" when the child ceases to cry.
3. **Bitot's spots-** Bitot's spots are triangular, pearly-white or yellowish, foamy spots on the bulbar conjunctiva on either side of the cornea. They are frequently bilateral. Bitot's spots in young children usually indicate vitamin deficiency. In older individuals, these spots are often inactive sequel of earlier disease.
4. **Corneal Xerosis-** This stage is particularly serious. The cornea appears dull, dry and non-weattable and eventually opaque. It does not have a moist appearance. In more severe deficiency there may be corneal ulceration. The ulcer may heal leaving a corneal scar which can affect vision.
5. **Keratomalacia-** keratomalacia or liquefaction of cornea is a grave medical emergency. The cornea may become soft and may burst open. The process is a rapid one. which can affect vision.

In severe vitamin A deficiency, epithelial changes, skin changes, degeneration of cells, with increase susceptibility to infection (eye, nasal passage, sinuses, middle ear, lungs and genitourinary tract) may occur.

**Treatment and prevention of vitamin A deficiency**

For children below 6 years of age prophylactic dose of 50,000 international units is recommended. A daily oral dose of 10,000 international units vitamin A is advised in case of mild to moderate deficiency cases and 50,000 international units vitamin a for a week for severe cases.

**Recommended Dietary Allowance**

In a mixed Indian diet a conversion factor of 0.25 is required to calculate the retinol from beta-carotene in food. The daily requirement for adult man & women is 600ug; with an increase of 350ug for lactating women.

**Dietary Sources**

Retinol is found in animal tissues (liver, egg yolk) and dairy products (whole milk, butter, cheese). Fish liver oils are the richest source. Carotenes are found in plant tissues such as dark green vegetables (spinach, turnip leaves, beet greens, bathua etc.) and

yellow fruits and vegetables (carrot, pumpkin, papaya, mango etc.) are good sources of carotene. Crude palm oil is also rich source of carotene.

**Toxicity**

Large intake (therapeutic dose) of vitamin A for long periods would lead to hypervitaminosis with symptoms such as nausea, headache, vomiting etc.

**Vitamin E or Tocopherols**

Vitamin E is a term used for tocopherols and tocotrienols and their derivatives. It is light yellow oil (C29H50O2 ), stable to high heat and acid but decomposition occurs in UV light. Oxidation occurs in presence of rancid acid, lead and iron salts. In nature, four tocopherols and four tocotrienols occur, the difference being the number and the position of methyl groups on the chromanol ring. In addition several types of synthetic Vitamin E are available.

**Function**

The principal role of vitamin E is as an antioxidant, though the exact mechanism is not yet known. Various other functions are as follows:

1. Regulation of immune response through cell mediated immunity.
2. Protects from various diseases like cancer, arthritis and ischemic heart disease by preventing peroxidation and maintaining integrity of cellular membrane.
3. Prevents oxidation of beta carotene, vitamin A and vitamin C. Prevents lipid peroxidation of polyunsaturated fatty acids (PUFA) in cells.
4. In rats, Vitamin E affects the reproductive biology. But no such definitive role has been observed in human subjects.
5. The vitamin derivative is found to be necessary for Coenzyme Q synthesis.
6. They are used in the food industry as antioxidants and permitted food additives.

**Deficiency**

It is rarely observed in humans. It may be observed in subjects with either fat mal-absorption or subjects on total parenteral nutrition (TPN) or in premature infants fed on formula feeds.

**Recommended Dietary Allowance-** The requirement is related to the fat and poly-unsaturated fatty acid (PUFA) content of the diet. For Indians, the requirement has been suggested to be as 0.8mg/g of essential fatty acids.

**Dietary sources**

Most of the cereal germ oils like wheat germ oil, corn oil and cottonseed oil, are good sources.



**Vitamin D3 or Cholecalciferol**

Cholecalciferol (Vitamin D3) is the naturally occurring form on cells. It is obtain edendogenously, by the action of ultraviolet light on 7-dehydrocholesterolin the skin to form Vitamin D3 (Cholecalciferol). Ergocalciferol (Vitamin D2) is found in plants, and is produced when ergosterol is exposed to ultraviolet light. Dietary Vitamin D2is ergocalciferol- the major source being fish, and some fortified margarines. Vitamin D is white crystalline solid, freely soluble in oils and fats. Vitamin D is stored in the liver.

**Metabolism**

Both vitamin D2 and Vitamin D3 undergo similar metabolic changes in the body. In the food dietary vitamin D is absorbed along with fat from the jejunum and ileum. For effective absorption, bile is essential. It is transported in the chylomicrons through the lymph circulation. Vitamin D produced in the skin enters the blood and circulates attached to specific globulin. In most individuals the endogenous synthesis is the major source of vitamin D.

**Function**

1. Necessary for absorption of calcium and phosphorus by the body.
2. These minerals are needed for formation of bone and teeth.

**Deficiency**

Deficiency leads to inadequate absorption of calcium and phosphors and further faculty mineralization of bone and tooth structure. Decreased synthesis or dietary deficiency causes rickets in children and osteomalacia in adults. Low serum calcium also cause tetany.

**Recommended Dietary Allowance**

By exposure to sunlight adequate vitamin D can be synthesized in the body. Therapeutic supplementation is necessary (10ig) in case of deficiency due to metabolic or genetic reasons.

**Dietary Sources**

Good source of vitamin D are exposure to sunlight, fish liver oil. Other animals foods such as egg yolk, liver and fish like herring, tuna and sardines have small amounts of vitamin.

**Vitamin K or Naphthaquinones**

Vitamin comprises of compounds derived from menadione (2methyl-1, 4 naphthaquinone). It exists in two forms in nature; vitamin K1- phylloquinone or

phytlmenaquinone and K2 -menaquinone or multiprenylmenoquinone. K1 is present in various green leafy vegetables like spinach and K2 in gastrointestinal tract of human and some animals as it can be synthesized in bowel by microorganism. These both are fat soluble, heat stable vitamin, but are unstable to strong acid, alkali, sunlight and oxidation.

**Metabolism**

In the presence of bite salts Vitamin K is readily absorbed along with fats in the upper small intestine and is transported to liver in the chylomicrons.

**Function**

1. The main function is in the formation of a number of coagulation factors like prothrombin factor II, VII, IX and X.
2. Some studies have suggested the role of vitamin K, and D on bone mineral density/ bone health.

**Deficiency**

The dietary deficiency is usually unlikely, but the deficiency may occur due to interference with the absorption or synthesis. The deficiency leads to an increase in the prothrombin time and thus an increased risk of hemorrhage.

**Recommended Dietary Allowance**

Due to the variation in intestinal synthesis, no dietary allowances have been recommended. Still 'safe intake' advised for adults is 1-2 ig/kg Body Weight/day and 10ig/day for infants.

**Dietary sources**

Green leafy vegetables are good sources of vitamins K, though the absorption is relatively poor as it is bound to membrane of the chloroplasts. Some plant derived oils such as Soya and Canola oils are also rich in vitamin K. Further research is still required to find the bioavailability and bioactivity of Vitamin K form in different food sources.

**Water-soluble B group Vitamins**

These groups of vitamins are important in the metabolism of carbohydrates, proteins and fats. Thiamine is referred to as B1 and the other B2 include riboflavin, nicotinic acid, pantothenic acid, pyridoxine, folic acid, Vitamin B12, biotin, choline and inositol. In human nutrition, the first seven (of B2 Vitamin) are of importance whereas the last two are important in nutrition of animal, poultry and microbes

**Thiamine/Vitamin B1**

The thiamine molecule has an amino and a hydroxyl group. Thiamin hydrochloride is



water soluble, heat labile white crystalline substance. It is destroyed by heat in neutral and alkaline solutions but is resistant to heat in acids solutions.

**Metabolism**

In food thiamin is available either in the free form or bound as thiamin pyrophosphate or bound with protein. Mainly the absorption takes place in the duodenum. It is not stored by the body; hence an adequate and regular supply is required.

**Function**

1. The principle active form is thiamin pyrophosphate (TPP). It acts as a co-enzyme in the carboxylation and transamination reactions in carbohydrate, protein and fat metabolism.
2. Is essential for a number of important enzyme systems used for release of energy from food.
3. It affects the function of nerve cell membranes.

**Deficiency**

Thiamin deficiency known as beriberi may occur either due to poor dietary intake (use of highly milled cereals only) or due to gastrointestinal disturbances like vomiting, diarrhea etc. Two deficiency forms termed as 'Dry' and 'Wet' Beri Beri are seen in adults. The deficiency in infants is called 'infantile Beri Beri'. The deficiency symptoms are loss of appetite, muscular weakness, peripheral neuritis (Dry Beri Beri); fatigues, dizziness, breathlessness, enlargement of heart, heart failure (Wet Beri Beri).

It has been observed that various vitamins B deficiencies overlap. Hence a mixture of B- complex is given in deficient states. Only in specific deficiency, a single large dose of vitamins is advised.

**Recommended Dietary Allowances-**

The requirement is based on the total energy requirement, composition of diet and cooking losses. The Recommended Dietary Allowances is 0.5 mg thiamin per 1000 kcal of diet.

**Dietary sources**

The richest sources of thiamin are Wheat germ and Brewer's yeast. Dry beans, peas, soybeans, peanuts and egg yolk and liver are also good sources. Unmilled cereals and pulses contain high amount of thiamin whereas highly polished cereals like rice are poor source of thiamin.

**Retention of food value**

Thiamin being water soluble, it is observed that considerable losses occur if water is thrown in which food is cooked. The losses are reduced if the amount of cooking water and total cooking time is reduced. Edible soda / making the cooking medium alkaline should be avoided. 25% of thiamin loss is observed during roasting of foods.

**Riboflavin**

Riboflavin molecule is a heterocyclic ring of carbon and nitrogen atoms. It is an odorless, orange yellow, bitter tasting compound, sparingly soluble in water. It is resistant to heat, oxidizing agents and acids. It is sensitive to light.

**Metabolism**

It is absorbed in the small intestine.

**Functions**

1. It is a component of two major coenzymes Riboflavin Mononucleotide (FMN) and Flavin Adenine Dinucleotide (FAD) that are part of Krebs' energy cycle reactions.
2. It is also a constituent of enzymes and amino acid oxidases required for oxidation of purines and amino acids.

**Deficiency**

Riboflavin deficiency (Ariboflavinosis) has symptoms of glossitis (soreness of tongue) dermatitis (especially in scrotal regions and seborrheic dermatitis), chielosis (cracking of lips), angular stomatitis and increased sensitivity of the eyes to light, itching and soreness of eyes. Riboflavin deficiency is highly prevalent especially among children and women in India.

**Recommended dietary allowances**

Riboflavin has a major role in the energy cycles reactions, thus the requirements are based on the total energy requirements and basal metabolic rate. Keeping in view, the high cooking losses an intake of 0.6 mg riboflavin per 1000 kcal is recommended for adults.

**Dietary sources**

It is widely distributed in various foods with highest concentration in liver, dried yeast, skimmed milk powder. Other good sources are green leafy vegetables, fresh milk, eggs, meat, and fisn. Millets and legumes are fair sources. Milled cereals and its products, other vegetables, roots and tubers are average sources of riboflavin.



Losses during cooking. There is not much loss in usual cooking process as riboflavin is sparingly soluble is water. But addition of soda to vegetables; pasteurization, evaporation and drying of milk; stewing, roasting of meat causes some riboflavin losses in the range of 10-25%.

**Niacin (Nicotinic acid)**

Niacin is present in two forms- a pyridine carboxylic acid nicotinic acid and its amide nicotinamide (niacinamide). These are water soluble and resistant to acids, bases, light or heat.

**Metabolism :** The absorption takes places in the small intestine. In humans, tryptophan from the diet can be converted to niacin (60 mg of tryptophan=1 mg niacin).

**Functions**

1. It is a part of coenzymes nicotinamide adenine dinucleotide (NAD) and nicotinamide adenine dinucleotide phosphate (NADP) which is part of krebs cycles, fatty acids and cholesterol metabolism.
2. It is required for conversion of phenylalanine to tyrosine.

**Deficiency**

Niacin deficiency results in pellagra- a condition involving gastrointestinal tract, nervous system, and skin. It is characterized by classical three D's- dermatitis, diarrhea, and dementia. Deficiency is observed in exclusive maize eating population as in Mexico and jowar eating population of southern India. It is due to bound form of nicotinic acid and due to imbalance of amino acids present.

**Recommended dietary allowances**

6.6 mg niacin equivalent per 1000 kcal has been recommended for all ages.

**Dietary sources** : The best sources are animal products like kidney, tuna fish, liver and brewer's yeast. Other animal foods like meat and poultry and vegetable sources like whole cereals, pulses, nuts (especially groundnut) are good sources. Milk, though low in niacin is a rich source of tryptophan.

Losses during cooking and processing may occur during boiling, as the vitamin is water-soluble. Reducing the amount of cooking water could reduce loss.

**Pyridoxine (Vitamins $B_6$)**

Name represents group of three pyridine derivatives. In animal products, it is present as pyridoxal and pyridoxamine; in vegetable products, it is present as pyridoxine. They are all interchangeable in the body.

**Metabolism**

Similar to other B-vitamins, it is absorbed in the small intestine and not stored in the body Pyridoxal phosphate is the active form of vitamin B6.

**Function**

1. It acts as a co-enzyme in the amino acids metabolism, catalyzes conversion of tryptophan to niacin, required for glycogen breakdown
2. Required for formation of antibodies, synthesis of hemoglobin molecule
3. Required in important chemical reactions in nervous system.

**Deficiency**

Some of the symptoms of vitamin B6 deficiency observed are anemia, skin lesion, glossitis, cheilosis, and seizures and reduced antibody production. However it is rarely observed as it is present in number of foods. Pellagra is also known to develop in tuberculosis patients receiving isoniazid medication as this depletes the coenzyme required for conversion of tryptophan to NAD.

**Recommended dietary allowances**

Though the requirements for Indians have not been established, an average dietary recommendation for adults is 1.5mg/day.

**Dietary sources**

It is present in a number of food products such as dried yeast, wheat germ, whole cereals, legumes, oil seeds, nuts, milk, egg, meat, liver, fish and green leafy vegetables.

**Pantothenic acid**

It is pale yellow oil with structure- $OHCH_2C(CH_3)$ $2CHOHCONHCH_2CH_2COOH$. It is soluble in water, destroyed by acid, alkali and heating.

**Metabolism**

It is absorbed in the gastrointestinal tract by intestinal cells and enters the circulation.

**Function**

It is part of two important coenzymes- Co A (coenzymes A) and ACP (Acyl carrier protein) which are part of the carbohydrate and fat metabolism.

**Deficiency**

On being food with antagonist various deficiency symptoms may occur such as loss of appetite, abdominal pain, peripheral neuritis, fatigue, weakness, insomnia and respiratory infections.



**Recommended dietary allowance**

The safe and adequate daily intake of 4-7 mg for adults has been recommended.

**Dietary sources**

It is present in number of plant and animal tissues. Animal sources like liver, yeast; egg yolk and meat are good sources of pantothenic acid.

The vitamin loss during milling and dry processing is about 50%.

**Biotin**

It is a cyclic urea derivative, stable to heat, light and acids. It is usually combined with proteins in the food and in tissues.

**Metabolism**

The dietary vitamin is absorbed by the intestinal cells. In addition, intestinal bacteria produce biotin in the gastrointestinal tract.

**Function**

It acts as a coenzyme in the synthesis of fatty acids and purines.

**Deficiency**

Due to its wide food availability, deficiency is rare.

**Recommended dietary allowances**

The recommended dietary allowance has not been established. The safe estimated intake for adults is 100-200mg/day.

**Dietary Sources**

Nuts and legumes, organ meats & egg yolk are good sources.

**Cobalamin/Vitamin $B_{12}$**

Vitamin $B_{12}$ is a large molecule ($C_{63}H_{90}O_{14}N_{14}PCo$) having cobalt as part of its structure. It is a deep red crystalline substance. It is stable to heat and only slightly soluble in water. When in the form of a solution, it is destroyed by sunlight.

**Metabolism**

Vitamin $B_{12}$, is absorbed in the small intestine requiring an intrinsic factor secreted by the stomach and is transported in blood circulation bound to a protein.

**Functions**

1. It forms part of coenzymes of some important metabolic reactions like synthesis of

DNA, methionine and choline.

2. For the metabolism of folic acid.
3. Along with folate and iron, required for formation of red blood cells.
4. Required for maturation of cells.
5. Involved in formation of mylelin sheath surrounding the nerve fiber.

**Deficiency**

The deficiency results in a condition called pernicious anemia. The mature red blood cells (RBC) are not produced by the bone marrow and thus the capacity to carry oxygen by the hemoglobin is reduced. Dietary deficiency is usually observed in persons who do not consume any animal food. In addition, the deficiency is also seen in persons to lacking intrinsic factor, which is required for absorption. This is observed in cases of mal-absorption syndrome and in cases of surgical removal of part of the stomach.

**Recommended dietary allowances**

It is required by the body in minute amounts. The daily allowance of 1 ig/day has been recommended for adults.

**Dietary sources**

Vitamin $B_{12}$ is present only in animal foods (e.g. liver, meat, fish, kidney, brain & egg) and is not present in foods of vegetable origin. Bacteria in the gastrointestinal tract also synthesize Vitamin $B_{12}$.

**Folic acid**

The generic name for folic acid is Folacin. It is a yellow crystalline substance, slightly soluble in water and stable in heat at neutral pH.

**Metabolism**

The absorption is mainly from the small intestine is mainly stored in the liver.

**Function**

1. Along with vitamin $B_{12}$, it is essential for DNA synthesize and for RBC's formation.
2. It has been observed that if folate supplementations are given before preconception, the incidence of neural tube defects is reduced.
3. It has been recently recognized that chronic mild hyperhomocysteinemia is a major risk factor for vascular disease and these respond to increased folate intake. It is yet to be confirmed if higher folate intake has a positive effect on vascular disease incidence.



**Deficiency**

The deficiency of folic acid cause megaloblastic or macrocytic anemia, resulting from inadequate dietary intake or secondary to diseases like malabsorption syndromes or during pregnancy when the high requirements are not met with. The symptoms of this anemia are- reduction in number of RBC's, immature large nucleated cells, low hemoglobin, low leukocyte and platelet levels. Medicinal supplements are recommended in such cases.

**Recommended dietary allowances**

Based on various studies, the recommended dietary allowances has been fixed at 100 mg/day for adults, with an additional intake of 300 mg for pregnant women and 50 mg for lactating women.

**Dietary sources**

It is present in a number of both animal and plant food stuffs like liver, kidney, yeast and deep green leafy vegetables and pulses.

**Toxicity**

No folate toxicity has been reported on high folate intake.

**Ascorbic Acid or Vitamin C**

Ascorbic acid or vitamin c is a water soluble white crystalline compound ($C_6H_8O_6$). The molecule does not contain a free carboxyl group and is a lactone. Lactones behave like acids. Ascorbic acid has a sharp taste usually associated with acids and will form salts. It is optically active and is dextrorotatry. It is a good strong reducing agent and gets easily oxidized. It is one of the unstable nutrients and is easily destroyed by atmospheric oxidation, exposure to light or high temperatures, alkalinity and metal ions especially copper. The rate of oxidation is reduced in weak acid solution and at low temperatures.

**Metabolism**

The vitamin is rapidly absorbed from gastrointestinal tract, with very little storage. As humans lack the enzymes required for its synthesis, it has to be provided in diet.

**Functions**

1. Ascorbic acid is easily oxidized. It is able to protect other substances from oxidation; acting as an antioxidant. Synthetic ascorbic acid & its sodium and calcium salts are used as permitted antioxidants in food industry.
2. In body tissues, ascorbic acid protects the easily oxidizable nutrients. It is effective in

'mopping up' free radicals. It has a preventive function for diseases in which free radicals are involved.

3. It helps in absorption of dietary iron.
4. Is involved in collagen (intercellular connecting protein) synthesis, formation of bone and teeth calcification & many other reactions.

**Deficiency**

Vitamin deficiency results in a condition called scurvy-characterized by weakness, bleeding gums and defective bone growth.

**Recommended Dietary Allowances :** The recommended dietary allowance is 40mg/day for adults; 25mg/day for infants and 80 mg/ day for lactating women.

**Dietary Sources**

Ascorbic acid occurs in mainly in foods of plant origin, especially fruits and vegetables. Fresh green vegetables and salad vegetables like cabbage, lettuce, spinach, amaranth and cucumber contain this vitamin. The citrus fruits (lemons and oranges), berries and melons are particularly rich in the vitamin. Tomatoes and potatoes also contain good amount. Gooseberry (Amla) is one of the richest sources of this vitamin. Storage causes decrease in the vitamin C content. Germinated grains have a higher vitamin C than non sprouted cereal and legumes e.g. Sprouted green gram. Amongst fruits, gooseberry (amla) and Guava are very rich sources of vitamin C.

During cooking, around 75% of ascorbic acid is lost. It is advised that a minimum amount of water should be used for cooking vegetable. It is best to place the vegetables in boiling water as this contains no dissolved oxygen. Addition of soda bicarbonate (alkaline condition) should be avoided. Heating or drying leads to Vitamin C destruction but gooseberry (Amla) is an exception.

**Minerals**

Minerals are required for many purposes like forming the frame and rigid structure of the body, as part of the body/cell fluids and for number of cellular and sub cellular physiological functions.

**Calcium**

Most of the calcium in the body is present in the bones and teeth; only a small amount (1%) is present in blood/body fluids. It is present either is combination with protein or as calcium ion. Thyroid and parathyroid hormones maintain the concentration of calcium in blood. During dietary deficiency, the calcium present in the bones maintains the blood calcium levels.



**Metabolism**

The dietary calcium absorption is only 20-30%. The dietary absorption depends on many factors e.g. vitamin D levels, any renal insufficiency, hypothyroidism and interaction with other diet components like phytates (present in cereals) and oxalates (present in amaranth, horse gram, gingelly seeds, tea coffee). The availability of calcium is reduced as it binds to form insoluble calcium phytate/oxalate. The calcium absorption across the intestinal mucosa is by both active and passive transport.

**Function**

1. Calcium is required for blood clotting;
2. For contraction of the muscles (e.g. contraction of heart) and
3. For many enzymatic activities.

**Deficiency**

Calcium loss leads to a condition is known as osteoporosis. In this condition, due to loss of calcium, bone becomes fragile and brittle and fracture easily. This is often found in postmenopausal women. Achievement of high bone mass through good nutrition and exercise during period of growth is beneficial.

**Recommended Dietary Allowances**

The requirement varies based on the age, sex and physiological conditions (e.g. growing children, pregnancy or lactating women). It varies from 400-1000mg per day. If dietary calcium sources are insufficient, the calcium required is taken from bones.

**Dietary Sources**

Calcium is present in both the plant and animal foods. Foods of animal sources are milk and fish (bhekti, chingri, rohu etc). Among vegetable sources, green leafy vegetables like amaranth, drumstick and fenugreek leaves are the richest sources of calcium. Amongst cereals/millets and pulses, ragi (millet); soybean and rajmah have high calcium content than other cereals & pulses. Nuts (almonds) and oilseeds (gingelly & mustard seeds) are also good calcium sources.

**Iron**

It is the major component of pigment hemoglobin in red blood cells, (which is essential for the transportation of oxygen; accounting for approximately 0.1% mineral content in the body. Iron, to a smaller extent, is also present in muscle as myoglobin (muscle protein) and as cell enzymes (cytochromes). Rest is stored in the liver, spleen and bone marrow (as iron binding protein- ferritin and hemosiderin).

**Metabolism**

The absorption of dietary iron by the body is small. Many factors affect rate of absorption-such as source of iron, presence of vitamin C in the diet. The bioavailability of iron varies depending on the kind of diets i.e. iron present in animal products (haem iron) is more readily absorbed than non-haem iron present in plants. Presence of ascorbic acid in the diet also promotes absorption (it reduces ferric ion to the absorbable ferrous state).

**Function**

Iron is a major component of pigment hemoglobin in red blood cells

**Deficiency**

With a prolonged iron deficiency, the hemoglobin falls below normal and the condition is known as anaemia. Iron deficiency anemia is an important nutritional problem in our country. It is observed that women especially pregnant women (60-70%) and children are suffering from iron deficiency anemia. Different factors contribute to it -poor iron absorption from our diets, various worm infestations and blood losses. For prevention and correction of anemia, haematinics (medicinal iron) are provided especially to pregnant women for their high requirements.

**Recommended Dietary Allowances**

Due to the low absorption rate of iron from composite cereal based diet (approximately 2-5% only); the recommendation for daily allowance is 28-38mg for adults.

**Dietary Sources**

Green leafy vegetables (amaranth, colocasia leaves, mustard leaves, pulses like soybean lentil, cow pea, roasted Bengal gram, cereals and millets (bajra, rice flakes) are rich sources of iron. Among animal products, liver is a rich dietary source.

**Iodine**

It is the heaviest member of the halogen group, occurring as salts in nature especially in seawater. The body has approximately 20-50mg iodine.

**Metabolism**

It is present as iodide in blood and is absorbed in the thyroid gland (as hormones thyroxin and tri-iodothyronine).

**Function**

Thyroxin and tri-iodothyronine are important hormones for



1. Body's metabolic activity,
2. Energy production in cells.

**Deficiency**

Iodine deficiency disorder (IDD) is a major public health problem in our country. If dietary deficiency occurs, the thyroid gland increases in size to compensate for the deficiency (known as goiter). Goiter occurs in many parts of the world especially in areas where iodine level of soil are low. This affects the level of the iodine in vegetation. Some vegetables if consumed in large quantities especially cabbage and cauliflower of brassica family interferes with the uptake of iodine by the thyroid gland thus causing goitre.

Iodine deficiency during the pregnancy affects the fetus and may lead to mental and growth retardation in later life. One of the ways of controlling IDD is the use of 'iodized salt'. This is prepared by adding potassium iodide (30ppm) to the salt.

**Recommended Dietary Allowances**

The daily requirement is reported to be 0.15mg.

**Dietary Sources**

Sea foods are the richest sources-like cod, salmon herring, and cod liver oil. Some iodine is also found in drinking water.

**Fluorine**

Fluorine is most abundant element in nature. Being so highly reactive, it is never found in its elemental gaseous form, but only in combined form. About 96 per cent of fluorine in the body is found in bones and teeth. Fluorine is essential for normal mineralization of bones and formation of dental enamel.

**Sources**

The principal sources of fluorine available to man are :

a. Drinking water- the major source of fluorine to man is drinking water. In most parts of India, the fluoride content of drinking water is about 0.5 mg/L, but in fluorosis-endemic areas, it may be as high as 3 to 12 mg/L.

b. Foods- fluoride occurs in trance in many foods, but some foods such as sea fish, cheese and tea are reported to rich in fluorides.

**Deficiency**

Fluorine is often called a two edged sword. Prolonged ingestion of fluorides through drinking water in excess of the daily requirement is associated with dental and skeletal fluorosis; and inadequate intake with dental caries. The use of fluoride is recognized as the most effective means available for the prevention of dental caries.

### Requirements

The recommended level of fluorides in drinking water in India is accepted as 0.5 to 0.8 mg per liter. In temperate countries where the water intake low, the optimum level of fluoride in drinking water is accepted as 1 to 2 mg per liter.

## Concept of Balanced diet in Ayurveda, Nityasevaneeyadravya, Balanced Diet for Different Sections of People in the Society, Social Aspects of Nutrition.

### Concept of balanced diet in Ayurveda

An Ancient balanced diet consist food articles which are explained in Nityasevaneeyahara. The food articles which are advised to take daily will fulfill the body requirements. The food articles which have similar qualities of Nityasevaneeyahara can be taken regularly.

मात्राशीस्यात । आहारमात्रापुनरग्निबलापेक्षिणी ।
यावदध्यशनमशितमनुपहत्यप्रकृतिंयथाकालंजरांगच्छतितावदस्यमात्राप्रमाणंवेदितव्यंभवति ॥
(च.सू. 5/3-4)

Ahara should be consumed in proper Quantity. It should always depend on the strength of Agni. The quantity of Ahara which doesn't disturb the Prakruti, normalcy of Dhatu and Dosha and which gets digested in proper time is regarded as proper Matra (Quantity).

तच्चनित्यंप्रयुञ्जीतस्वास्थ्यंयेनानुवर्तते । अजातानांविकाराणामनुत्पत्तिकरंचयत् ॥ (च.सू. 5/12,13)

One should take food articles that which maintain the health and prevent the unborn diseases. Ideal health means positive and perfect health and not merely an absence of disease.

### Nitya Sevaneeya Dravya

षष्टिकाञ्छालिमुद्गांश्चसैन्धवामलकेयवान् । आन्तरीक्षंपयः सर्पिजाङ्गलंमधुचाभ्यसेत् ॥ (च.सू. 5/12)

Food which are hita to the body like Shali (Rice), Mudga (Green Gram), SaindhavaLavana (rock salt), Amalaki (Gross Berry), Yava (Barley), Antariksha Jala (Rain Water), Paya (Milk), Ghrita(Ghee), Jangala Mamsa (Meat) and Madhu (Honey). These foods consumed regularly for the maintenance of health and prevention of diseases.

1. Shashtika is a kind of rice which grows very quickly to maturity within sixty days (meaning of Shashtika) and is therefore light on digestion. It is rich in carbohydrates, potassium.
2. Shali is a variety of rice, sometimes translated as red rice. It is rich in carbohydrates.



3. Mudga is a pulse called green gram (maybe including black gram) similar to lentils or dals which is light on digestion. It is rich in proteins, phosphorus, calcium, potassium.
4. Saindhava is called rock salt; it is powdery, light pink in color. Its composition is said to include more of potassium than of sodium. This salt is cooling unlike other types of salt.
5. Amalaki is a type of fruit indigenous to India. It is rejuvenative, antioxidant, pacifying to all Doshas but Pitta, especially. It is rich in vitamin C and calcium.
6. Yava (Barley) is also light, laxative, diuretic, and is especially useful for removing excess Kapha from the body. It is rich in carbohydrates, Vitamin B1, B2, phosphorus.
7. Antariksha Jala (Rain water) is the translation in the text but because of environmental pollution a better meaning would be pure water. It's interesting to note that the source of water determines its Doshic qualities. Well water is heavy while moving water is lighter. Hot water reduces Kapha and body weight while cold water increases kapha and body weight. It maintenance the fluid in the body and minerals.
8. Milk that comes fresh from cows is best among milks. It is more easily digested if brought to a boil then drank warm. Milk is light in digestion, nourishing the body and Tridoshas. It rich in fat, protein, vitamins and minerals.
9. Ghee is clarified butter and is best among oils for pacifying Pitta. It also pacifies Vata and because it increases the digestive fire and is digested easily it does not aggravate Kapha. Rich in fat.
10. Honey pacifies Kapha predominantly and Pitta secondarily. Honey must be raw, uncooked and never used in foods to be cooked. The lighter the color means the less sharpness in it.

शीलयेच्छालिगोधूमयवषष्टिकजाङ्गलम् । सुनिषण्णकजीवन्तीबालमूलकवास्तुकम् ॥
पथ्यामलकमृद्वीकापटोलीमुद्गशर्कराः । घृतदिव्योदक क्षीर क्षौद्रदाडिमसैन्धवम् ॥ (अ.सं.सू. 10/18,19)

Vagbhata lists the following as to be taken regularly: Shali (rice), Godhuma (wheat), Yava (barley), Shashtika (rice maturing in 60 days), Jangala (meat of animals of hot arid lands), Sunisannaka, Jivanti (tuberous plant), Balamulaka, Pathya (haritaki), Amalaka, Mridvika, Patoli, Mudga (green gram), Sharkara (sugar), Ghrita (ghee), Divyodaka (rain water), Ksheera (milk), Kshaudra (honey), Dadima and Saindhava Lavana (mineral salt) may be consumed regularly.

### Balanced Diet

'Balanced diet' is defined the kinds of food on which a person or group lives. A

balanced diet is defined as one which contains a variety of food in such quantities and proportions that the need for energy, amino acids, vitamins, minerals, fats, carbohydrates and other nutrients is adequately met for maintaining health, vitality and general wellbeing and also makes a small provision for extra nutrients to withstand short duration of leanness. Since all foods don't have similar nutritional quality, the nutrients provided and thus the health depends on the choice & quantity of foods selected. For a healthy & active life, diets should be planned on sound nutritional principles. Thus while planning the diet, in addition to the calorific value, the quantity and quality of food is taken into consideration. The three proximate principles of food are Protein, Carbohydrate and Fat. The main energy food sources are carbohydrate and fats; whereas for growth and development protein food sources are required. Deficiency, excess or imbalance of nutrients results in malnutrition, which could be either under nutrition or over nutrition. Proper nutrition is required for prevention of illness as well as for treatment of the illness. A combination of different foods is required to be included in the diet as no single food meets all the nutrient requirements. For convenience in planning of a meal, different foods have been grouped based on their function and major nutrient contribution. These are:

1. Milk and its products;
2. Meat/Poultry;
3. Cereal;
4. Pulses/Legumes;
5. Fruits;
6. Vegetables;
7. Fats & Sugar

Though there are number of factors affecting the health of an individual: diet is an important component. Nutrients provided to our body by a balanced diet helps in proper growth and development. One of the fundamental basic requirements for health is good nutrition as it not only promotes growth and development but also provides immune competence and affects cognitive development. Studies have indicated that kind of nutrition in early life (especially intrauterine and infancy) affects disease processes in adult life. With the changing lifestyle modifications in the world, including a change in the quantity and quality of food supply & intake; nutrition is emerging as an important tool for promoting health and for prevention/reducing the risk of many diseases.

**Basic food groups**

There is no single food providing all essential nutrients in sufficient amounts. Different



foods provide different nutrients, requiring us to select a variety of foods so as to provide a balanced satisfactory diet. Quantitatively and qualitatively; the kind of diet/food we consume is important for our health and wellbeing. Conveniently, foods are grouped as-

1. Cereals, Millets and pulses
2. Vegetables and fruits
3. Milk and milk products, egg, meat and fish
4. Oils & fats and nuts & oilseeds

**They are also classified according to their functions**

1. **Energy Foods :** Carbohydrate and fat rich foods mainly contribute energy in our diet. The carbohydrate rich foods are cereals, sugars, and starchy vegetables. The fat rich foods are oils, nuts and butter etc. In addition to energy, cereals also provide B-group of vitamins and several minerals. The fats and sugars add palatability to the diet.
2. **Body Building Foods-** Body building foods are mainly protein rich foods such as milk & its products, egg, meat, fish, poultry (animal sources); pulses, legumes and nuts (plant sources). In addition, these foods contribute Vitamin A, Vitamin B, minerals and energy. The animal proteins contain all essential amino acids and have better protein utilization than plant proteins.
3. **Protective Foods -**This group of food consists of mainly of vitamin and mineral rich food sources such as fruits and vegetables (except roots and tubers). Among various fruits and vegetables, orange and deep yellow colored fruits and vegetables are good source of β-carotene; green leafy vegetables are rich in calcium, iron, vitamin C and β-carotene; and citrus fruits are good source of vitamin C.

While selecting food it is also useful to able to compare the nutrient value. One of the simplest ways is through nutrient density. Nutrient density is the amount of nutrient present in relation to a unit of energy. Use of nutrient density concept is helpful in providing high nutrient with smaller size portions in different situations such as requirement as in children & elderly.

Earlier nutrition science has focused on understanding deficiencies thus recommendations were given. Further step was epidemiologic studies showing how diet contributes to risk of certain diseases e.g. fat and cardio vascular disease. The increasing knowledge about micronutrients including vitamins , minerals and other compounds(such as flavones, anthocyans) on a molecular level together with results from epidemiological studies open a new field of nutrition science-neutriceuticals- link between nutrition and medicine.

**Balanced Diet for Different Sections of People in the Society, Social Aspects of Nutrition**

To promote healthy diet, governmental and other official bodies of countries have issued guidelines. National Institute of Nutrition has given the dietary guidelines for Indians for a balanced diet and good health throughout life

**Composition of balanced diet**

Balanced diet is a diet providing nutrients in the requisite proportions. It has been recommended that a balanced diet provide approximately 60-70% of total calories from carbohydrate source, 10-12%from protein source and 20-25% from fat. In addition, non nutritional nutrients as dietary fiber, antioxidants (such as –β carotene, Vitamin C, E), and phytochemicals (e.g. Polyphenols, flavones etc.) needs to be provided by the balanced diet.

**Recommended dietary allowances (RDA) for average Indian**

To maintain proper body functions, the body requires different nutrients in varying proportions depending on different factors such as age, sex, activity, body weight and height, physiological conditions (like adolescence, pregnancy or lactation etc).

Recommended Dietary Allowances (RDA) or Intakes (RDI) is defined as "the intake of nutrient derived from diet which keeps nearly all people in good health". While preparing RDA the individual variation and the diet-to-diet variability like bioavailability of nutrients, margin of safety are taken into account. These are optimal requirements for maintaining health and not average or minimum.

The Indian Council of Medical Research (ICMR) expert group has given the nutrient needs and RDA (recommended dietary allowances) for different nutrients for different age groups, for different activities based on the safe allowances as given by Food and Agriculture Organization (FAO) and World Health organization (WHO). These guidelines have been based on the following assumptions:

**Reference man and woman**

Reference Man is defined as "an adult man between 20-39 years of age, weighing 60kg and height of 163cms. He is free from disease and is physically fit for active work. On each working day, he is employed for eight hours in occupation that usually involves moderate activity. While not at work, he spends eight hours in bed, four to six hours in sitting and moving about and two hours in walking, active recreation or household duties."

Reference Woman is defined as "an adult woman between 20-39 years of age, weighing 50kg and height of 151cms. She may be engaged for eight hours in general household work, in light industry or in any other moderately active work. Apart from eight hours in bed, she spends four to six hours in sitting and moving around (light activity) and two hours in walking, active recreation or household duties."



For infants and children national Centre for Health Statistics (NCHS – USA) standards was used.

**Energy Allowances**

It is based on the equation given by FAO using BMR values derived from body weight. It is reduced by 5 % due to lower BMR for Indians.

**Protein Requirement**

Based on Indian mixed vegetable diets & considering NPU of 65, the requirement is recommended.

**Fat requirement**

The minimum EFA requirements and the invisible fat content of a cereal-based diet were also considered.

**Minerals**

Iron: Based on the levels of absorption in different cereal based diets (rice -5%; mixed cereal-3%; wheat and millet -2%) and on the basal loss, menstrual loss (in women) and growth requirement (in children), the requirements were estimated.

Calcium and Phosphorus: Due to the interrelation between calcium and phosphorus, the desirable ratio Ca: P of 1:5in infants and 1:1 in adults is considered.

**Vitamins**

Vitamin A: 1μg β carotene =0.25μg retinal. For conversion the following conversion factors are used:

a) Retinol content (μg) = μg Retinol + μg beta-carotene *0.25, if retinol and beta-carotene are expressed in μg.

b) Retinol content (μg) = vitamin A IU * 0.3 + beta-carotene IU * 0.15, if Vitamin A and beta –carotene are given in International Units.

Vitamin B Group: These are related to the energy intake; the recommendation is given per 1000kcal.In case of niacin, contribution of tryptophan is taken into account assuming 60mg dietary tryptophan yields 1mg niacin in the body.

**Social aspects of nutrition**

Food means not only proteins, fats, minerals, vitamins and other nutrients- but much more; it is part of security and civilization. Nation as and civilization are linked together not only by idea, but also by bread. Hunger and malnutrition are problem everywhere and

have harassed mankind and threatened peace throughout history. It is no wonder that the growing incidence of hunger and malnutrition should have come to the forefront of international concern.

**Problems of malnutrition**

Malnutrition has been defined as "a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients". It comprises four forms under nutrition, over nutrition, imbalance and the specific deficiency.

1. Under nutrition- this is the condition which results when insufficient food is eaten over an extended period of time. In extreme cases, it is called starvation.
2. Over nutrition- this is pathological state resulting from the consumption of excessive quantity of food over an extended period of time. The high incidence of obesity, thermo and diabetes in western societies is attributed to over nutrition.
3. Imbalance- it is the pathological state resulting from a disproportion among essential nutrients with or without the absolute deficiency of any nutrient.
4. Specific deficiency- it is the pathological state resulting from a relative or absolute lack of an individual nutrient.

**Ecology of malnutrition**

Malnutrition is a man-made disease. It is a disease of human societies. It begins quite commonly in the womb and ends in the grave. The great advantage of looking at malnutrition as a problem in human ecology is that it allow for variety of approaches towards prevention. Ecological factors are as follow:

1. Conditioning influences-infectious diseases are an important conditioning factor responsible for malnutrition, particularly in small children. Diarrhea, intestinal parasites, measles, whooping cough, malaria, tuberculosis all contribute to malnutrition.
2. Cultural influence- lack of food is not the only cause of malnutrition. Too often there is starvation in the midst of plenty. People choose poor diets when good ones are available because of cultural influences which vary widely from country to country, and from region to region.

a. Food habits, customs, beliefs, traditions and attitudes
b. Religion
c. Food fads
d. Cooking practices
e. Child rearing practices
f. Miscellaneous



1. Socio-economic factors- malnutrition is largely the by – product of poverty, ignorance, insufficient education, lack of knowledge regarding the nutritive value of foods, inadequate sanitary environment, large family size, etc.
2. Food production- increased food production should lead to increased food consumption. The average India has 0.6 hectare of land surface compared to 5.8 hectare per head in the developed countries. The per capita arable land for an average Indian is only 0.3 hectare. Yields per hectare are only about one fourth of those achieved in the industrialized countries.
3. Health and other services-the health sector can, if properly organized and given adequate resources can combat malnutrition. Some of the remedial actions that can be taken up by health sectors are:

a) Nutritional surveillance
b) Nutritional rehabilitation
c) Nutritional supplementation etc.

**Table 1.** recommended Dietary Daily Allowances for Indians (Macronutrients and minerals)

| Group | Particular body | Weight | Energy | Protein (Gm) | Fat (Gm) | Calcium (mg) | Iron (mg) |
|---|---|---|---|---|---|---|---|
| Man | Sedentary<br>Moderate<br>Heavy | 60 | 2425<br>2975<br>3800 | 60 | 20 | 400 | 28 |
| Woman | Sedentary<br>Moderate<br>Heavy<br>Pregnancy<br>Lactation<br>0-6 months<br>6-12 months | 60 | 1875<br>2225<br>2825<br>500*<br><br>550*<br>400* | 50<br><br>50<br><br>25<br>18 | 20<br><br>30<br><br>45<br>45 | 400<br><br>1000<br><br>1000<br>1000 | 30<br><br>38<br><br>30<br>30 |
| Infants | 0-6 months<br>6-12 months | 5.4<br>8.6 | 108/kg<br>98/kg | 2.05/kg<br>1.65/kg | - | 500<br>500 | - |
| Children | 1-3 years<br>4-6 years<br>7-9 years | 12.2<br>19<br>26.9 | 1240<br>1690<br>1950 | 22<br>30<br>41 | 25 | 400 | 12<br>18<br>26 |
| Boys<br>Girls | 10-12 years<br>10-12 years | 35.4<br>31.5 | 2190<br>1970 | 54<br>57 | 22<br>22 | 600<br>600 | 34<br>19 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Boys | 13-15 years | 47.8 | 2450 | 70 | 22 | 600 | 41 |
| Girls | 13-15 years | 46.7 | 2060 | 65 | 22 | 600 | 28 |
| Boys | 16-19 years | 57.1 | 2640 | 78 | 22 | 600 | 50 |
| Girls | 16-19 years | 49.9 | 1060 | 63 | 22 | 600 | 30 |
| *-indicates additional to normal allowance | | | | | | | |

Vitamin D: No dietary recommendation given as exposure to sunlight provides adequate Vitamin D.

The daily recommended dietary allowances for macronutrients, minerals and vitamins for adult man and woman engaged in different activities and infants and children are tabulated in Table-1 & 2.

Table 1: recommended Dietary Daily Allowances for Indians (vitamins)

| Group | Particulars | Vit-A | Thia-mine mg | Ribo-flavin mg | Nicoti-nic acid mg | Pyrid-oxine mg | Vit. C mg | Folic acid µg | Vit. B12µg |
|---|---|---|---|---|---|---|---|---|---|
| Man | Sedentary | | 1.2 | 1.4 | 16 | | | | |
| | Moderate | 600/ | 1.4 | 1.6 | 18 | 2.0 | 40 | 100 | 1 |
| | Heavy | 2400 | 1.6 | 1.9 | 21 | | | | |
| Woman | Sedentary | | 0.9 | 1.1 | 12 | | | | |
| | Moderate | 600/ | 1.1 | 1.3 | 14 | 2.0 | 40 | 100 | 1 |
| | Heavy | 2400 | 1.2 | 1.5 | 16 | | | | |
| | Pregnancy | 600/ | 0.2* | 0.2* | 0.2* | 2.5 | 40 | 100 | 1 |
| | Lactation | 2400 | | | | | | | |
| | 0-6 months | 950/ | 0.3* | 0.3* | 4 | 2.5 | 80 | 150 | 1.5 |
| | 6-12 months | 3800 | 0.2* | 0.2* | 3 | 2.5 | 80 | 150 | 1.5 |
| Infants | 0-6 months | 350/ | 55 | 65 | 710 | 0.1 | 25 | 25 | 0.2 |
| | 6-12 months | 1200 | 50 | 60 | 650 | 0.4 | 25 | 25 | 0.2 |
| Children | 1-3 years | 400/1600 | 0.6 | 0.7 | 8 | 0.9 | | 30 | |
| | 4-6 years | 400/1600 | 0.9 | 1.0 | 11 | 0.9 | 40 | 40 | 0.2-1.0 |
| | 7-9 years | 600/2400 | 1.0 | 1.2 | 13 | 1.6 | | 60 | |
| Boys | 10-12 years | 600/2400 | 1.1 | 1.3 | 16 | 1.6 | 40 | 100 | 0.2-1.0 |
| Girls | 10-12 years | 600/2400 | 1.0 | 1.2 | 13 | 1.6 | 40 | 100 | 0.2-1.0 |
| Boys | 13-15 years | 600/2400 | 1.2 | 1.5 | 16 | 2.0 | 40 | 100 | 0.2-1.0 |
| Girls | 13-15 years | 600/2400 | 1.0 | 1.2 | 14 | 2.0 | 40 | 100 | 0.2-1.0 |
| Boys | 16-19 years | 600/2400 | 1.3 | 1.6 | 17 | 2.0 | 40 | 100 | 0.2-1.0 |
| Girls | 16-19 years | 600/2400 | 1.0 | 1.2 | 14 | 2.0 | 40 | 100 | 0.2-1.0 |
| *-indicates additional to normal allowance | | | | | | | | | |



**Locally available foods :** Inexpensive quality foods and foodstuffs rich in more than one nutrient. Man derives nutrients through the food he daily eats. Type and quantity of various foods depend on socio-cultural & economic considerations. Each food in our diets, contain a wider range of nutrient, serves as the major source of one or two nutrients.

**Cereals :** Millets including ragi are rich in minerals & fiber especially in rice-based diets. Inclusion of some millet in a diet will help in making up deficiency of some of these minerals in the diet & in providing bulk (fiber) to diet.

**Pulses :** Protein of pulses are of low quality since they are deficient in methionine, but are rich in lysine. These supplement proteins of cereals. The most effective combination to achieve maximum supplementary effect is 4 parts of cereal protein + 1 part of pulse protein. In terms with the grains it will be 8 parts of cereal and 1part of pulses.

**Vegetables :** Green leafy vegetables (GLV) are rich source of calcium, iron, ß-carotene and vitamin C, riboflavin & folic acid. These are inexpensive and are advisable to include at least 50g of GLV's in the diet. Some of the important root vegetable like tapioca, potato, sweet potato, carrot, yam, and colocasia are important source of energy, carotene and calcium. Other vegetables add variety to the diet; provide vitamin C, some minerals and dietary fiber.

**Milk and milk products :** Milk is an important source of good quality protein; in addition it provides other nutrients especially calcium and riboflavin.

**Eggs :** Eggs proteins are considered as standard for evaluating the quality of other proteins. It has the highest nutritive quality as compared with any other dietary protein. They are rich source of all nutrients except ascorbic acid.

**Flesh foods :** They are rich in good quality protein, vitamin A. (liver) and vitamins $B_{12}$.

**Emphasis on nutritional adequacy**

Thus diets could be improved by :

- Replacing single cereal by cereal pulse combination and mixed cereal for improving protein quality.
- For improving vitamin & mineral content at least 50g of green leafy vegetable is included.
- Diets including seasonal inexpensive yellow fruits help and improve vitamin A & C content of be diet.
- Addition of 150 ml of milk to diet can improve protein and calcium content of the diet.
- Addition of at least 10g oil/fat will increase energy and EFA intake.

## Ahara Varga

परमतोवर्गसंग्रहेणाहरद्रव्याण्यनुव्याख्यास्यामः ॥
शूकधान्यशमीधान्यमांसशाकफलाश्रयान । वर्गानहरितमद्याम्बुगोरसेक्षुविकारकान ॥
दशब्दौचापरौवर्गौ क्रुतान्नाहारयोगिनाम् । रसवीर्यविपाकैश्चप्रभावैश्चप्रचक्ष्महे ॥ (च.सू. 27/6-7)

Categories of food substances, Shuka Dhanya, Sami Dhanya, Mamsa, Shaka, Phala, Harita, Madya, Ambu, Gorasa, Ikshu Vikara, Krutanna, Ahara Yogi Varga are described in respect of their Rasa, Virya, Vipaka and Prabhava.

**Dhanyavarga (Cereals and millets)**

Here Anna has been considered as food material in which all types of Dhanya, Mamsa, Shaka, are incorporated. Dhanya is of two types-Sukadhanya and Simbidhanya.

Among them Shukadhanya is primary food regimen because of its wide uses. Whereas Simbi Dhanya has been considered as accessory food material in daily regime. On the other hand Shukadhanya is much more potent as suitable dietary regime in comparison with Simbidhanya. So Shukadhanya has been described first.

**Shukadhanya Varga (Grains and Cereals) (Ref. Cha.su.27/8-12 Bha. Pra. 6/1-2, Su. Su.46/4)**

Shuka means outer covering of the grain. In this group or cereals have been included and many of them have these covering like different verities of rice. Hence this group of Dhanya is called Shukadhanya.

रक्तो महान सकलमस्तूर्नकः शकुनाहृतः । सारामुखो दीर्घशूको रोध्रशूकः सुगन्धिकः ॥
पुण्ड्रः पाण्डुः पुण्डरीकः प्रमोदो गौरसारिवौ । काञ्चनो महिषः शूको दूषकः कुसुमाण्डकः ॥
लाङ्गला लोहवालाख्याः कर्दमाः शीतभीरुकाः । पतङ्गास्तपनीयाश्च ये चान्ये शालयः शुभाः ॥
स्वादुपाकरसाः स्निग्धा वृष्या बद्धाल्पवर्चसः । कषायानुरसाः पथ्या लघवो मूत्रला हिमाः ॥
(अ.ह.सू. 6/1-4)

Shuka Dhanya Varga-types of rice-Rakta (red), Mahan (big sized rice), Kalama, Turnaka, Shakunahruta, Saaramukha, Deerghashuka (having long sharp spike at the ends), Sugandhika (having good smell), Rodhrashuka, Pundra, Pandu, Pundarika, Pramoda, Gaura (white rice), Sariva, Kanchana (golden colored rice), Mahisha, Shuka, Dushaka, Kusumandaka, Langala Lohavala, Kardama, Sheetabheeruka, Patanga, stapaneeya (bright red)-these varieties of rice are good for consumption.

**Shali Dhanya Varga /Shali Varga (Ref. Cha.Su. 27/8-12,Bha. Pra. 6/3-6, Su.Su. 46/4-10)**

Shali is Svadu Rasa, Swadupaka, Snigdha, Vrushya, Baddhalpavarchasaha (causes



mild constipation, causes lesser volume of faeces), Kashaya anurasa, Pathya (suitable for daily consumption), Laghu, Mutrala, Hima.

शूकजेष वरस्तत्र रक्तस्तृष्णाक्रिदोषहा । महांस्तमनु कलमस्तं चाप्यनु ततः परे ॥ (अ.ह.सू. 6/5)
रक्तशालिर्वरस्तेषां तृष्णाघ्नस्त्रिमलापहः । महांस्तस्यानु कलमस्तस्याप्यनु ततः परं ॥ (च.सू. 27/11)

Rakta Shali (Red variety of rice) is the best quality. It relieves thirst and balances all the three Doshas. Next best to it is Mahan (big sized rice) variety. Next to it is Kalama variety.

**Yavaka, Haayana, Paamshuvashpa, Naishadha** varieties of rice are Svadu, Ushna, Guru, Shleshmapittala, Snigdha, Amlapaka, aggravates Kapha and Pitta, Srushtamutrapureesha and they are bad in their reverse order means Pamshuvaspa from Naisadha, Hayanah from Pamsuvaspa and Yavaka from Hayana, are inferior in quality respectively.

**Shashtika Shali**

षष्टिका मधुराः शीता लघवो बद्धवर्चस । वातपित्तप्रशमनाः शालिभिः सदृशा गुणैः । (अ.ह.सू. 6/6)
षष्टिका प्रवरा तेषां लघ्वी स्निधा त्रिदोषजित । स्वाद्वी मृद्वी ग्राहिणी च बलदा ज्वरहारिणी ॥
(भा.प्र. 6/24-26)

शीत स्निग्धोऽगुरुः स्वादु स्त्रिदोषघ्नः स्थिरात्मकः । (च.सू. 27/13)
षष्टिकः प्रवरस्तेषां कषायानुरसो लघुः । मृदु स्निग्धस्त्रिदोषघ्नः स्थैर्यद्बलवर्धन ॥ (सु.सू. 46/10)

Shashtika shali - the paddy which matures in 60 days is best among all paddies. It is Snigdha, Grahi, Laghu, Svadu, Tridoshaghna, Sthira, Hima.

It is of two types - Gaura - white and Asita-gaura (blackish white).

Next inferior to Shashtika is Mahavrihi, next to that is Krishnavrihi and the others such as Jatu Mukha, Kukkutandaka, Lavaka, Paravataka, Sukara, Varaka, Uddalaka, Ujvala, Cina, Sarada, Dardura, Gandhana and Kuruvinda.

The other types of rice are - sweet in taste, sour at the end of digestion, increases Pitta and are hard to digest. It increases volume of urine and faeces, increases body heat and causes imbalance of Tridosha.

**Truna Dhanya Varga** - group of grains produced by grass like plants –

Kangu, Kodrava, Neevara, Shyamaka and other grains are cold in potency, easily digestible, increases Vata, Lekhana (scraping, sacrificing) and balance Kapha and Pitta.

Among the Truna Dhanya varga, Priyangu helps in fracture healing, nutritive, nourishes and is heavily digestible.

Koradusha is grahi (absorbent), coolant and anti-poisonous.

**Yava (Barley)**

रुक्षः शीतो गुरुः स्वादुः सरो विडवातकृद्यवः । वृष्यः स्थैर्यकरो मूत्रमेदः पित्तकफान जयेत ।
पीनसश्वासकासोउरुस्तम्भकण्ठात्वगामयान । (अ.ह.सू. 6/13-14)

यवः कषायो मधुरः शीतलो लेखनो मृदुः । व्रणेषु तिलवत्पत्थो रुक्षो मेधाऽग्निवर्धनः ॥ (भा.प्र. 6/28)

रुक्षः शीतोऽगुरुः स्वादुर्बहुवातशकृद्यवः । स्थैर्यकृत सकषायश्च बल्यः श्लेष्मविकारानुत ॥
(च.सू. 27/19)

यवः कषायो मधुरो हिमश्च कटुविपाके कफपित्तहारी ।
व्रणेषु पथ्यस्तिएलवच्च नित्यं प्रबद्धमूत्रो बहुवातवर्चा ॥ (सु.सू. 46/41)

Yava (Barley) is Rooksha (dry), Sheeta-cold, Guru (Heavy to digest), Svadu, Sara-(promotes bowel movements), Vid-Vata Kruta-(it increases the bulk of faeces and causes flatus), Vrushya, Stairyakrut. Useful in Mutrameda (urinary disorder), Pitta-Kapha imbalance disorders, Peenasa, Shwasa, Kasa, Urusthamba (thigh stiffness), Kantaroga (diseases of throat), Twakroga.

Anuyava (small sized barley) is inferior in qualities to that of Yava. Venuyava (seeds of bamboo) is non- unctuous and hot in potency.

**Godhuma (Wheat)**

वृष्यः शीतो गुरुः स्निग्धो जीवनो वातपित्तहा ॥ सन्धानकरो मधुरो गोधूमः स्थैर्यकृत्सरः ।
(अ.ह.सू. 6/15)

गोधूमः सुमनोऽपि स्यात्त्रिविधः स च कीर्तितः । महागोधूम इत्याख्यः पश्चाददेशात्समागत ॥
गोधूमो मधुरः शीतो वातपित्तहरो गुरुः । कफशुक्रप्रदो बल्यः स्निग्ध सन्धानकृत्सर ॥
जीवनो बृंहणो व्रण्यो व्रण्यो रुच्य स्थिरत्वकृत ॥ (भा.प्र. 6/31-32)

सन्धानकृद्वातहरो गोधूमः स्वादुशीतलः जीवन्तो बृंहणो वृष्यः स्निग्धः स्थैर्यकरो गुरुः ॥ (च.सू. 27/21)

Wheat is Vrushya, Sheeta, Guru, Snigdha, Jivaniya (enlivening), Bruhaniya, Sandhanakari (heals fractures and wounds), Vatapittahara, Kaphakara, Balya, Madhura, Sthairyakrut, Sara (promotes bowel movements), Varnya, Pathya.

Nandimukhi variety of wheat is good for health. It is Sheeta, Kashaya, Madhura and Laghu.

**Shimbidhanya / Vaidala varga-(group of legumes and pulses)**

मुद्गाढकीमसूरादि शिम्बीधान्यं विबन्धकृत । कषायं स्वादु संग्राहि कटुपाकं हिमं लघु ॥
मेदः श्लेष्मास्त्रपित्तेषु हितं लेपोपसेकयोः । (अ.ह.सू. 6/17)

Mudga (green gram), Adhaki (toor dal), Masura (lentil) and other varieties belong to



the group called Shimbidhanya (those having pods/legumes). Vibandhakrut (cause constipation), Kashaya, Swadu, Grahi, Katu Vipaka, Sheeta, Laghu , mitigate fat, Kapha, Asra (blood) and Pitta, suited for use as external application and bathing the body parts etc.

वरोऽत्र मुद्गोऽल्पचलः, कलायस्त्वतिवातलः ॥ रजमाषोऽनिलकरो रुक्षो बहुशकृदगुरुः ॥
(अ.ह.सू. 6/18)

Among Shimbidhanya, Mudga (green gram) is best; it causes mild increase of Chala (vata).

Kalaya (round pea) causes Vata and dryness, produces more faeces and is hard to digest.

Rajamasha (big sized black gram) increases Vata, dry, heavy to digest and increases bulk of faeces.

**Kulttha (Horse gram)**

उष्णाः कुलत्थाः पाकेऽम्लाः शुक्राश्मश्वासपीनसान् ।
कासार्शः कफवाताश्रं घ्नन्ति पित्तास्त्रदाः परम् ॥ (अ.ह.सू. 6/19)

लघुर्विदाहा वीर्योष्णः श्वासकासकफानिलान । हन्ति हिक्काश्मरीशुक्रदाहानाहान सपीनसान ।
स्वेदसंग्राहको मेदोज्वरक्रिमिहरः सरः ॥ (भा.प्र. 6/61-62)

उष्णाः कषायाः पाकेऽम्लाः कफशुक्रानिलापहाः । कुलत्थाग्रहिणः कासहिक्काश्वासार्शसां हिता ॥
(च.सू. 27/26)

उष्णः कुलत्थो रसतः कषायः कटुविपाके कफ़मारुतघ्न ।
शुक्राश्मरीगुल्मनिषूदनश्च सांग्राहिकः पीनसकासहन्ता ॥ (सु.सू. 46/37)

Kulttha is Kashaya Rasa, Laghu, Ushna, Amlapaka. It cures seminal disorder, useful in urinary stones, Laxative, Shwasa, Krimihara, Peenasa, Kasa, Medohara, Jwarahara, Kapha-Vata diseases but it increases bleeding (Raktapitta).

Nishpava (flat bean) aggravates Vata, Pitta, bleeding disorders; it increases breast milk production and promotes urine formation. It is Guru, Sara, Vidahi (increases burning sensation). It is not good for eyes and semen quality. It decreases Kapha, inflammation and is useful in poisoning.

**Masha (Black gram)**

माषः स्निग्धो बलश्लेष्ममलपित्तकरः सरः । गुरूष्णोऽनिलहा स्वादुः शुक्रवृद्धिविरेककृत ।
(अ.ह.सू. 6/21)

माषो गुरुर्भिन्नपुरिषमूत्रः स्निग्धोष्णवृष्यो मधुरोऽनिलघ्न ।
संतर्पणः स्तन्यकरो विशेषाद्बलप्रदः शुक्राकफावहश्च ॥ (सु.सू. 46/34)

वृष्यः परं वातहरः स्निग्धोष्णो मधुरो गुरुः । बल्यो बहुमलः पुंस्त्वं माषः शीर्घ ददाति । (च.सू. 27/24)
वृष्यः परं वातहरः स्निग्धोष्णो मधुरो गुरुः । बल्यो बहुमलः पुंस्त्वं माषः शीर्घ ददाति । (च.सू. 27/24)
माषो गुरुः स्वादुपाकः स्निग्धो रुच्योऽनिलापहः । स्त्रंसनस्तर्पणो बल्यः शुक्रलो बृंहणः परः ।
भिन्नमूत्रमलः स्तन्यो मेदःपित्तकफप्रदः । गुदकीलर्दितश्वासपप्तिशूलानि नाशयेत ॥ (भा.प्र. 6/41-42)

Masha is Snigdha, Balya, increases Kapha and Pitta, Malakara, Sara, Guru, Ushna, Vatahara, Madhura, Shwasahara, Ardita, Arsha, Shulanashaka, Shukra Vruddhikara and Virekakruta.

Fruits of Kakandola and Atmagupta (Mucuna pruriens) are similar to black gram in qualities.

**Tila (Sesame seed)**

तिलो रसे कटुस्तिक्तो मधुरस्तुवरी गुरुः । विपाके कटुकः स्वादुः स्निग्धोष्णः कफपित्तनुत ।
बल्यः केश्यो हिमस्पर्शस्त्वच्यः स्तन्यो व्रणे हितः । दन्त्योऽल्पमूत्रकृद ग्राही वातघ्नोऽग्निमतिप्रदः ॥
ईषत्कषायो मधुरः सतिक्तः सांग्राहिकः पित्तकरस्तथोष्णः ।
तोलो विपाके मधुरो बलिष्ठः स्निग्धो व्रणे लेपन एव पथ्यः ॥ (सु.सू. 46/39)
स्निग्धोष्णो मधुरस्तिक्तः कषायः कटुकस्तिल । त्वच्यः केश्यश्च बल्यश्च वातघ्नः कफपित्तकृत ॥
(च.सू. 27/30)

Tila is Ushna, Tvachya, Sheetasparsha, Keshya, Balya, Guru, Alpamutra, Katu Paka-Medhakruta, Agnikruta, and increases Kapha and Pitta.

Masa (black gram) in the group of Simbija (legumes) and Yavaka (small barley) in the group of Sukaja (cereals) are inferior.

**Adhaki**

आढकी कहपित्तघ्नी वातला, कफवातनुत । (च.सू. 27/33)
आढकी कफपित्तघ्नी नातिवातप्रकोपणी ॥ (सु.सू. 46/31)
आढकी तुवरा रुक्षा मधुरा शीतला लघुः । ग्राहिणी वातजननी वर्ण्या पित्तकफास्त्रजित ॥ (भा.प्र. 6/52)

Adhaki alleviates the vitiation of Kapha and Pitta but aggravates Vata, good for complexion, easily digestible.

Fresh grains (just harvested) are Abhisyandi (causes excess exudation from tissue pores and block them by it), those old by one year are easily digestible.

Those which grow quickly, those which are removed of their husk, those that are properly fried are also easy to digest.

**Kritannna varga- (group of prepared foods)**

मण्डपेयाविलेपीनामोदनस्य च लाघवम । यथापूर्वं शिवस्तत्र मण्डो वालानुलोमनः ॥



तृडग्लानिदोषशेषघ्नः पाचनो धातुसाम्यकृत् । स्त्रोतोमार्दवकृत्स्वेदी सन्धुक्षयति चानलम ॥
(अ.हृ.सू. 6/26-27)

Manda, Peya, Vilepi and Odana are preparations of rice or other grains cooked in water.

**Manda :** The thin fluid resembling water, drained out immediately after boiling is known as Manda. Manda is the best. It causes easy movement of faeces and flatus, relieves thirst and exhaustion, It nullifies residual Doshas. Hence it is used as diet after Panchakarma, where in all the Doshas are eliminated.

Manda helps digestion, restores the normalcy of the tissues, causes softness of the channels, perspiration and kindles the digestive activity.

**Peya :** Slightly thicker to Manda but still only liquid is Peya. Peya (more liquid, less solid) relieves hunger, thirst, exhaustion, debility, diseases of the abdomen and fevers, if it causes easy elimination of faeces, good for all, kindles appetite and helps digestion.

**Vilepi :** The next stage with more of solid grain and less of fluid is called Vilepi. Vilepi (less liquid more solid) withholds discharge of fluids from the body, good for the heart, relieves thirst, kindles appetite, ideal for all, especially for those suffering from ulcers, eye diseases, those who have been administered Panchakarma purification therapies, who are weak and who have been given fats for drinking as part of Snehana therapy (before Panchakarma).

**Odana :** The last stage which is solid without fluid portion is known as Odana. Odana (solid) prepared with grains which have been washed well, in which the entire water has evaporated and which is devoid of hot fumes is easy to digest; likewise that prepared along with addition of decoction of medicinal substances of hot potency or that prepared with fried grains are also easily digestible; the opposite of these that prepared with addition of milk, mutton etc. are hard to digest.

Manda is prepared by adding fourteen parts water, Vilepi by four parts, Yavagu by six pats and Odana by little amount of water in rice. After boiling the rice with fourteen parts of water the drained out liquid which resembles like water is known as Manda. After boling the rice or wheat with six parts water, slightly thicker than Manda but still liquid is known as Peya and when the liquid portion is less than Peya then it is called Yavagu. The next stage with more solid grain and less of fluid is called Vilepi. And last stage, after boiling the rice which is solid without fluid portion is known as Odana. Manda, Peya, Vilepi and Odana are more easily digestible in their preceding order of enumeration. Manda-easiest to digest. Odana-is comparatively harder to digest.

In this manner, the effects of the grain, kind of processing, admixtures, quantity and other aspects should all be determined.

**Mamsa rasa (meat soup)**

Mamsa rasa is Brihmana, Preenana (gives satisfaction), Vrushya, Chakshushya, Vranaha (heals ulcers and wounds).

**Mudga Yush (soup of green gram)**

Mudga Yush is good for health, for those who have undergone Panchakarma purification therapies and for those suffering from ulcers, diseases of the throat and eyes.

**Kulattha Yush (horse gram soup)**

Kulattha Yush (horse gram soup) is Vatanulomi, Useful in Gulma (abdominal tumour), Tuni and Pratituni (pains of the groin region).

The fermented preparation from Tila (sesamum), Pinyaka (residue of sesamum after the oil is taken out), dried leafy vegetables, germinated grains, Shandaki Vataka (balls of fried rice dried in sun and then fried in oil) are not good for eyes, increase the Doshas, cause debility and are hard to digest.

**Rasala**

Rasala-curds churned and added with pepper powder and sugar- it causes body weight increase, it is aphrodisiac, unctuous, improves strength and improves taste.

**Panaka (vegetable / fruit juice)**

Relieves exhaustion, hunger, thirst and fatigue, gives satisfaction. It is generally hard to digest, stays long in the stomach, diuretic and good to the heart. Its properties depend on material from which it is prepared.

**Laja (fried paddy)**

Laja is prepared by frying paddy. Relieves thirst, vomiting, diarrhea, diabetes, obesity, mitigates Kapha, cough and Pitta, increases appetite, easy to digest and cold in potency.

**Prithuka**

Prithuka (parboiled and flaked paddy) is hard to digest, strengthening increases Kapha and causes constipation. Prithuka is prepared by boiling paddy for short while and pounding it with pestle and mortar.

**Dhana**

Dhana (fried barely and other grains) stays long in the stomach causing indigestion,



is dry, satisfying, scarifying, and hard to digest. Dhana is made by frying barely which is soaked in water and Saktu is flour either raw or fried.

**Saktu (corn flour)**

Corn flour is easy to digest, relieves hunger, thirst, fatigue, eye diseases and wounds, is nutritious and taken as a drink gives strength immediately.

Corn flour should not be eaten without drinking water in between.

Should not be consumed twice in a day, Should not be had at night.

Should not be taken solely.

Without other kinds of foods.

Should not be had after meals.

It should not be hard to chew and it should not have in excess quantity.

Many tasty eatables are prepared from the flour of rice and other cereals, horse gram, bengal gram and other legumes, with addition of spices, sour and fragrant substances, some of them are boiled in water, some are steamed, some are fried in oil etc, vegetables like onions, brinjals, etc. are also used in some preparations. These are usually consumed as side-dishes or snacks in between meals. However in view of their difficult digestibility, some warnings have been enumerated above.

**Mamsa varga (group of meats)**

**Mruga Varga** : Harina (antelope, fawn) Kuranga (type of deer), Arksa (white footed antelope) Gokarna (Deer antelop), Mrigamatrika (Red coloured hare like deer), Shasha (rabbit), Shambara (deer with branched horns), Charushka (gazelle) sarabha (eight footed animal) etc. are known as Mriga. Generally all mruga meat mitigates Pitta and Kapha slightly increases Vata, easy for digestion and increase the strength of the person.

**Viskira varga (group of birds which scratch ground with legs to pick food)**

Lava (bustard quail), Vartika (bush quail), Vartira (rain quail), Raktavartma (red eyed owl), Kukkubha (wild cock), Kapinjala (black partridge), Upachakra (small greek pheasant), Chakora (greek pheasant), Kurubahava, Vartaka (button quail), Vartika( bush quail), Tittiri (grey partridge), Krakara (black partridge), Sikhi (peacock), Tamracuda (domestic cock), Bakara (small creane), Gonarda (siberian crane), Girivartika (mountain quail), Sharapada (a kind of sparrow), Indrabha (hedge sparrow), Varata (goose) etc. belong to the group known as Viskira (birds which scratch the ground with their legs and picks up their food). Meat of these Varga Madhura Rasa, cold in potency, Kashaya, Katu after digestion, Balya, Vrushya, mitigates all the three Doshas, easy for digestion.

**Pratuda- (group of birds which peck the food and eat)**

Jivanijivaka (greek partridge), Datyuha (gallinule), Bhrunagahwa (shrike), Suka (parakeet), Sarika (mynah), Latva (wild sparrow), Kokila (cuckoo), Harita (grey peigon), Kapota (wood peigon), Chataka (house sparrow) etc. belong to the group of pratuda (birds which peck the food and eat). Meat of Pratuda is Madhura, Kashaya, cold in potency, mitigates Pitta and Kapha, easy for digestion, causes constipation and slight increase of Vata.

**Bileshaya (group of creatures that live in burrows)**

Bheka (frog), Godha (iguana lizard), Ahi, (snake), Swavid (hedgehog) etc. are Bileshaya (living in burrows). Meat of these animals mitigates Vata, Madhura rasa and after digestion Madhura Vipaka, Balya, hot in potency, with hold elimination of urine and feaces.

**Prasaha varga (living beings which catch food by teeth, tear and eat)**

Go (cow), Khara (ass, donkey), Aswatara (mule), Ustra (camel), Ashwa (horse), Dwipi (leopard), Simha (lion), Aruksha (dear), Vanara (monkey), Marjala (cat), Musaka (rat, mice), Vyaghra (tiger), Vrka (jackal), Babhru (large brown mongoose Tarksu (hyena), Lopaka (fox, jambuka (jackal), Syena (hawk), Casa (blue joy), Vantada (dog), Vayasa (crow), Sasaghni (golden eagle), Bhasa (bread vulture), Kurara (osprey), Grdhra (vulture), uluka (owl), Kulingaka (sparrow hawk), Dhumika (owlet), Madhuha (honey buzzard), these and other animals and birds belong to the group known as Prasaha (which catch their food by the teeth, tear it and eat). Meat of Prasaha is hot in potency; it produces consumption, voracious appetite, insanity and loss of semen.

**Mahamriga (big animals) -** Varaha (boar), Mahisa (buffalo), Nyanku (dog deer), rohita (big deer), Ruru (swamp deer), Varana (elephant), Srmara (Indian wild boar), Chamara (yak), Khadga (rhinoceros) and Gavaya (goyal ox) are known as Mahamriga (animals of huge body). Meat of these animals mitigates Vata and Pitta, Vrushya, Balya, Madhura rasa, cold in potency, Snigdha, Mutrala and increases Kapha.

**Apchara varga / Plava (aquatic birds)**

Hamsa (swan), Sarasa (Indian crane), Kadamba (grey legged goose), Baka (heron), Karandava (white breasted goose), Palva (pelican), Balaka (crane), Utkrosa (mattard), Chakrahva (ruddy Sheldrake), Madgu (small cormorant), Krouncha (pound heron) etc. are known as Apcara (aquatic birds). Meat of Plava birds mitigates Pitta, Snigdha, Madura Rasa, Hard for digestion, cold in potency, Balya, Vrusha, increase strength.



**Matsya varga (group of fish)**

Rohita (red fish), Pathina (boal), Kurma (tortoise), Kumbhira (gavial, alligator), Karkata (crab), Sukti (pearl mussel), Sankha (conch shell), Urdu (otter), Sambuka (comman snail), Safari (large glistening fish), Varmi Candrika (a kind of cat fish) Chuluki (propoise, seahog ) Pakra (crocodile), Makara (crocodile), Sisumara (dolphin), Timingala (whale , shark), Raji (snake fish), Cilicima (red striped fish) and others belongs to group of Matsya (fishes). Thus eight kinds of (source of) Mamsa (meat) are enumerated. Meat of Matsya is Snigdha, hot in potency, increases the Kapha and Pitta, mitigates Vata, Balya, Vrushya, and help taste, ideal for those who habituated to wine copulation and who have very keen digestive fire.

Goat and sheep are not included in any particular group because of their mixed heredity and living in all types of lands.

Out of the eight groups mentioned above, the first three (Mriga, Vishkira and Pratuda) are also known as Jangala (Vata dominant); the last three (Mahamriga, Jalacara and Matsya), are also called Anupa (Kapha dominant); the middle two (bilesaya and prasaha) are known as Sadharana (Tridosha balancing).

The region of land which has dry forests (shrubby) with less rainfall is Jangala, the region. This region is Vata dominant. Area with plenty of rainfall and water-logged is Anupa (Kapha dominant). The region which has neither too much of dryness nor too much of moisture is Sadharana (temperature). The nature and qualities of the land are also seen in all the flora and fauna of the region.

**Aja (goat's meat)**

Goat meat is not very cold in potency, hard to digest, fatty, does not aggravate the doshas, being identical with the doshas of the human body, it is Anabhisyandi (does not cause increases of secretions in the tissue channels). It is nourishing, causes weight gain.

Avi (meat of sheep) is opposite in nature with that of goat and causes weight gain.

**Heaviness and lightness of the flesh :** Meat obtained from the parts above the umbilicus of male animals and from the parts below the umbilicus of female animals that obtained from the pregnant animal are all hard to digest. Among the quadrupeds, the flesh of females is easily digestible but among the birds it is of the males. Flesh obtained from the head, neck, thighs, back, waist, forelegs, stomach and intestines are hard to digest in the reverse order of enumeration. The tissues of the animals such as blood and others are hard to digest in their successive order; testicles, penis, kidneys, liver and rectum are hard to digest than the flesh.

**Shaka Varga (group of leafy vegetables)**

Patha (Cissampelos pareira), Shati (Hedychium spicatum), Susha, Sunishanna, Satinaja in general, mitigates all the three Doshas, are easily digestible and Grahi (absorbent); Sunishanna increases hunger and is aphrodisiac; Rajakshava is still better and cures duodenal diseases, hemorrhoids; Vastuka breaks up the hard faceces. Kakamachi (Solanum nigrum) mitigates the three Doshas, useful in skin diseases, is aphrodisiac, hot in potency, rejuvenator, causes easy movement of faeces, and is good for voice. Changeri (Oxalis corniculata) is sour taste, kindles digestion, good for duodenal diseases, hemorrhoids and for increased Vata and Kapha; hot in potency, withholds elimination of fluids and is easily digestible.

Patola, Saptala, Arista (neem leaves), Sharngeshta (angaravalli/bharangi), Avalguja (Bakuchi), Amruta (Tinospora), Vetra (shoot of Vetra), Brhati (Solanum indicum), vasa (Adhatoda vasica), Kutill, Tilaparnika (badraka), Mandukaparni (Gotu kola), Karkota, Karavella (bitter gourd). Parpata, Nadikalaya, Gojihwa (Godhumi); Vartaka (Brhati), Vanatiktaka (Vatsaka/Kutaja), Karira, Kulaka (Kupila), Nandi (Jaya), Kucaila, Sakuladani (Mesasrngi), Katilla (raktapunarnava), Kebuka (kembuka), Kosataka, and Karkasa (Kampilla) all these are cold in potency, bitter in taste, pungent at the end of digestion, with hold the movement of fluids, increase Vata and mitigate Kapha and Pitta.

Patola is good for the heart (or the mind), useful in worms, sweet at the end of digestion and gives taste.

The two Brihatis (Brihati and Kantakari) increases Pitta, promote hunger, breaks the hard faeces.

Vrusha (Vasa) cures vomiting, cough and especially so the hemorrhagic disease.

Karavella (bitter gourd) is better in taste, kindles digestion and mitigates Kapha and Pitta especially.

Brinjal is pungent, bitter, hot in potency, sweet, mitigates Kapha and Vata, is slightly alkaline, kindles digestion improves taste and does not aggravate Pitta.

Tanduliya is cold in potency, dry, sweet in taste and also at the end of digestion and easily digestible, cures intoxication, Pitta, poison and discovers of bold;

Palankya is hard to digest, and laxative.

Upodika (spinach) relieves intoxication; Chanchu is similar to Palankya and withholds elimination of fluids.

Vidari mitigates Vata and Pitta, is diuretic, sweet in taste and cold in potency, prolongs life (by giving strength), makes the body stout, good for the throat, hard to digest, aphrodisiac and rejuvenator.



Jivanti is good for the eyes, mitigates all the Doshas, sweet in taste and cold in potency.

Kusmanda (ash gourd), Tumba (alabu), Kalinga, Karkaru, Evaru, Tindisa, Trapusa, Cinaka, Cirbhata—all cause increase of Kapha and Vata, breaks the hard faeces, stays long without digestion inside the stomach, causes more secretion in the tissues, sweet in taste and at the end of digestion and not easily digestible.

Ash gourd is best among the creepers, mitigates Vata and Pitta cleanses the urinary bladder, and aphrodisiac. Trapusa causes more urination (diuretic).

Sarsapa (mustard) is not easily digestible, hot in potency, binds the faeces and urine and causes increase of all the Doshas.

Mulaka (radish), when tender and not having definite taste, is slightly alkaline and better, mitigates the Doshas, easily digestible hot in potency, and cures abdominal tumors, cough, asthma, ulcers, disease of the eye and throat, hoarseness of voice, asthma, upward movement inside the abdomen (reverse peristalsis) and chronic nasal catarrh. Radish that is tender, and not having definite taste, is slightly alkaline and bitter, balances Doshas, easy to digest, hot in potency and cures abdominal tumors, cough, respiratory conditions, ulcers, diseases of eye and throat, hoarseness of voice, bloating, and rhinitis. Radish, big in size is hard to digest, pungent in taste and at the end of digestion, not in potency, increases all the three Doshas, hard to digest and is Abhishynadi (indigestion plus sticky to the gut).

Pindalu is pungent, hot in potency, mitigates Vata and Kapha but increase pitta.

Kuthera, Sigru (drum stick), Surasa, Sumuka, Asuri, Bhutrna, Phanijjia, Arjaka, Jambira, etc. when green are water absorbent, cause burning sensation during digestion, pungent, cause dryness, hot in potency, good for the heart (or the mind), kindles hunger and taste, destroy vision, semen and worms (intestinal parasites), penetrates deep, cause slight increase of the Doshas and are easily digestible.

Surasa (Tulasi- Holy Basil) cures hiccup, cough, poison, asthma, pain in the flanks and bad breath.

Lashuna (garlic) is highly penetrating (deep into the tissues), hot in potency, pungent in taste, and at the end of digestion, makes the bowels to move, good for the heart (or the mind), and hairs; hard to digest, aphrodisiac, unctuous, improves taste and digestion, helps union of features, gives strength, greatly vitiates the blood and Pitta, cures leucoderma, skin diseases, abdominal tumors, hemorrhoids, diabetes, worms, diseases caused by Kapha and Vata, hiccup, chronic nasal catarrh , asthma and cough. It is a rejuvenator of the body.

Palandu (onion) is inferior in the above qualities, increases of Pitta.

Grinjanaka (carrot) is best suitable to persons suffering from hemorrhoids of Kapha Vata origin, for fomenting (the pile masses) and eating; it is penetrating, water absorbent and not suitable to those who have pitta predominance.

**Harita Varga (non leafy vegetables) :** Plants are used in salad from.

Adraka (Green ginger) is appetizer, digestive, stimulant and Vrushya. Its juice is prescribed in diseases due to the vitiation of Vata and Kapha. It also cures constipation.

Jambira (citrus medica) is appetiser, digestive stimulant, Tikshna, Sugandhi, mouth cleanser, alleviator of Kapha as well as Vata and anti infective. It helps digestion of food.

Dhanyaka (coriandrum sativum), Ajagandha are appetizer and fragrant. They are not very pungent. They also do not provoke Doshas.

**Phala Varga (group of fruits)**

Draksha (grapes) is best among fruits, is aphrodisiac, good for the eyes, helps elimination of urine and faeces, sweet in taste and the end of digestion, unctuous, slightly astringent, cold potency, hard to digest, cures diseases of Vata, Pitta and Rakta; better taste in the mouth, intoxication, thirst, cough, fever, respiratory conditions, hoarseness, injury to the lungs and chronic respiratory diseases.

**Dadima-(Pomegranate)**

It mitigates the greatly increased Pitta in particular and the other doss also and is sweet; the sour variety is also not going to increase Pitta, not very hot in potency and mitigates Vata and Kapha. All varieties of Pomegranate are good to the heart, easily digestible unctuous, without elimination of fluids, stimulate appetite and digestion.

Mocha (plantain), Kharjura (dates) Panasa (jack fruits) Narikela (cocoanut ) parusaka Amrataka , Tala, Kasmarya, Rajadana, Madhuka, Badara, Ankola, Phalgu, Slesmataka, Vatama, Abhisuka, Aksoda, Mukulaka, Nikocaka, Urumanam, and Priyala make the body stout, not easily digestible cold in potency, relive burning sensation , injury to the lungs, consumption, bleeding conditions, sweet in taste and also at the end of digestion, unctuous, stay long in the stomach without digestion, increase Kapha and semen.

**Fruit of Tala**-Borassus flabellifera increases Pitta, moves the bowels. A fruit of Kasmarya is cold in potency, relives the obstruction of faeces and urine, good for the hairs, increases intelligence and is a rejuvenator.

Bilvaphala (bael fruit) when ripe is hard to digest, aggravates the Doshas and causes flatus; unripe fruit kindles digestion, mitigates Vata and Kapha; both are water absorbent.



Amakapittha (unripe Kapittha) is bad to the throat, and increases the three Doshas. Ripe fruit mitigates the Doshas, relives hiccup ad vomiting, both are water absorbent and anti-poisonous.

Jambava (Jamun fruit) is not easily digestible, stays long inside the stomach, cold in potency, causes aggravation of Vata especially, absorbs moisture from urine and faeces, bad for throat and mitigates Kapha and Pitta.

Bala Amra (tender unripe mango) increases Vata, Rakta (blood) and Pitta; when its seed is fully formed, it increases Kapha and Pitta; when it is ripe it is not easily digestible, mitigates Vata, and increases Kapha and semen.

Vrksamla (Garcinia fruits) is absorbent, dry, hot in potency, mitigates Vata and Kapha and easily digestible.

Samya (fruit of Sami) is not easily digestible, hot in potency, destroys the hairs and causes dryness.

Pilu increases Pitta, mitigates Kapha and Vata, is purgative, cures diseases of the spleen, haemorrhoids, worms, abdominal tumors; that variety of Pilu which has bitter-sweet taste is not very hot in potency and mitigates all three Doshas.

The skin of Matulunga (bigger variety of lemon) fruit is better, pungent and unctous, mitigates Vata; its fleshy part makes the body stout, is sweet in taste, mitigates Vata and Pitta and not easily digestible its tendril is easily digestible cures cough, asthma, hiccup, alcoholic intoxication dryness of the mouth, disorders of Vata and Kapha, constipation, vomiting, loss of taste, abdominal tumor, enlargement of the abdomen, haemorrhoids, colic and dyspepsia.

Bhallataka (marking nut) The outer rind and fleshy part of Bhallataka fruit makes the body stout, sweet in taste, cold in potency; its seed is just like fire in properties, increases intelligence and effectively mitigates Kapha and Vata.

Draksa (grapes) and Parusaka and Karamardaka, in their green state are sour, increase Pitta and Kapha, hard to digest, hot in potency, and mitigate Vata and laxative.

Fruits of Amlika and Kola improve digestion, cause purgation, cures thirst, fatigue, and exhaustion; are easily digestible and mitigates Kapha and Vata.

Lakuca phala is least among all the fruits and increases all the above the Doshas.

**Ausadha varga (group of medicinal herbs)**

Lavan (Salts) - All types of salts are Vishyandi (produce more secretions in the tissues) Suksma (enter into minute pores) help soft/easy movement of faeces, mitigate Vata, help digestion, are penetrating, aggravate Kapha and Pitta.

Among them, Saindhava salt (rock salt) is slightly sweet, aphrodisiac, good for the heart (or mind), mitigates all the three Doshas, easily digestible not hot in potency, good for health, does not cause burning digestion and kindles digestion.

Sauvarcala (sochal salt) is easily digestible good for the heart (or mind), possesses good smell, purifies belching, pungent at the end of digestion, relives constipation, kindles digestion and gives taste.

Bida salt produces both upward and downward movement of Kapha and Vata, kindles digestion, cures constipation, flatulence, obstruction, of flatus, colic and heaviness (of the abdomen).

Samudra (common salt) is sweet at the end of digestion, not easily digestible and aggravates Kapha.

Aubdhida is slightly bitter, pungent and alkaline in taste, penetrates deep and increases the secretions.

Krisna lavana (black salt) has properties similar to Souvarcala except the smell.

Romaka is easily digestible; Pamsuttha is slightly alkaline, aggravates Kapha and not easily digestible.

Whenever Lavanas (salt) are to be used (for medicinal recipes) they should be prepared commencing with Saindhava.

Yavakshara (Kshara prepared from barley) mitigates abdominal tumors, diseases of the heart, duodenal disease, anemia, splenic disorders, distension of the abdomen, diseases of the throat, asthma, hemorrhoids and cough arising from Kapha.

**Kshara** – All Ksharas are very

Teekshna – penetrating;

Ushna – very hot in potency,

Krumijit – destroy worms

Laghu – easily digestible

Pitta Asruk dushana – vitiate Pitta and blood

Paki – helps in digestion, causes healing of wounds

Chedya – help break up hard masses,

Ahrudya not good for the heart, punctures the tissues; being pungent and salty in taste are not good to semen, Ojus (essence of the tissues), hairs and eye (vision).

Hingu (asa foetida) mitigates Vata, Kapha, cues distension of the abdomen and colic, aggravates Pitta, pungent in taste and at the end of digestion, enhances taste, hunger, digestion and is easily digestible.



**Haritaki**

Haritaki is astringent, sweet at the end of digestion, dry (causes dryness) devoid of Lavana Rasa (possesses the remaining five tastes) easily digestible, kindles hunger, helps digestion, improves intelligence, best to maintain youth, hot in potency, laxative, bestows long life, strengthens the mind and the sense organs, cures leprosy (and other skin diseases) discoloration, disorders of voice, chronic intermittent fevers, diseases of the head, and eyes, anaemia, heart disease, jaundice, disease of the duodenum, consumption, dropsy, diarrhea, obesity, fainting, vomiting, worms (intestinal parasites), dyspnoea, cough, excess salivation, hemorrhoids, disease of the spleen, distension of the abdomen, enlargement of the abdomen, obstruction of channels, abdominal tumors, stiffness of the thing, loss of taste (anorexia and many other disease arising from (aggravation of ) Kapha and Vata.

Similarly so is Amalaka in all other properties it is cold in potency, and mitigates Pitta and Kapha. Aksha (Vibhitaka) is pungent at the end of digestion, cold in potency, good for hairs and possesses properties similar (to Haritaki and Amalaka) but slightly less (in degree).

Thus, the Triphala (Haritaki, Amalaki and Vibhitaki), together is a best rejuvenator of the body, cures diseases of the eyes, heals wounds and cures skin diseases, excess moisture of the tissues, obesity, diabetes, aggravation of Kapha and Asra (blood).

**Kanda varga (roots and tubers)**

All type of Kanda cure bleeding disease are cold in potency, swet in taste, hard for digestion, increases semen greatly and augment breast milk.

Vidari Kanda- It is sweet, stoutening, aphrodisiac, cold in potency, good for voice, increases urine greatly, strengthen and mitigates Pitta and Vata.

Satavari Kanda- It mitigates Vata and Pitta, is aphrodisiac, sweet and bitter in taste; the bigger kind is good for heart, increases intelligence, digestive power and strength.

Varaha Kanda- It mitigates Kapha, diabetes, leprosy, and worms, bestows strength, aphrodisiac and rejuvenator.

**Taila Varga (Fats and Oils)**

The fatty material from unctuous substance like Tila (sesamum) etc. is known as Taila Varga. All Taila mitigates Vata Dosha.

**Tila Taila (oil of sesame seeds)**

Tila Taila is not easily digestible, bestows stability, strength and complexion, laxative, Vrushya, Vikashi, Vishada, Madura Rasa and Vipaka, Sukshma, mitigates Vata and

Kapha, hot in potency, Kashaya and Tikta rasa aggravates Rakta and Pitta, Lekhaniya, Badhdavinmutra, cleanses the uterus, increase digestive fire, wisdom, intelligence, spreads to all the parts quickly, mitigates ulcers and diabetes, cures pain of ears, vagina and head and makes them light, good for skin, hair and eyes, not good for massage and consuming with food, it is especially useful in Chinna, Binna, Cyuta, Utpista, Mathita, Kshata, Piccita, Bhagna, Sphutita and Viddha Kinds of Bhagna, burns when the skin is torn from the assault by wild animals, for therapies like enema, oleation, processing of foods, nasal medication filling to ears and eyes, sudation, massage and tub bath.

**Sarsapa Taila (oil of black mustard)**

Sarsapa Taila is Katu both in taste and Lekhaniya, hot both in touch and potency, penetrating aggravates Pitta and Rakta, mitigates Kapha, Meda and Vata, cures piles, diseases of the head, ears, itching, leprosy, worms, leucoderma, urticaria, bad kinds of worms.

**Ikshu Varga (Group of sugarcanes)**

Ikshu mitigates Rakta and Pitta, Bestow strength, Vrushya, increases Kapha, Madhura Rasa and Madhura Vipaka, Snigdha, heavy for digestion, diuretic and cold in potency.

**Ikshu Bheda**

Paundraka, Bhiruka, Vamsaka, sataporaka, Kantara, Tapaseksu, Kandekshu, Suchipatraka, Naipala, Dirgapatra, Nilapora, Kosakruta, Manogupta- these are different kind of Ikshu.

**Ikshu Rasa Guna (Qualities of sugar cane juice)**

Sugarcane juice sucked by biting mitigates Pitta and Rakta, equal to sugar properties, not causing heartburn and increase Kapha.

Phanita- sugarcane juice coked, which is thick, consisting of more water, is known as Phanita. Phanita is heavy for digestion, causes increase of moisture, Balya, produces Kapha and Vrushya, mitigates Vata, Pitta and fatigue, purifies the urine and urinary bladder.

Matsyayandi (Molasses) - sugarcane juice well cooked, which has become solid with very slight quantity of water left, responds slowly hence called Matsyayandi. Matsyayandi is purgative, bestow strength easily digestible, mitigates Pitta and Vata, Madhura Rasa, Balya, Vrushya and removes the impurities of Blood.

Guda (Jaggery) - sugarcane juice well-cookedbecomes hard like stone is known as



Guda. Guda is Vrushya, heavy for digestion, Snigdha, mitigates Vata, purifies the urine, and produces fat, Kapha, worm and gives strength.

Khanda (sugar candy)- Khanda is Madhura Rasa, Vrushya, good for the eyes, Balya, cold in potency, mitigates Vata and Pitta, Snigdha, cures vomiting effectively.

Sarkara (podery sugar) - Khanda in the shape of sand, white in colour, is called Sarakara and Sita. Madhura Rasa helps in taste, mitigates Vata, Pitta, Rakta, burning sensation, fainting, vomiting and fever, cold in potency and Vrushya.

**Madhya Varga or Sandhana Varga (Alcoholic Beverages)-**

Madya, Sidhu, Maireya, Ira, Madira, Kadambari, Varuni, Hala and Balavallabha are synonyms of Madya. All kinds of Madya is hot in potency, aggravates Pitta, mitigates Vata, causes purgation, undergoes digestion quickly, creates dryness and especially mitigates Kapha, sour in taste, kindles digestive taste, digestive, quickly in actions, penetrating, enters into minute pores, spreads quickly and produces looseness of joints.

**Dugdha Varga (Milk and Milk products)**

Dugdha, Ksheera, Payas, Stanya and Balajivana are synonyms.

Dugdha is Madhura Rasa, cold in potency, suitable for health for all, Balya, Medhya, Vrushya, retards aging, prolong life, Sandhikari, Rasayana.

**Persons suitable for drinking milk**

Milk is to be consumed by those who have undergone purgation, emesis and enema therapies, those suffering from chronic fever, mental diseases, consumption, fainting, giddiness, diseases of the heart, abdominal pain, upward movement of gas inside, abdominal tumor, diseases of the urinary bladder, piles, bleeding diseases, diarrhea, diseases of the vagina, fatigue and exhaustion, and abortion, it is always ideal for children the aged, wounded and specially to those emaciated by hunger and excess of copulation.

**Varieties of milk**

Dodugdha, Mahisa, Aja, Mruga, Avika, Austral, Badava, Hastini, Nari milks.

Masala and Vyanjana Dravyas (Spices & Condiments)-

**Triphala**

इयं रसायनवरा त्रिफलाऽक्ष्यामयापहा । रोपणी त्वग्गदक्लेदमेदोमेहकफास्त्रजित ॥ (अ.ह.सू. 6/159)

**Trijata and Chaturjata**

सकेसरं चतुर्जातं त्वकपत्रैलं त्रिजातकम । पित्तेप्रकोपि तीक्ष्णोष्णं रुक्षं रोचनदीपनम ॥ (अ.ह.सू. 6/160)

Twak - (Cinnamon), patra (Cinnamon leaf) and Ela - (Cardamom) together are

known as Trijataka and these along with Kesara from the Chaturjata. They because aggravation of Pitta, are penetrating, hot in potency, cause dryness, improve taste and hunger.

Maricha (pepper) black pepper is pungent both in taste and at the end of digestion, mitigates Kapha and is easily digestible.

Pippali (Long pepper), in its green state aggravates Kapha, is sweet in taste and cold in potency, not easily digestible and is unctuous. The same, when dry, becomes opposite aphrodisiac, pungent in taste, sweet at the end of digestion, mitigates Vata and Kapha, use in asthma, cough; is laxative. Long pepper should not be used in excess, for long period, without following the regimen of rejuvenation therapy.

Nagara - (ginger), increases hunger, is aphrodisiac, water absorbent, good for the heart (or the mind), relives constipation, bestows, taste, easily digestible, sweet at the end of digestion, unctuous, hot in potency and mitigates Kapha and Vata. Similar is Ardraka (fresh ginger, green);

**Trikatu**

एतच्च त्रयं त्रिकटुकं जयेत । स्थौल्याग्निसदनश्वासकासश्लीपदपीनसन ॥ (अ.ह.सू. 6/164)

Pepper, long pepper and ginger – together have known as Trikatu, useful in obesity, asthma, dyspepsia, cough, filariasis and chronic nasal catarrh.

Chavaika (Piper chaba) and Pippalimula (long pepper root) possess qualities and properties similar to Marica (black pepper) but in lesser degree.

Chitraka is similar to fire in digesting thing and cures dropsy, hemorrhoids, worms and leprosy (and other skin diseases).

पञ्चकोल–

पञ्चकोलकमेतच्च मरिचेन विना स्मृतम । गुल्मप्लिहादरानाहशूलघ्न दीपनं परम ॥ (अ.ह.सू. 6/166)

The above, excluding Marica, (Pippali, Pippalimula, Cavya, Citraka and Nagara) is known as Panchakolaka. It cures abdominal tumors, disease of the spleen, enlargement of the abdomen, distension and colic, and is best to improve hunger and digestion.

बिल्व पञ्चमूल–

बिल्वकाश्मर्यतकारीपाटलाटिण्टुकैर्महत । जयेत्कषायतिक्तोष्णं पञ्चमूल कफनिलौ ॥ (अ.ह.सू. 6/17)
ह्रस्वं बृहत्यंशुमतीद्वयगोक्षुरकैः स्मृत । स्वादुपाकरसं नातिशीतोष्णं सर्वदोषजित ॥ (अ.ह.सू. 6/168)

Bilwa, Kasarya, Tarari, Patala and Tintuka are together known as Mahat panchamula. It is astringent and bitter in taste, not in potency, mitigate Kapha and Vata. Brihatidwaya (Brihati and Kantakari), Amsumatidwaya (Saliparni and Prsniparni) and



Goksuraka- together are known as Hrasva Panchamula (Laghu Panchamoola). It is sweet in taste and at the end of digestion, neither very hot nor very cold in potency and mitigates all the Doshas.

## Food Hygiene

Apart from diseases due to deficient and excess intake of food, there are diseases due to food contamination by microorganisms that occur during production, storage, transport, cooking or feeding. The primary aim of food hygiene is to prevent food poisoning and other food borne illness.

**Food borne diseases**

Food borne disease is defined as "A disease, usually either infectious or toxic in nature, caused by agents that enter the body through the ingestion of food." With increase in urbanization, industrialization, tourism and mass catering systems, food borne diseases are on the increase throughout the world. Food borne diseases may be classified;

**A. Food intoxications-**

1. Diseases due to naturally poisoning of food-
   a. Lathyrism
   b. Endemic ascites
2. Due to toxins produced by certain Bacteria-
   a. Botulism
   b. Staphylococcus poisons
3. Due to toxins produced by some fungi
   a. Aflatoxin
   b. Ergot
   c. Fusarium toxins
4. Foodborne chemical poisoning
   a. Heavy metals, e.g. mercury (usually in fish), cadmium (in certain shellfish), lead (in canned food)
   b. Oils, petroleum derivatives and solvents (trycresyn phosphate)
   c. Migrant chemicals from package materials
   d. Asbestos
   e. Pesticide residues (DDT,BHC)

**Foodborne infections**

1. **Bacterial diseases :** Typhoid fever, paratyphoid fever, salmonellosis, staphy-

lococcal, intoxication, Cl. Perfringens illness, Botulism, B. cereus food poisoning, E. coli diarrhea, non-cholera vibrio illness, streptococcal infection, shigellosis, brucellosis.

2. **Viral diseases :** Viral hepatitis, gastroenteritis
3. **Parasites :** Taeniasis Hydatidosis, Trichinosis, Ascarisis, Amoebisis, Oxyuriasis.

**Lathyrism**

Lathyrism is paralyzing disease of humans and animals. In the humans it is referred to as neruolathyrism because affects the nervous system, and in animals as osteolathyrism because the pathological changes occurs in the bones resulting in skeletal deformities.

Neurolathyrism is a crippling disease of the nervous system characterized by grually developing spastic paralysis of lower limbs, occurring mostly in adults consuming the pulse, Lathyrusm sativus in large quantities.

Neurolathyrism is prevalent in parts of Madhya Pradesh, Uttar Pradesh, Bihar and Orissa. It has been reported in Maharashtra, west Bengal, Rajasthan, Assam and Gujarat where the pulse is grown. Lathyrism sativus is commoly known as Khesari Dhal. It is known by local names such as Teora dhal, Lak dhal, Batra, Gharas, Matra etc. the toxin present in Lathyrus seeds has been identified as Beta oxalyl amino alanine (BOAA). It has been isolated in crystalline form and is water soluble; is property has been made use of in removing the toxin from pulse by soaking it hot water and rejecting the soak water, studies indicate that there is a blood- brain to this toxin. In order to overcome this barrier, the pulse must be eaten in large amount over a period of time for 2 months or more. The disease affects mainly young men between the ages of 15-45 years.

1. Latent stage- physically stress exhibits ungainly gait, neurological examination shows characteristic physical signs. This stage is considered important from the preventive aspect, since at this stage, if the pulse is withdrawn from the diet, it will result in complete remission of the disease
2. No- stick stage- patients walks with short jerky steps without the aid of stick. A large number of patients are found in this stage.
3. One stick stage- the patient walks with a crossed gait with a tendency to walk on toes. Muscular stiffness makes it necessary to use a stick to maintain of balance.
4. Two stick stage- the symptoms are more severe. Due to excessive bending of knees and crossed legs, the patient needs two crutches for support.
5. Crawler stage- finally the erect posture become impossible as the knee joint cannot support the weight of the body. There is atrophy of the thigh and leg muscles.



**Ergot**

Unlike Aspergillus, ergot is not a storage fungus, but a field fungus. Food grains such as bajra, rye, sorghum and wheat have tendency to get infested during the flowering stages by the ergot fungus, claviceps fusifomis. Fungus grows as a blackish mass and the seeds become black and irregular and are harvested along with food grains. Consumption of ergot infested grain leads to ergotism. Sporadic outbreaks of ergot poisoning in human population have been reported from time to time in areas where bajra is consumed as staple. The symptoms are acute but rarely fatal and include nausea, repeated vomiting, giddiness and drowsiness extending sometimes for periods up to 24 to 48 hours after the ingestion of ergoty grain. In chronic cases, painful cramps in limbs and peripheral gangrene due to vasoconstriction of capillaries have been reported.

**Milk Hygiene**

Milk is an efficient vehicle for a great variety of disease agents. The sources of infection or contamination of milk may be the dairy animal, human handler or the environment e.g. contaminated vessels, polluted water, flies, dust etc.

**Milk composition**

Milk is the best and most complete of all foods. It is secreted by animals to serve as the sole and wholesome food for their sucking young ones. It is a fine blend of all the nutrients necessary for growth and development of young ones. Thus milk is a good source of proteins, fats, sugars, vitamins and minerals.

**Proteins :** The chief protein of milk is casein; it occurs in combination with calcium as calcium caseingenate. The other proteins are lactalbumin, lactoblobulin. Animal's milk contains nearly three times as much protein as human milk. Milk proteins contain all essential amino acids. Human milk proteins contain greater amounts of tryptophan and sulphur containing amino acids than animal milk proteins.

**Fats :** The fat content of milk varies from 3.4 percent in human milk to 8.8 percent in buffalo milk. Milk fat is good source of retinol and vitamin.

**Sugar :** The carbohydrate in all milks is lactose or milk sugar. It is found nowhere else in nature. It is less sweet than cane sugar and is readily fermented by lactic acid bacilli. Human milk contains more sugar than animal milks.

**Minerals :** Milk contain almost all known minerals needed by the body such as calcium, phosphorus, sodium, potassium, magnesium, cobalt, copper, iodine, etc. milk is particularly rich in calcium; it is however a poor source of iron

**Vitamins :** Milk is a good source of all vitamins except vitamin C.

### Milk Borne Diseases

Transmissible disease transmitted from infected man to another via contaminated milk either directly by infected or carrier individuals, or indirectly through polluted water, insects, air & dust, milk utensils & equipment, rodents, flies, rations, etc.

A joint FAO/WHO Expert Committee on milk hygiene classified milk -born diseases:

**1. Infections of animals that can be transmitted to man:**

Primary importance–

- Tuberculosis
- Brucellosis
- Streptococcal infections
- Staphylococcal enterotoxin poisoning
- Salmonellosis
- Q Fever

Lesser importance–

- Cowpox
- Foot and mouth disease
- Anthrax
- Leptospirosis
- Tick-borne encephalitis

**2. Infections primary to man that can be transmitted through milk:**

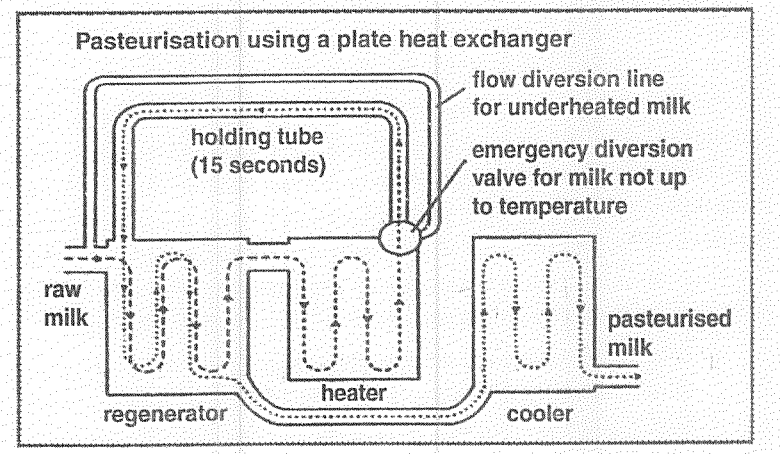
- Typhoid and paratyphoid fevers
- Shigellosis
- Cholera
- Enteropathogenic Escherichicoli (EEC)
- Non-diarrheal diseases
- Streptococcal infections
- Staphylococcal food poisoning
- Diphtheria
- Tuberculosis
- Enteroviruses
- Viral hepatitis



### Clean and Safe Milk

The safety and keeping quality of milk are related to its microbial content. The first essential in the production of clean and safe milk, therefore, is a healthy and clean animal. Milk from a healthy udder contains only a few organisms, and these are relatively unimportant. Secondly, the premises where the animal is housed and milked should be sanitary. The milk vessels must be sterile and kept covered. The water supply must be bacteriological safe.

Milk handler must be free from communicable diseases, and before milking they must wash their hands and arms. Where possible, milking machines must be used. Milk should be cooled immediately to below 10°C after it is drawn to retard bacterial growth. In the production of good quality milk, cleanliness of all containers and equipment in which milk is handled is very important.




### Pasteurization of milk

Pasteurization may be defined as the heating of milk to such temperatures and for such periods of time as are required to destroy any pathogens that may be present while causing minimal changes in the composition, flavor and nutritive value (WHO). There are several methods of pasteurization.

1. Holder (Vat) method - Milk is kept at 63-66°C for at least 30 minutes, and then quickly cooled to 5°C. Vat method is recommended for small and rural communities.
2. HTST method- "High Temperature and Short Time Method" Milk is rapidly heated

to a temperature of nearly 72°C, is held at that temperature for not less than 15 seconds, and is then rapidly cooled to 4°C. This is now the most widely method. Very large quantities of milk per hour can be pasteurized by this method.

3. UHT Method: Also known as "Ultra High Temperature Method". Milk is rapidly heated usually in 2 stages (the second stage usually being under pressure) to between 125°C, for a few seconds only. It is then rapidly cooled and bottled as quickly as possible.

**Meat Hygiene**

The term "meat" includes various tissues of animal origin. The diseases which may be transmitted by eating unwholesome meat are,

1. Tape Worm Infestations: Tineasoliu, T. saginata, Trichinellaspiralis and Fasciola hepatica.
2. Bacterial infections: anthrax, actinomycosis, tuberculosis and food poisoning.

**Meat Inspection**

Animals intended for slaughter are subjected to proper ante mortem and postmortem inspection by qualified veterinary staff. The principal causes of ante mortem rejection of animals are emaciation, exhaustion, pregnancy, sheep-pox, foot-rot, actinomycosis, brucellosis, febrile conditions, diarrhea and other diseases of an infectious nature rendering meat unfit for human consumption. The main causes of the postmortem rejection are cysticercus bovis, liver fluke, abscesses, sarcocystis, hydatidosis, septicaemia, parasitic and nodular infections of liver and lungs, tuberculosis, cysticercus cellulose, etc. The characteristics of good meat are that it should be neither pale pink nor a deep purple tint, firm and elastic to touch should not be slimy and have an agreeable odour.

**Slaughter house**

Slaughter house are the places where animals, whose flesh is intended for human consumption, are killed. The hygiene of the slaughter house is of paramount importance to prevent the contamination of meat during the process of dressing.

The following minimum standard for slaughter house.

Location : Preferably away from residential areas.

Structure : Floors and walls up to 3 feet should be impervious and easy to clean.

Disposal of wastes: Blood, offal, etc. should not be discharged into public sewers but should be collected separately.



Water Supply : Should be independent, adequate and continuous.

Examination of animals: Ante mortem and postmortem examination to be arranged. Animals or meat found unfit for human consumption should be destroyed or denatured.

Storage of meat : Meat should be stored in fly-proof and rat-proof rooms; for overnight storage, the temperature of the room shall be maintained below 5°C.

Transportation of meat : Meat shall be transported in fly-proof covered vans.

Miscellaneous : Animals other than those to be slaughtered should not be allowed inside the shed.

**Fish**

Fish deteriorates or loses its freshness because of autolysis which sets in after death and because of the bacteria with which they become infected. Stale fish should be condemned. The signs of fresh fish:

1. It is in a state of stiffness or rigor mortis,
2. The gills are a bright red and
3. The eyes are clear and prominent.

**Egg**

Although the majority of freshly laid eggs are sterile inside, the shells become contaminated by fecal matter from the hen. Microorganisms including pathogenic Salmonella can penetrate a cracked shell and enter the egg.

**Fruits and Vegetables**

Fruits and vegetables constitute another important source for the spread of pathogenic organisms, protozoan and helminthes. These infections are a serious menace to public health where sewage is used for growing vegetables. The vegetables which are consumed raw in the form of salads pose a problem in food sanitation. People should be educated to wash the vegetables before eating then raw. Vegetables which are cooked and eaten are free from this danger.

**Sanitation of Eating Places**

1. Location : Shall not be near filth or open drain, stable, manure pit and other sources of nuisances.
2. Floors: To be higher than the adjoining land, made with impervious material and easy to keep clean.
3. Rooms:

a. Rooms where meals are served shall not be less than 100 sq. feet and shall provide accommodation for a maximum of 10 persons.

b. Walls up to 3 feet should be smooth, corners to be rounded; should be impervious and easily washable.

c. Lighting and ventilation – ample natural lighting facilities aided by artificial lighting with good circulation of air are necessary.

4. Kitchen:

a. Floor space minimum 60 sq. ft.
b. Window opening to be 25 percent of floor area.
c. Floor to be impervious, smooth, easy to keep clean and non-slippery.
d. Doors and windows to be rat-proof, fly-proof, and of the self-closing type.
e. Ventilators 2 percent of the floor area, in addition to smoke pipes.

5. Storage of cooked food: Separate room to be provided. For long storage, control of temperature is necessary.

6. Storage of uncooked foodstuffs. Perishable and non-perishable articles to be kept separately in rat-proof and vermin-proof space; for storage of perishable articles temperature control should be adopted.

7. Furniture: Should be reasonably strong and easy to keep clean and dry.

8. Disposal of refuse: To be collected in covered, impervious bins and disposed of twice a day.

9. Water supply : To be an independent source, adequate, continuous and safe.

10. Washing facilities : To be provided. Cleaning of utensils and crockery to be done in hot water and followed by disinfection

**Food Handlers**

Food sanitation rests directly upon the state of personal hygiene and habits of the personnel working in the food establishments. Proper handling of foods, utensils and dishes together with emphasis upon the necessity for good personal hygiene are of great importance. The infections which are likely to be transmitted by the food handlers are diarrheas, dysenteries, typhoid and para-typhoid fevers, entero-viruses, viral hepatitis, protozoa cysts, eggs of helminthes, strepto and staphylococcal infections and salmonellosis.

The first essential is to have a complete medical examination carried out of all food handlers at the time of employment. Any person with a history of typhoid fever, diphtheria, chronic dysentery, tuberculosis or any other communicable disease should not



be employed. Persons with wounds, otitis media or skin infections should not be permitted to handle food or utensils. The day to day health appraisal of the food handlers is also equally important; those who are ill should be excluded from food handling. It is also important that any illness which occurs in a food handler's family should at once be notified.

Education of food handlers in matters of personal hygiene, food handling, utensils, dishwashing, and insect and rodent control is the best means of promoting food hygiene. Many of the food handlers have little educational background. Certain aspects of personal hygiene are therefore required to be continually impressed upon then.

a) Hands : The hands should be clean at all times. Hands should be scrubbed and washed with soap and water immediately after visiting a lavatory and as often as necessary at other times. Finger and nails should be kept trimmed and free from dirt.

b) Hair : Head covering should be provided particularly in the case of females to prevent loose hair obtaining entrance to food-stuffs.

c) Overalls : Clean white overalls should be worn by all food handlers.

d) Habits : Coughing and sneezing in the vicinity of food, licking the fingers before picking up an article of food, smoking on food premises are to be avoided.

**Adulteration of Foods**

Adulteration of foods consists of a large number of practices - mixing substitution, abstraction, concealing the quality, putting up decomposed foods for sale, misbranding or giving labels and addition of poisons. Some forms of adulteration are injurious to health, e.g. adulteration of mustard oil with argemone oil. But for the most part food adulteration has an economic rather than a sanitary significance e.g. addition of water to milk.

**Food Fortification**

Fortification of food is public health measure aimed at reinforcing the usual dietary intake of nutrients with additional supplies to prevent or control some nutritional disorders. The process whereby nutrients are added to foods to maintain or improve the quality of the diet of a group, a community or a population.

Programmes of demonstrated effectiveness of fortification of food or water are fluoridation of water as a preventive of dental carries; iodization of salt for combating the problem of endemic goiter, and food fortification e.g. Vanaspati, milk with Vitamin A and D. Technology has also been developed for the twin fortification of salt with iodine and iron.

### Food Additives

The concept of adding "non-food" substances to food products is not new. Pickling is an ancient culinary practice aimed at preserving food articles such as mango, lime and amla for fairly long periods by the addition of salt and spices. Modern science of food technology employs more than 3,000 substances – some natural (eg. saffron, turmeric) and others artificial or synthetic (eg. saccharin, sorbic acid) known as 'food additives'. Majority of the processed foods such as bread, biscuits, cakes, sweets, confectionary, jams, jellies, soft drinks, ketchup, all contain food additives.

Food additives are defined as non-nutritious substances which are added intentionally to food, generally in small quantity, to improve its appearance, flavor, texture or storage properties. The definition also includes animal food adjuncts which may result in residues in human food and components of packing materials which may find their way into food.

The food additives may be classified as coloring agents (e.g. saffron, turmeric), flavoring agents (e.g. vanilla essence), sweeteners (e.g. saccarin), preservatives (e.g. sorbic acid, sodium benzoate), bleaching agents (e.g. chlorine) acidity imparting agents (e.g. citric acid acetic acid), etc. Uncontrolled or indiscriminate use of food additives may pose health hazards among consumers. For example, certain preservatives such as nitites and nitrates can lead to the production of toxic substances, e.g. nitrosamines that have been implicated in cancer etiology.

## Properties of Vegetarian and Non-Vegetarian Diet

Diets across the world can be broadly categorized into two-vegetarian and non-vegetarian. A vegetarian is classified as one who does not consume meat while a non-vegetarian does. If broken down further there are various types of vegetarian diets as well. For example there are sections of people who consider eggs to be vegetarian while others do not. There are many people who abstain from milk considering it to be a part of non-vegetarian diet. However, here we will stick to the two basic types of diets, which are vegetarian and non-vegetarian.

### Vegetarian diet

A vegetarian diet focuses on plants for food. These include fruits, vegetables, dried beans and peas, grains, seeds and nuts. There is no single type of vegetarian diet. Instead, vegetarian eating patterns usually fall into the following groups:

The four main types of vegetarians are: Cooking with diced vegetables

1) Lacto-vegetarians - they consume dairy products, but no eggs. Most do consume honey.



2) Ovo-vegetarians - they consume eggs, but no dairy. Most do consume honey.
3) Lacto-ovovegetarians - they consume eggs and dairy. Most do consume honey
4) Vegans - only consume plant-based foods (no dairy, eggs or honey)

People who follow vegetarian diets can get all the nutrients they need. However, they must be careful to eat a wide variety of foods to meet their nutritional needs. Nutrients vegetarians may need to focus on include protein, iron, calcium, zinc and vitamin $B_{12}$.

### Advantages

1. A vegetarian diet is usually low in saturated fat, the solid fat found in animal meats. Saturated fats promote higher cholesterol levels, especially LDL or bad cholesterol. Plant foods, except for coconut and palm kernel oils, do not contain saturated fat.
2. Vegetarian diets are higher in fiber than traditional meat-based diets, especially the Western diet followed in the States. Following a vegetarian diet may decrease your risk of heart disease, cancer, obesity and hypertension.

### Disadvantages

1. You have a lower intake of vitamin $B_{12}$ and iron with the vegetarian diet. Meats provide adequate amounts of $B_{12}$ and iron. Fortified Vitamin $B_{12}$ is necessary in vegetarian products, such as soy-based analogs and cereals. Vegetarians would need to consume large amounts of cheese, whole eggs and other dairy products to get adequate amounts of $B_{12}$. This could contribute to a greater saturated fat intake and higher cholesterol levels.
2. Other critical vitamins and minerals lacking in the vegetarian diet include vitamin D, calcium and zinc. Omega-3 fats are easier to absorb and reduce inflammation in the body when consumed from cold-water fish than plant sources, such as flax seeds, a primary source of omega-3 fats in the vegetarian diet.

### Non-vegetarian diet

Eating non-veg foods have countless health benefits as they are excellent source of the high quality protein, healthy fat, vitamins and minerals including all the essential amino acids which body requires for important functioning. They contain lots of iron which is beneficial for everybody to maintain their hemoglobin count and body stamina.

### Advantages

1. They are rich in calcium, phosphorus and vitamin B12 which are very necessary for the bone and blood health.
2. They are very rich in proteins and healthy fat which are mostly required by the growing

age kids for their healthy growth and development of the muscles, bone and other body systems.

3. They are rich in Vitamin B complex and other vitamins which are very necessary to maintain the normal body system functioning.
4. They help in repairing and building new body tissues and enhance the production of antibodies to get protected from various infections.
5. They are rich in zinc and selenium which helps in the tissue formation and metabolism whereas selenium helps in breaking down fat and other chemicals.
6. They helps in maintain the good vision, strong teeth, bones, healthy skin, hair, central nervous system, promote brain development and etc.

**Disadvantages**

1. The toxins produced during slaughter of an animal are directly transferred into one's body partially if not entirely. Being a vegetarian one can experience all the benefits by consuming an all nutrient balanced diet.
2. Vegans appear to enjoy slight health benefits in comparison to other vegetarians, including a reduced risk of type 2 diabetes, high blood pressure and obesity; though they might be at increased risk of suffering from low bone mineral density if not supplementing the base diet. Compared to non-vegetarians vegans may be at greater risk of urinary tract cancers.

**Effects of Spices and Condiments**

Spices are the substances which are obtained from aromatic parts of plants such as leaves, roots, barks, rhizomes, fruits, flower buds. These are mainly used for the flavoring food, medicine & in pharmaceutical purposes. The main important chemical constituent is volatile oil which is responsible for its flavor & aroma. They possess strong antioxidant, antimicrobial & antibacterial properties. Apart from this they helps in digestion of food and inhibit thrombus formation thus facilitates the thrombolysis. Commonly used spices are pepper, cloves, fennel and cinnamon.

Spices and condiments are important components of food because they significantly change the taste, appearance and effect of the food even though they are used in small quantities. Many spices promote digestion. Most of them have little effect on acid base balance. Many food colorings and preservatives can be carcinogenic so use foods containing these substances sparingly.



## Consumption of Alcohol and its Effects on Personal and Social Health

**Alcohol and Public Health :** Alcohol is a psychoactive substance with dependence-producing properties that has been widely used in many cultures for centuries. The harmful use of alcohol causes a large disease, social and economic burden in societies.

1. Environmental factors such as economic development, culture, availability of alcohol and the level and effectiveness of alcohol policies are relevant factors in explaining differences and historical trends in alcohol consumption and related harm.
2. Alcohol-related harm is determined by the volume of alcohol consumed, the pattern of drinking, on rare occasions, the quality of alcohol consumed.
3. The harmful use of alcohol is a component cause of more than 200 disease and injury conditions in individuals, most notably alcohol dependence, liver cirrhosis, cancers and injuries.
4. The latest causal relationships suggested by research are those between harmful use of alcohol and infectious diseases such as tuberculosis and HIV/AIDS.
5. A wide range of global, regional and national policies and actions are in place to reduce the harmful use of alcohol.

Alcohol can cause social effects and health effects (both physical and mental).Social effects are for instance those that affect the behavior of individuals, or how they interact with others. Although mainly health effects of alcohol are discussed here, it is important to note that social harm has a major impact on well-being, even if it cannot be easily quantified. Health effects of alcohol have been observed in nearly every organ of the body. Indeed alcohol consumption has been linked to more than 60 diseases. The effects of alcohol on health and well-being can manifest themselves as chronic disease, accidents and injuries, as well as short-term and long-term social consequences. Both the amount of alcohol consumed and the pattern of drinking determine whether there will be:

Biochemical effects on cells and organs in the body, intoxication, and alcohol dependence. Biochemical effects of moderate consumption can be beneficial, such as protection against coronary heart disease, but more usually harmful, leading for instance to damage to the pancreas.

Intoxication is strongly linked to accidents, injuries, deaths, domestic conflict and violence.

Alcohol dependence is a powerful mechanism that sustains alcohol consumption and its short-term and long-term consequences.

Some diseases, such as alcohol dependence, are clearly fully attributable to alcohol. Others, such as cirrhosis of the liver are mainly attributable to alcohol, while others, such as breast cancer, are only partly attributable to alcohol. The extent to which alcohol

contributes to a disease is expressed in "alcohol attributable fractions" (AAFs). In a similar way, it is possible to establish the AAF for road traffic accidents, based on the alcohol concentration in the driver's blood.

**Alcohol consumption can affect work performance in several ways:**

**Absences** - There is ample evidence that people with alcohol dependence and drinking problems are on sick leave more frequently than other employees, with a significant cost to employees, employers, and social security systems. In estimated 30% of absenteeism may be due to alcohol. In a survey showed that workers with drinking problems are nearly 3 times more likely than others to have injury-related absences from work.

**Work accidents** - In Great Britain, up to 25% of workplace accidents and around 60% of fatal accidents at work may be linked to alcohol. In India about 40% of work accidents have been attributed to alcohol use.

**Productivity** - Heavy drinking at work may reduce productivity. In 10% of productivity losses are attributed to alcohol. Performance at work may be affected both by the volume and pattern of drinking. Co-workers perceive that heavy drinkers have lower performance, problems in personal relationships and lack of self-direction, though drinkers themselves do not necessarily perceive effects on their work performance

**Unemployment**- Heavy drinking or alcohol abuse may lead to unemployment and unemployment may lead to increased drinking.

**Family is affected by alcohol consumption**

Drinking can impair how a person performs as a parent, a partner as well as how he or she contributes to the functioning of the household. It can have lasting effects on their partner and children, for instance through home accidents and violence.

Children can suffer Fetal Alcohol Spectrum Disorders (FASD), when mothers drink during pregnancy. After birth, parental drinking can lead to child abuse and numerous other impacts on the child's social, psychological and economic environment.

The impact of drinking on family life can include substantial mental health problems for other family members, such as anxiety, fear and depression.

Drinking outside the home can mean less time spent at home. The financial costs of alcohol purchase and medical treatment, as well as lost wages can leave other family members destitute. When men drink it often primarily affects their mothers or partners who may need to contribute more to the income of the household and who run an increased risk of violence or HIV infection.

**Major disease and injury categories causally impacted by alcohol consumption**

Neuropsychiatric conditions: alcohol use disorders (AUDs,) are the most important



neuropsychiatric conditions caused by alcohol consumption. Epilepsy is another disease causally impacted by alcohol, over and above withdrawal-induced seizures.

Alcohol consumption is associated with many other neuropsychiatric conditions, such as depression or anxiety disorders but the complexity of the pathways of these associations currently prevents their inclusion in the estimates of alcohol-attributable disease burden.

**Gastrointestinal diseases:** liver cirrhosis and pancreatitis are causally related to alcohol consumption. Higher levels of alcohol consumption creates an exponential increase in risk. The impact of alcohol is so important that for both disease categories there are subcategories which are labeled as "alcoholic" or "alcohol-induced" in the ICD.

**Cancers:** alcohol consumption has been identified as carcinogenic for the following cancer categories cancer of the mouth, nasopharynx, other pharynx and oropharynx, laryngeal cancer, oesophageal cancer, colon and rectum cancer, liver cancer and female breast cancer. In addition, alcohol consumption is likely to cause pancreatic cancer. The higher the consumption, the greater the risk for the secancers, with consumption as low as one drink per day causing significantly increased risk for some cancers, such as female breast cancer.

**Intentional injuries :** alcohol consumption, especially heavy drinking, has been causally linked to suicide and violence.

**Unintentional injuries:** almost all categories of unintentional injuries are impacted by alcohol consumption. The effect is strongly linked to the alcohol concentration in the blood and the resulting effects on psychomotor abilities. Higher levels of alcohol consumption create an exponential increase in risk.

**Cardiovascular diseases (CVD):** the relationship between alcohol consumption and cardiovascular diseases is complex. The beneficial cardio protective effect of relatively low levels of drinking for ischemic heart disease and ischemic stroke disappears with heavy drinking occasions. Moreover, alcohol consumption has detrimental effects on hypertension, atrial fibrillation and hemorrhagic stroke, regardless of the drinking pattern.

**Fetal alcohol syndrome (FAS) and preterm birth complications:** alcohol consumption by an expectant mother may cause these conditions that are detrimental to the health of a newborn infant.

**Diabetes mellitus:** a dual relationship exists, whereby a low-risk pattern of drinking may be beneficial while heavy drinking is detrimental.

**Infectious diseases:** harmful use of alcohol weakens the immune system thus enabling development of pneumonia and tuberculosis. This effect is markedly more pronounced when associated with heavy drinking, and there may be a threshold effect,

meaning that disease symptoms manifest mainly if a person drinks above a certain level of heavy drinking.

**Alcohol use disorders (AUDs)**

Harmful use of alcohol is defined as a pattern of alcohol use that is causing damage to health and the damage may be physical (as in cases of liver cirrhosis) or mental (as in cases of depressive episodes secondary to heavy consumption of alcohol). Alcohol dependence (also known as alcoholism or alcohol dependence syndrome) is defined as a cluster of behavioral, cognitive, and physiological phenomena that develop after repeated alcohol use and that typically include a strong desire to consume alcohol, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority givento alcohol use than to other activities and obligations, increased tolerance, and sometimes a physiological withdrawal state.

## Effects of Pathya-Apathya in Life Style Disorders-Diabetes, Hypertension, Obesity and Coronary Heart Disease

पथ्यंपथोनपेतयद्य चोक्तंमनसः प्रियम । यचचाप्रियमपथ्यंचनियत तन्न लक्षयेत ॥ (च.सू. 25/45-46)

Diet that are not causing any harm in the body channels and likened for heart are known as Pathya Ahara and diets that are causing harm in the body channels and disliked for heart are known as Apathya Ahara.

In Ayurvedic therapy, this is considered as one of the most important measures during the treatment of disease. One should avoid unsuitable diet and lifestyle during the therapy and must adopt suitable one for faster result and total cure of disease.

**Ayurvedic Approach on Prevention and Health promotion**

1. Nidan Parivarjana-Avoidance of causative and precipitating factors of disease
2. Samshodhan-Panchakarma purification
3. Samshamana-simple therapies ,Use of palliative remedies
4. Pathya Vyavastha-Health-promoting regimen (are the hall mark of Ayurvedic therapeutics recommended for physicians to prescribe.

Specific diet and lifestyle guidelines are always prescribed along with the drugs and therapies so as to facilitate restoration of bio-humoral balance and health status.

Some Ayurvedic Lifestyle Concepts:
Dinacarya - Daily code of health conduct
Ratricarya - Conduct for the night
Rutucarya - Conduct in relation to various seasons
Sadvrtta - Personal and social hygiene
Pathya - Nutrition and dietetics



Vega Dharana - Adharaniya Vegas - Suppressible and non-suppressible urges

**Control of negative emotions**

Pancakarma- Periodical biological cleansing

Trividha Nimitta - three causative factors responsible for all sorts of diseases, avoidance of which prevents the manifestation of diseases

Rasayana-Restorative remedies

**Dincharya (Daily regimen):** Ayurveda in detail describes daily activities, right from the morning we wake up to the time we go to sleep at night. Following this, one can achieve a long, healthy and active life. It includes early rising, attending natural calls, oral care, oil massage, exercise, bathing, food intake, good conducts, night sleep etc.

**Rutucharya (Seasonal regimen):** It is commonly felt that seasonal changes have very significant impact on our health. Ayurvedic literature has classified whole year in 6 seasons each having 2 months period and suggests very peculiar diet and lifestyle regime accordingly, following which one can withstand the seasonal changes and stay away from illness. Seasonal recommendations to balance the Vata, Kapha and Pitta Doshas. Each of these mind-body types is more active during particular seasons. The seasonal directives for each are guides to keep them balanced. Avoid foods that are cold, sour, sweet or difficult to digest during spring. Have regular bath, oil massages and avoid napping during the day etc.

**Pathya (Do's) Apathya (Don'ts) in Madhumeha (Diabetes mellitus)**-Reference Pathyapathya Vinirnaya

| | **Pathya (Do's)** | **Apathya (Don'ts)** |
|---|---|---|
| Cereals | Kruna Dhanya, Kanguni, Yava, special variety of grain (sanvaka, kodrava), wheat | Freshly harvested grains, rice |
| Pulses | Green gram (Mudga), Kulattha, Chanak, Adhaki, Alasi, | Black gram (Masha) |
| Fruits and | Shigru, Patola, Karavellaka, Rasona, ApakvakadaliPhala, Amalaki, Haridra, Kapittha, black pepper, vegetables | |
| Others | Honey, betel nut, rock salt, Mamsa Rasa of pigeon, rabbit, peacock, wild animals and bird, Tila etc. | Anupa Desha Mamsa, Milk, curd, butter milk, clarified butter, oil, Jaggery, alcohol, |

| | | |
|---|---|---|
| | | sugarcane products, betel, eating before digestion of previous food, incompatible food |
| Life style | Walking, playing, physical exercise, bathing, Vaman, Virechana, Udawartana | Dhumrapana, Day sleeping, sudation, suppression of natural urges, therapeutic bloodletting, riding, sexual intercourse |

**Pathya (Do's) Apathya (Don'ts) in Obesity**-Reference Pathyapathya Vinirnaya

| | **Pathya (Do's)** | **Apathya (Don'ts)** |
|---|---|---|
| Cereals | Old Shali rice, Sanvaka, Kodrava, Bajara, maze (Makka), barley | Newly harvested shali rice, wheat |
| Pulses | Chickpea (Cana), pigeon pea (Arahara), green gram (Mudga), Kulattha | Black gram (Masha) |
| Fruits & vegetables | Brinjal, Paravala, drum stick (Shigru) | Potato |
| Others | Butter milk, cardamom, Amalaki, mustard oil, luke warm water, Priyangu, Guggulu, Lauhabhasma, Shilajatu, intake of water before meal, food substances with pungent, bitter and astringent taste | Milk, curd, meet, fish, clarified butter, Jaggery, intake of water after meal |
| Life style | Vaman, Virechana, Physical exercise, night awakening, worry, massage with medicated paste/powder (udvartana), lightening, sunlight exposure, walking, Apatarpana Ahara, exercise, Bathing with luke warm water | Bathing with cold water, day sleeping, luxurious lifestyle, oil massage |



**Pathya (Do's) Apathya (Don'ts) in hypertaension / Coronary heart Disease -** Reference PathyapathyaVinirnaya

| | **Pathya (Do's)** | **Apathya (Don'ts)** |
|---|---|---|
| Cereals | Old Shali rice | Newly harvested Barley, millets etc |
| Pulses | Chickpea (Canaka), pigeon pea (Arahara), green gram (Mudga), Kulattha | Black gram (Masha) |
| Fruits & vegetables | Patola, Kadali Phala, pu$ranakushmanda, Dadima, Mulaka, dry grapes, Rasona, Eranda Taila, Purana Guda, coriander, ginger | Potato |
| Others | Sandhava Lavan, Jangala Mamsa rasa, cow milk. | Dushitajala, Mesha, Dugdha, Kashaya Amla Rasa Ahara. |
| Life style | Vaman, Virechana, Laghana, Basti, Swedana, Physical exercise, night awakening, worry, massage with medicated paste/powder (Udvartana), lightening, sunlight exposure, walking, Apatarpana Ahara, exercise, Bathing with luke warm water | Trushna, Chardi, Vega Dharana, Dantadhavana, Raktamokshana, |

# CHAPTER 7 Nidra (Sleep)

The Trayopasthmbhas are the subsidiary pillars, which support the body throughout the life span, by providing the qualities like Bala, Varna, Upachaya etc. they are considered as subsidiary or secondary as principal pillars of life are the three Doshas. But their importance in normal functioning of the body cannot be over looked. The Trayopastmbhas are Ahara, Nidra and Brahmacharya. Each one of these deserves due impotence because these factors are concerned with the basic needs of living system and over indulgence or total abstinence of any of these may be harmful to life. The Ahara is mainly concerned with the energy production and maintenance of living tissues. The Nidra is the one which provide complete relaxation to the body and mind and there it restores the potentials of the individual. The Brahmacharya is concerned with disciplined mode of sexual life and reproduction.

**Derivation of Nidra-** Nidra is derived from the root "Dra" with a prefix 'N'. The root "Dra" means undesired. Therefore Nidra is considered as state in which there will be no desire (Shabdakalpadruma).

The word meaning of Nidra-

Vachaspatyama- Sayana, Swapne, Tatwapratibodhe, Abhavapratyayalambnayam, Swanyavastha.

Amarkosha- Sayana, Swapa, Swapna, Samvesa

Vaidyakashabdasindhu- swapi

Sanskrit Hindi dictionary by V.S, Apte- Suptavastha, Nind, Sithilala, Aakhayan Mudra, Kali ki Avastha

Sanskrit- English dictionary by V.S. Apte- sleep, sleepiness, sloth, shutting, bidding state

**Definition**

यदातुमनसिक्लान्तेकर्मान्तेकर्मात्मनः क्लमान्विता । विषयेग्योनिवर्तन्तेतदास्वपतिमानवः ॥

(च.सू. 21/35)

Charakacharya explains Nidra is a special state of mind in which the mind is not associated with any type of Indriyas. This detachment from the Bahya Vishaya is result from the tiredness of the body as well as mind.





हृद्यंचेतनास्थानमुक्तंसुश्रुत ! देहिनाम ॥ तमोभिभूतेतस्मिंस्तुनिद्राविशतिदेहिनम ॥ (सु.शा. 4/34)

Hrudya is the seat of Chetana and when it is dominated by covered by Tamas the person gets sleep.

श्लेष्मावृतेषुस्त्रोतःसु श्रमादुपरतेषु ..... । (अ.स.सू. 9/29)

The Strotasa become accumulated with Shleshma and the Mana is devoid of sense organs because of Fatigueness, so individual gets sleep.

रात्रिस्वभावप्रभावामतायातांभूतधात्रीप्रवदन्तिज्ञाः ।
तमोभवामाहुरघस्यंमूलंशेषाः पुनर्व्याधिषुनिर्दिशन्ति ॥ (च.सू. 21/59)

The sleep caused by Ratrisvabhavaprabhava (nature of the night) the sleep par excellence and is known as Bhutadhatri that nurses all the living beings. The sleep which occurs due to increased Tamas is the cause for no righteous deeds because the person will always be sleeping without doing any Sadvritta. Other types of sleep are just like disease itself, hence they are grouped under Vyadhi disease.

**Types of Nidra**

AcharyaCaraka has classified Nidra in following manner according to causes-

तमोभवा श्लेष्मसमुद्भावाचमनः शरिरश्रमसंभवाच ।
आगन्तुकीव्याध्यनुवतिनीचरात्रिस्वभावप्रभवाचनिद्रा ॥ (च.सू. 21/58)

1. **Tamobhava-** caused by Tama.
2. **Sleshmasamudbhava-** caused by highly aggravated Kapha.
3. **Manah-Sharir Srama Sambhava-** caused by physical and mental exhaustion.
4. **Agantuki-**indicative of bad prognosis leading imminent death.
5. **Vyadhi-Anuvartini-** caused as a complication of other disease like Sannipataja Jwara etc.
6. **Ratri-Swabhava Prabhava-** caused by the very nature of the night.

Acharya Dalhana has classified Nidra into three types on the basis of Susruta Samhita like-**Tamasi-** when SangyavahaSrotas become filled with Shlesma dominated by Tamoguna, Tamasi Nidra is produced.

**Swabhaviki-** this type of Nidra occurs naturally and daily in all living beings. .

**Vaikariki** - if there is any disturbance in Mana and body, Nidra does not occur. But if Nidra is occurred, it is Vaikariki Nidra.

Acharya Charaka, Nidra is a condition in which Mana including Indriyas dissociates themselves from their objects. According to Acharya Sushruta Nidra is related to God

Vishnu. Acharya Vagbhat has said that Nidra is produced from Tamas at the time of commencement of the creation. It is another form of Tamas itself and manifest when tama is predominant, generally at night.

**Physiology of Nidra**

When the mind including sensory and motor organs is exhausted and they dissociate themselves from their objects, then the individual sleeps.

According to Acharya Charaka, when the Man including Indriyas is exhausted and thus they dissociate themselves from their objects, the individual sleeps. When the Mana (as well as the soul) gets exhausted or becomes inactive and the Gyanendriyas and Karmendriyas become inactive then the individual gets sleep. Acharya Sushruta said about the physiology of Nidrathat Hridaya is the seat of Chetna in living being. When this is invaded by Tamo Guna, persons are subjected to Nidra. Tamo Guna is the cause of sleep and Satva Guna is the cause of awakening but overall, nature itself is more dominant cause. Acharya Caraka explained physiology of Nidra that when Srotas of the body become covered by Kapha, then the body is fatigued by exertion and when the sense organs are not functioning, Nidra manifests in the body.

**Effect of Sleep**

निद्रायत्तंसुखं दुःखं पुष्टिः कार्श्यबलाबलम । वृषताक्लीबता ज्ञानमज्ञानंजीवितंनच ॥
अकालेऽतिप्रसगाच्चनअचनिद्रानिषेविता । सुखायुषीपराकुर्यातकालरात्रिरिवापरा ॥
सैवयुक्तापुनर्युक्तेनिद्रादेहंसुखायुषा । पुरुषंयोगिनंसिद्धयासत्याबुद्धिरिवागता ॥ (च.सू. 21/36-38)

Happiness, misery, nourishment, emaciation, strength, weakness, virility, sterility, knowledge, ignorance, life and death – all these occur depending on proper or improper sleep. According to Sushruta Samhita, a good sleep enjoyed at proper time and for proper period, tends to improve the growth, strength, vigor and complexion of the body. It increases the sense of well-being by freshening the body and mind and also restores the natural equilibrium among different body tissues. So much so that the scope and importance of good sleep has been equated with the soundness of health enjoyed by a person. There is no physiological system in the body which doesn't get the salutary effect of sound and soothing sleep.

Untimely and excessive sleep takes away both happiness and longevity. The same sleep, if properly enjoyed brings happiness and longevity in human beings as real knowledge brings about spiritual power in a yogi.

दिवास्वप्न-Indication of day sleep :

गीताध्ययनमद्यस्त्रीकर्मभारध्वकर्शिताः । अजीर्णिनः क्षताः क्षीणावृद्धाबालास्तथाऽबलाः ॥



तृष्णार्तीसारशूलार्ताः श्वासिनोहिक्किनः कृशाः । पतिताभिहतोन्मताः क्लान्तायानप्रजागरैः ॥
क्रोधशोकभयक्लान्तादिवास्वप्नोचिताश्चये । सर्वएतेदिवास्वप्नंसेवेरनसार्वकालिकम ॥
(च.सू. 21/39-41)

For most, day sleep is contraindicated but sleeping during the day time can be prescribed for those who are exhausted by singing, study, alcoholic drinks, sexual acts, elimination therapy, carrying heavy weight, walking long distance; those suffering from phthisis, wasting diseases like tuberculosis, thirst, diarrhea, colic pain, dyspnea, hiccup, insanity, those who are too old, too young, weak and emaciated; those injured by fall and assault, those exhausted by journey by a vehicle, anger, grief and fear, and those who are accustomed to day sleep i.e. they are working in night.

**Benefits of Day sleep**

धातुसाम्यंतथा ह्येषां बलंचाप्युपजायते । श्लेष्मापुष्णातिचागानिस्थैर्यभवतिचायुषः ॥
ग्रीष्मेत्वादानरुक्षाणांवर्धमानेचमारुते । रात्रीणांचातिसंक्षेपाद्दिवास्वप्नः प्रशस्यते ॥
ग्रीष्मवर्षेषुकालेषुदिवास्वप्नातप्रकुप्यतः ॥ श्लेष्मपित्तेदिवास्वप्नस्तस्मात्तेषुनशर्यते ॥ (च.सू. 21/42-44)

Equilibrium of Dhatus and strength are maintained and Kapha nourishes the organs and ensures longevity. In summer season, nights become shorter and Vata gets aggravated in the body due to the absorption of fluid (Adana Kala). Therefore, during this season, sleep during the daytime is prescribed for all.

**Contra-indications of day sleep**

मेदस्विनः स्नेहनित्याः श्लेष्मलाः श्लेष्मरोगिणः । दूषिविषार्ताश्चदिवानशयीरनकदाचन ॥
हलीमकः शिरःशूलंस्तैमित्यंगुरुगात्रता । अंगमर्दोऽग्निनाशश्चप्रलेपो हृद्यस्य च ॥
शोफोरोचकहृल्लासपीनसार्धावभेदकाः । कोठः पिडकाः कण्डूस्तन्द्राकासोगलामयः ॥
स्मृतिबुद्धिप्रमोहश्चसंरोधः स्त्रोतसांज्वरः । इन्द्रियाणासामर्थ्यविषवेगप्रवर्तनम ॥
भवेन्नृणां दिवास्वप्नस्याहितस्यनिशेवणात । तस्माद्धिताहितंस्वप्नंबुद्धध्वास्वप्यातसुखंबुध् ॥
(च.सू. 21/45-49)

Sleeping during the daytime in the seasons other than summer is not advisable as it causes vitiation of Kapha and Pitta. Persons with excessive fat, those who are addicted to taking unctuous substances, those with Kapha constitution, those suffering from diseases due to the vitiation of Kapha and those suffering from artificial poisoning should never sleep during day time. If one violates the prescription regarding sleep during the day time, he would subject himself to Halimaka (type of jaundice), headache, feeling as if body is covered by wet blanket, heaviness of the body, malaise, loss of digestive power, Hridaya-Alepa (a feeling as if adhered to the heart), edema, anorexia, nausea , sinusitis,

rhinitis, hemicranias, urticaria, eruption, abscess, prurutus, drowsiness, coughing, diseases of the throat, impairment of the memory and intelligence, obstruction of the circulating channels of the body, fever, weakness of sensory and motor organs and enhancement of the toxic effects of artificial poisons. So one should considering the merits and demerits of sleep in various seasons and situations. So that it may bring happiness and health to him. Just because you feel like you need to nap during the day, it doesn't mean it is beneficial for you.

**Ratri Jagarana-Effect of night awakening**

रात्रौजागरणं रुक्षं स्निग्धंप्रस्वपनंदिवा । अरुक्षमनभिष्यन्दित्वासीनप्रचलायितम ॥ (च.सू. 21/50)

Awakening during night causes roughness in the body; sleep during daytime cause's unctuousness and sleeping in sitting posture does neither cause roughness nor unctuousness.

देहवृत्तौयथाआहारस्तथास्वप्नः सुखोमतः । आहारसमुत्थेचस्थौल्यकार्श्यविशेषतः ॥ (च.सू. 21/51)

**Swapna (Dreams)**

Sleep is a physiological phase of 'unawake' that exists between two phase of normal and routine awakening. It is a period of rest for the body and mind during which bodily functions are partially suspended and sensitivity to the external stimuli is diminished, but readily or easily regained.

After hours of working (physical or mental) our mind & body need rest, so that they are once again charged. But when we are dreaming during sleep our mind is still working, it isn't taking rest. That is why people who dream often are not feeling fresh (mind is not recharged) even after long hours of sleep, or they want to sleep more in the daytime. The quality of sleep is hampered due to dreams which in turn hamper our thinking/working process & thus quality of life in the long run.

**Sleep requirements**

During sleep the body gets repaired by itself and the brain processes the day's events and helps to sort them. Some sleep more and other sleep less, but both may be normal. The range of deviation of sleeping hours in the normal adult population is 4 to 10 hours per day. Although the infants and children sleep more while the old people sleep less. A normal adult can with stand several days up to 10 days of sleep deprivation without showing any remarkably gross changes.

| Category | Sleep requirement |
|---|---|
| New born babies | 16-20 hours |
| Children's | 12-14 hours |



| | |
|---|---|
| Adults | 4-10 hours |
| Old | About 5 hours |

**Methods and measures to induce a good sleep**

अभ्यगोत्सादनंस्नानंग्राम्यानूपौदकारसाः । शाल्यन्नं सद्रुधि क्षीरं स्नेहोमद्यंमनः सुखम ॥
मनसोऽनुगुणागन्धाः शब्दाः संवाहनानिच । चक्षुष्योस्तर्पणंलेपः शिरसोवदनस्यच ॥
स्वास्तीर्णशयनंवेश्मसुखंकलस्तथोचितः । आनयन्त्यचिरान्निद्रां प्रनष्टा यानिमित्ततः ॥

(च.सू. 21/52-54)

Aharaja Hetu - Gramya, Anup, Varija Mamasa Rasa, Shalyanna, Shali with Dadhi, Ksheera, Madya, Sneha.

Viharaja Hetu - Abhyanga, Snana, Utsadana, Samvahana, Cakshusostaerpana, application of soothing pastes to the head, application of soothing pastes to the face, comfortable bed, sleep in proper time.

Manasika Hetu - pleasure of mind, indulging in odors' and sound of once own taste. Person gets sleep immediately when the etiologies of sleeplessness are removed.

**Nidra-one of the Vega**

Vegas are natural urges which should not be controlled deliberately. Nidra is one among the 13 Vegas. The Dharana of Nidra Vega may cause Moha, Gaurava, of Shira and Akshi, Alasya, Jrumbha and Angamarda. The treatment that be given to these symptoms is nothing but allow the individual to sleep. Gentle touch also can promote sleep.

**Causes of Insomnia**

कायस्यशिरस्यश्चैवविरेकश्छर्दनंभयम । चिन्ता क्रोधस्तथाधूमोव्यायामोरक्तमोक्षणम ॥
उपवासोऽसुखाशय्यासत्वौदार्यतमोजयः । निद्राप्रसगमहितंवारयन्तिसमुत्थितम ॥ (च.सू. 21/55-56)

Elimination of Doshas in excess from the body through purgation and emesis, Nasya, fear, anxiety, anger, smoking, excessive physical exercise, excess bloodletting/loss, fasting and uncomfortable bed are causes for insomnia.

The above mentioned factors along with overwork, stress, old age, diseases, especially these due to the vitiation of Vata like colic pain, etc. are known to cause sleeplessness even in normal individuals. Some are insomniac even by nature.

# CHAPTER 8 Brahmacharya

Brahmacharya is a word that has two main meanings; in Sanskrit it means to move in a higher awareness. But throughout the world, the religious sects explain Brahmacharya as having control over sexual interactions. Brahmacharya can be understood in two ways; to be immersed in higher awareness while abstaining from all forms of sexual interactions.

Bramhacharya (abstinence) refers to the state of life when any living being refrains from excessive sensuality. This state does not mean a complete sexual abstinence but to indulge in sex such a way not to have any adverse effect on health. It is one of the prominent, most important and absolutely essential aspects of human life.

Bramhacharya - Brahma + Charya
Brahma - ultimate knowledge
Charya - life style

Life which required for attaining ultimate knowledge, called Brahmacharya.

ब्रह्मचर्यशब्देनइन्द्रियसंयमसौमनस्यप्रभृतयोब्रम्हज्ञानानुगुणा गृह्यन्ते । (चक्रपाणिटिका च.सू. 11/35)

Bramhacharyais a process in which one has control over the sense which lead to pleasant mind and helpful to attain knowledge about Bramha i.e. supreme God.

कर्मणामनसावाचासर्वावस्थासुसर्वदा । सर्वत्रंमैथुनम्त्यागम्ब्रह्मचर्यप्रचक्षते ॥ (गरुडपुराण)

Avoidance of sexual act physically, mentally and verbally always under any circumstances is known as Bramhacharya.

According to Veda - ब्राह्मणमोक्षायचर्येब्रह्मचर्य ।

Any type of activity, which is favorable for attaining Brahma (salvation).

**As per some renounced person definition about Bramhacharya-**

Brahmacharya is abstaining from all kinds of Maithuna or sexual enjoyment forever, in all places and in all conditions, physically, mentally and verbally. **-Yajnavalkya**

Know that in this world there is nothing that cannot be attained by one who remains from birth to death a perfect celibate In one person, knowledge of the four Vedas, and in another, perfect celibacy of these, the latter is superior to the former who is wanting in celibacy. **-Mahabharata**

A wise man should avoid married life as if it were a burning pit of live coals. From





the contact comes sensation, from sensation thirst, from thirst clinging; by ceasing from that, the soul is delivered from all sinful existence. **-Lord Buddha**

Death is hastened by letting out semen from the body; life is saved and prolonged by preserving it. There is no doubt that people die prematurely by letting the semen out of the body; knowing this, the Yogi should always preserve semen and lead a life of strict celibacy. **-Shiva Samhita**

Sensuality destroys life, luster, strength, vitality, memory, wealth, great fame, holiness and devotion to the Supreme. **-Lord Krishna**

In Vagbhata Samhita Abrahmacharya is mentioned, to give more importance to Grihastha Ashram (having progeny), for this Abrahmacharya is required, which is also warned to have in controlled way or under limitation/ rule of sex.

कायवाङ्गमनोभिमैथुनवर्ज्जनसामान्यदेकमेवगव्यते । (गगाधरटिकाच.सू. 11/35)
स्मरणंकिर्तनम्केलीप्रेक्षणं गुह्यभाषणं । संकल्पध्यवसायश्चक्रियानिर्वृत्तिरेवच ॥
एतन्मैथुनमष्टागंम प्रवक्ष्यन्तिमनीषिणः । विपरितंब्रह्मचर्य मेतदेवाष्ट लक्षणम ॥ (योगवल्कस्मृति)

Avoid the eight kinds of enjoyment, namely, Darshana (looking at women with passionate resolve), Sparshana (touching them), Keli (play), Kirtana (praising the qualities of the other sex), Guhya-Bhashan (talking in private), Sankalpa (determination), Adhyavasaya (nearing the other sex with the desire for gratification) and Kriyanivritti (the actual sexual act). But it is difficult to fallow strict abstinence for everyone, so Vagbhata indicates Abramhacharya.

**Importance and uses of Bramhacharya**

आयुस्तेजोबलंवीर्यप्रजाधीश्चमहायशः । पुण्यंचमनत्र्यत्वंचप्राप्यतेब्रह्मचर्यया ॥ (बुद्धगौतमस्मृति)

Celibacy is one among best enhancer of longevity.

ब्रह्मचर्येवीर्यलाभ । (योगसूत्र)

On performing celibacy one conserve Virya(energy).

त्रयउपस्तम्भाइति—आहार, स्वप्नोब्रह्मचर्यामिति, एभिस्त्रिभिर्युक्तियुक्तै रुपस्तब्धमुपस्तम्भैः संस्कारमहितमनुअपसेवमानस्य । (चरक)

Life endowed with strength, complexion and growth and continues until full span of life, provided person does not indulge in wrong activity.

ब्रह्मचर्यमायुष्णाम । (च.सू. 25/40) वीर्यबलवर्धनानाम् । (च.सू. 30/15)

Celibacy is one of the best ways to attaining goal. Adopted Celibacy will promotes longevity, strength, nourishment, delightfulness and happiness.

धर्म्यंयशस्यमायुष्यंलोकद्वयरसायनम । अनुमोदामहेब्रह्मचर्यमेकान्तनिर्मले ॥ (अ.सं.सू. 7)

Celibacy gives success, longevity of the life, rejuvenate both the worlds, it provides peace and purity.

मरणंबिन्दुपातेनजीवनम्बिन्दुधारणत । यावतबिन्दुस्थितोदेहेतावतकालमयंकुत ॥ (ह.यो.प्र.)

Excessive loss of Sukra will lead to death and preservation of sukra lead to longevity of life. Sukra is preserved in the body the body power of body is enhanced.

आहारस्यपरंधामंशुक्रतदरक्ष्यमात्मनः । वशयोह्यस्य बहूनरोगानमरणंवानियच्छति ॥ ( च.नि. 6/8 )

Food is untimely transformed into Sukra, so one should prevent the loss of Sukra because loss of Sukra leads to emaciation many diseases and even death.

**Vyavayasambandhiniyama**

1. Avoid sex with a wife who is unhappy, sick, or pregnant, observing certain religious rites, menstruating, or not willing to have sex.
2. Males below 25 years should abstain (Vagbhata says before 20 years of age).
3. Females below 16 should abstain as they are not physically grown.
4. Avoid sex with a woman who thinks of another man.
5. Avoid sex with animals.
6. Avoid unnatural sex, i.e. anal or unnatural position
7. Avoid sex at a crossroad in the countryside, at a crematory or graveyard or where people have been killed, in water, where there are medicinal plants, where there is a Guru or deity place, at sunrise, or at sunset (Sandhikala)
8. Must not have sex without Vajikarana medicine (Aphrodisiac).
9. Avoid sex when you haven't decided.
10. Avoid sex when you are not aroused.
11. Avoid sex if you haven't had food.
12. Avoid sex if you over eat.
13. Avoid sex if body is in an irregular position.
14. Avoid sex if bed is in an irregular position.
15. Avoid sex if you are having a natural urge (having gas, need to urinate or defecate and other)
16. Avoid sex if you are tired.
17. Avoid sex when fasting.
18. Avoid sex when you are not in isolation.



19. Avoid sex while menstruating as having sex during these days you will not conceive or if you do conceive it will result in miscarriage or abnormality of child.

**Effect of sex those not follow the rules of Vyayaya**

1. If you have sex with menstruating women (it is Adharma – without morals) you lose eyesight, energy and longevity reduces.
2. If you have sex with your Guru's wife or an old woman or at sunset, you lose life energy.
3. If you have sex with a pregnant woman you will cause damage to the unborn baby.
4. If you have sex with a sick woman, it reduces her strength.
5. If you have sex with a woman who hates you, who is unclean or have sex in an unclean place, it reduces your sperm and adversely affects your own mind.
6. If you have sex when you are hungry or your mind is disturbed, when you are weak or thirsty, you lose sperm as well and Vata is provoked.

**Then there are different set of rules regarding sexual union if a couple are trying to have a child (progeny)**

1. This would take Panchakarma treatments of Shodhana to purify the sperm, and ovum first.
2. After the Shodhana, the couple is rejuvenated with the specific proper foods for nourishment to rebuild the system for the conception of the child.
3. Three days from menstruation: there is celibacy maintained, sleeping on the ground, eating from clean vessels, the body is kept unbathed and unkept. On the fourth day, the couple uses unction, takes a head bath, wears white apparel and garlands, having happiness and attraction to each other enter into Mithuna (sexual intercourse)
4. The sex of the child can be chosen as per the day of conception.

**Rules regarding food**

During this conception the woman lays only on her back as any other position aggravates the Doshas. Prone-Vata aggravation, left side-Pitta aggravation, right side – Kapha blocks the uterus. Intake of food in excess, fasting, thirst, fear, dejection, grief, anger, desire for another man, excessive desire for intercourse, with a woman too young, too old, or diseased. All prevents conception or produces abnormalities in the child.

The food that is eaten beforehand should be all wholesome and beneficial as per Ayurveda's understanding of what that is, and it should not be taken in excess but in moderation. The bed should be in an acceptable arrangement and should have

pleasantries such as scent, nice bedding, and it should be comfortable. The man climbs into bed with his right leg first and the woman her left first.

**Effects of Ativyavaya**

अतिव्यवायाज्जयन्तेरोगश्चाऽऽक्षेपकाद्यः । शूलकासज्वरश्वासकार्श्यपाण्डवामयाक्षयाः ॥

(यो.र. रात्रिचर्या 47)

Over indulgence in sexual intercourse causes Akshepaka, Sula, Kasa, Jwara, Shwasa, Karshyata and Panduroga etc.

**Methods of Virya Raksha**

स्नानानुलेपनहिमानिलखण्डखाद्यशीताम्बुदुग्धरसयूषसुराप्रसनाः ।
सेवेतचानुशयनंविरतौरतस्यतस्याऐवमाशुवयुषः पुनरेतिधाम ॥ (यो.र. रात्रिचर्या 45)

After completion of sexual inter course, one should have bath, application of sandal wood paste etc. He should expose to cool air, consume sweets, cold drinks, mutton soup and Sura and should be happy. All these measures prevent loss of strength.

स्नानंसशर्करं क्षीरं भक्ष्यमेक्षवसंस्कृतम । ततोमांसरसः स्वप्नोव्यवायान्तेहिताअमी ॥ (यो.र. रात्रिचर्या 46)

After sexual intercourse, one should take refreshing bath, sugar added milk, sweets, mutton soup. Then one should go for sleep.

शुक्रलैर्जीवनीयैश्चबृंहणैर्बलवर्धनैः । क्षीरसंजननैश्चैवपयः सिद्धंपृथ्क ॥
युक्तंगोधूमचूर्णेनसघृतक्षौद्रशर्कराम । पर्यायेणप्रयोक्तव्यमिच्छताशुक्रमक्षयम ॥ (च.चि. 2/3/6-7)

Milk boiled with Drugs belonging to Shukrala, Jivaniya, Bruhana, Bala Vardhana, and Ksheerasamjanana groups can be administrated separately. Before administration, wheat flour, ghee, honey and sugar should be added. These five recipes should be administrated separately to a person who is desirous of inexhaustible semen.

**Factor which enhance strength**

सद्योमांसं नवान्नं चबालास्त्री क्षीरभोजनम । घृतमुष्णोदकस्नानंसद्यः प्राणकराणिषट ।

(यो.र. रात्रिचर्या 23)

Fresh meat, new rice, Bala Stree, milky food, ghee and warm water or hot water bath these six factors increases the strength.

**Follow the rules and regulation about Maithuna**

त्र्यहाद्वसन्तशरदोः पक्षाद्वर्षानिदाघयोः शीतेरात्रौग्रीष्मेवसन्तेतुदिवानिशि ॥ ( यो.र. रात्रिचर्या 18 )

Timing in accordance with seasons,

Sheetakala (winter) - Night Time



Grishma (summer) - Day Time

Vasanta (spring) - Day or Night Time

Varsha (rainy season) - Megha Garjana (thunder).

Sarad (autum) - one feels the sexual desire, one should indulge in sexual activity.

**Time for sexual intercourse**

वर्षाषुवारिदध्वानेशरत्सुसरसः स्मरः । त्रिभिस्त्रिभिरहोभिर्हिसमेयात्प्रमदांनरः ॥ (यो.र. रात्रिचर्या 19)

According to some other opinion; a wise man should have sexual encounter once in the three days, except in Grishma (summer), where in one can indulge in fifteen days.

सर्वेष्वृतुषुधर्मेषुपक्षात्पक्षादव्रजेदबुधः । आयुःक्षयभयाद्विद्वान्नाह्नि सेवेतकामिनीम ॥ (यो.र. रात्रिचर्या 20)

अवशोयदिसेवेततदाग्रीष्मवसन्तयोः । (यो.र. रात्रिचर्या 21)

Restriction on sex during day time, a wise man should not indulge in sexual intercourse during day time as it may cause Ayukshaya i.e reduction in life span. If one is not self-controlled person, such person should have sex in day time, only in Grishma and Vasanta Rutu only.

**Surataspriha (Libido) through Vajikarana**

As per Charaka Samhita, by proper use of these formulations, one becomes endowed with good physique, potency, strength, and complexion and sexually exhilarated and sexually potent. This in turn is helpful in many common sexual dysfunctions, including Infertility, Premature Ejaculation and Erectile dysfunction. The therapy is preceded by living in strict compliance with the directions mentioned in Ayurved' classics, various methods of body cleansing and other non-medicinal strategies like sexual health promoting conduct, behavior and diet. Certain individualized herbal and herbo-mineral combinations are administered as per the nature of a person according to the Ayurveda. Many limitations need to be considered before considering the use of theses therapy like lack of scientific studies, possibilities of adulteration in the herbal and herbo-mineral combinations available in market and possibilities of unexpected side-effects etc., The article calls upon initiating research in this area so that claims of ancient Ayurvedic texts could be substantiated and Vajikarana Therapy may be utilized by modern medicine.

**Indication of Vajikarana preparations**

As per Ayurveda, it is recommended that the person below 17 years of age and more than 70 years of age should not consume Vajikarana preparations. These preparations have to be consumed by "Jitendriya Purusha" or man who has control on his senses and

desires. If Vajikarana preparations are consumed by "Ajitendriya Purusha" or man who has lost control over his senses and desire, he may prove harmful to society.

**Benefits of sexual intercourse**

आयुष्मन्तोमन्दुजरावपुर्वर्णबलान्विताः सिश्नोपचितमांसाश्चबवन्तिस्त्रीषुसंयताः ॥ (यो.र. रात्रिचर्या 16)

If person follow the rules and methods with respect in his routine sexual activities. His life span increases, aging process also become normal in accordance with age, color, complexion and strength of the body is maintained and his body physique etc. is also maintained well.

**Viryanasaphala-Shukrakshaya**

पूतिमांसंस्त्रियोवृद्धाबालार्कस्तरुणंदधि । प्रभातेमैथुनंनिद्रासद्यः प्राणहरणि ॥ (यो.र. रात्रिचर्या 14)

Fermented food, aged woman, half formed curds, sex in early hours of the day and sleeping in early hours of a day decreases the strength of an individual.

दौर्बल्यंमुखशोषश्चापाण्डुत्वंसदनं श्रम । क्लैब्यंशुक्राविसर्गश्च क्षीणशुक्रस्यलक्षणम् । (च.सू. 17/69)
शुक्रक्षयेमेड्वृषणवेदनाऽशक्तिमैथुनेचिरादवाप्रसेकः प्रसेकेचाल्परक्तशुक्रदर्शनम ॥ (सु.सू. 15)
शुक्रेचिरातप्रसिच्येतशुक्रंशोणितमेववा । तोदोऽत्यर्थवृषणयोर्मेढ्रंधूमायतीवच ॥ (अ.ह.सू. 11)

Dourbalya (weakness), Mukhashosha (dry mouth), Pandu (anemia), Sadana (body ache), Shrama(exhaustion), klaibya (impotency), Chirata Praseta (early ejaculation), Medra Vrushana Vedana (pain in testes and penis), Dhumaayatteva (burning sensation in testes and penis).

**Shukrapradoshaja Roga-diseases due to vitiated semen**

From vitiation of Shukra arise Klaibya (impotency), Aharsana (lack of sexual pleasure), birth of children who are sick, impotent, short life span, distorted shape. It affect both men and women.

# CHAPTER 9 Roganutpadaniya

Human body is an amazing machine which has a number of ways to balance the substance which could be useful and harmful to the body. To make balance of these substances, our body is equipped with Vega (urges) which appears naturally.

Acharya Vagbhata suggested non suppression of natural urges as one of the measures of prevention in Roganutpadaniya Adhyaya. Hemadri elaborating on it mention that without giving importance for time at any time these can be evacuated.

इहानियतकालः । सचपञ्चधा-वेगधारणंवेगोदीरणंशोधनंबृहणं, भूतास्पर्शनंचेति ।
(टिका आयुर्वेदरसायन अ.ह.सू. 4/1)

Five preventive measures like suppression of natural urges, forceful action of unmanifested urges, purification, nourishing and touch by Bhutadi factors should be done irrespective of time.

रोगाः सर्वेऽपिजायन्तेवेगोदीरणधारणैः ॥

Always the diseases are produced due to the Vegadirana and Vegadharana.

Vegadirana-initiation of urges by force

Vegadharana-suppression of urges by force

Roga-disease

Anutpadaniya-prevention of origin

Adharaniya Vega-urges not to be suppressed by force

According to the Ayurvedic texts, there is one main cause of all type of diseases and that is the suppression of natural Vega. Therefore it should not to be suppressed. Ayurveda has described 13 natural Vegas which should not be retained at any cost. If they are suppressed on a regular basis due to any reason, they can lead to various health problems. The problem created due to Non- suppressible urges are getting more and more now a day.

There are two types of natural urges namely Dharaniya Vegas (suppressible urges) and Adharaniya Vegas (non suppressible urges). According to Acharya Charaka, there are 13 types of natural urges in the body which should not be suppressed. In addition to these Vegas, 14th Vega is mentioned by Vagbhata. There is a description of thirteen

Adharaniya Vegas and the disorders caused by suppressing them with their line of treatment.

नवेगानधरयेद्धिमाज्ञातानमूत्रपुरीषयोः । नरेतसोनवातस्यनछर्द्याः क्षवथोर्नच ॥
नोद्गारस्यनजृम्भायानवेगान क्षुत्पिपासयोः । नबाष्पस्यननिद्रायानिःश्वासस्य श्रमेणच ॥ (च.सू. 7/3-4)
वेगान्नधारयेत्वातविष्णुत्रक्षवतृटक्षुधाम । निद्राकासश्रम श्वासजृम्भा श्रुच्छर्दिरेतसाम ॥ (अ.ह.सू. 4/1)

1. Mutra Vega
2. Purisha Vega
3. Shukra Vega
4. ApanaVayu Vega
5. Chardi Vega
6. Kshavathu Vega
7. Udaggara Vega
8. Jrumbha Vega
9. Kshudha Vega
10. Trushna Vega
11. Bashpa Vega
12. Nidra Vega
13. Shramashwasa Vega
14. Kasavega (A/C Vagbhata)

| **Adharaniya Vega** | **AdharaniyaVegajanyaroga Diseases due to suppression of urges** | **Chikitsa- management** |
|---|---|---|
| Mutra Vega Dharana (Suppression of urge of urine) | Pains in the body especially in the Basti Shool (pain in urinary bladder), Mehana Shoola (pain in penis), Mutrakruchata (difficulty in micturition), Shiroruja (headache), Malavrodha (constipation), Vinama (bending the body near to abdomen), Anaha (distension of the abdomen) | Swedana (hot fomentation) over abdomen, Avgahana (hot tub bath), Abhyanga (body massage with oil), Ghrit Avapida (drops of ghee in nose) and Basti karma (enema treatment) Trividhabasti i.e. Niruha, Anuvasana and Uttarbasti is advised. According to Acharya Vagbhata such patients should be administered with large quantities of medicated Ghrita (butter), before and after food, which is known as "Avapidaka Sarpi". |
| Purisha Vega Dharana (Suppression of urge of faeces) | Pakwashaya Shula (pain in large intestine), Shiroshula (headache), Purish Aapravarthanam (obstruction of stool), Vata Apravarthanam (obstruction of flatus), Pindikodveshteana (cramps in | Sneha-(oleation) followed by swedana (hot fomentation) Avagaha (tub bath or steam bath), inserting Varti (suppositories) in to rectum, administering Basti (medicated enema) and use of foods which are |



| | | |
|---|---|---|
| | calf muscles) and Adhmana (distension of abdomen). Bad odor from mouth and sometime Mukhenmalapravrutti (stool comes out from mouth) | Pramathi (laxative) |
| Shukra Vega Dharana (Suppression of urge of discharge semen) | Medra & Vrushan Shula (Swelling and pain at genitals parts especially in penis & testicles), Jwara (fever), Hridhyapida (discomfort in the region of heart) Angamarda (body pain) Mutraavarodha (obstruction during urination), enlargement of scrotum, formation of Shurashamari (seminal calculi) and over a period of time the person may suffer from Klaibyata (impotency) | Abhyanga (medicated oil massage), Avagaha (hot water tub bath), nutritional diet that contains milk, rice, ghee (Clarified butter).These problems should be managed by giving Madira (alcohol) and meat of Charanyudha (chicken of Cock/hen), Rakta Sali (Red colored rice), and Maithuna(indulging in sexual intercourse), Basti (medicated enema) |
| Apanavayu Vega Dharana (Suppression of urge of passing flatus) | Udavarta (painful upward movement of Vayu in abdomen), Adhmana (distension of abdomen) Klama (Exhaustion), Mala Avrodha (obstruction to pass flatus and faeces), Mutrarodha (urine retention), Koshtashula (abdominal pain) Dushtivadha (diminished or loss of vision), Agninaash (loss of appetite) and Hridyaroga. | Snehan (oleation), Swedana (hot fomentation), Avgahana (hot tub bath), Abhyanga (body massage with oil) use of Ushnodak (mild got water) and use of Vatashamak and Anulomak Dravya for food and drink and Basti Prayoga. |
| Chardi Vega Dharana (Suppression of urge of vomit) | Visarap, Kotha (urticaria or rash), Kandu (itching all over the body), Aruchi (anorexia), Vyanga (black colored patch on face), Shotha (oedema or swelling), Pandu (anemia), Jwara (fever), Kushta (Various skin diseases) and Hrillasa (nausea). | Langhan (fasting), Raktamokshan (bloodletting by Jaloka (Leech) or Tumbi etc. use of foods and drinks which are dry i.e. Ruksha Annapana (Without using oil or butter), Dhumpana (medicated smoking) Vyayama (physical exercise) and Virechana Karma (purgation). |

| | | |
|---|---|---|
| Kshavathu Vega Dharana (Suppression of urge of Sneeze) | Shiroshula (headache), Manyasthambha (neck stiffness), Aardit (facial paralysis), Ardhavbhedak (partial headache) and Indriya Dourablya (weakness of sensory organs). | Abhyanga (external oleation of head, shoulders and neck region), Swedan (hot fomentation), Dhumpaan (inhalation of medicinal smoke), use of Nasya (medicated nose drops therapy), Auttarabhaktika-person should consume ghee after meals and follow all the measures which are useful to stabilize the Vata Dosha. |
| Udagar Vega Dharana (Suppression of urge of Belching) | Hikka (hiccup), Shwasa (dyspnoea), Aruchi (reduced interest in meals), Kampa (shivering), feeling of heaviness in chest and heart. | These symptoms are relieved by following all the treatments that are mentioned in the cure of hiccup diseases. |
| Jrumbha Vega Dharana (Suppression of urge of yawning) | Vinama (Bending the body near to abdomen), Aakshepa (convulsions), Sankocha (contractions), Supti (loss of tactile sensation), Kampa (tremors) and Pravepna (more shivering of the body). | Symptoms are relieved by following all measures to stabilize VataDosha. For the treatment of these ailments, one should use drugs for alleviating Vata. |
| Kshudha Vega Dharana (Suppression of urge of hunger) | Krushata (emaciation), Durbalta (weakness), Vaivarna (Discolorations), Angamarda, Aruchi (aversion towards food) and Bhrama (Vertigo) | Symptoms are relieved by giving little quantity of (Snigdha) unctuous, (Ushna) hot and (laghu)light food which is easily digestible |
| Trisnha Vega Dharana (Suppression of urge of severe thirst) | Kanthashosha (Dryness of throat and mouth), Badhirya (deafness), Shrama (tiredness), Sada (exhaustion) and discomfort in the chest. | Treatment of these symptoms is providing cold comforts (residing in cool chamber, cold shower bath followed by food and drinks that are cooling in nature etc. |
| Bashpa Vega Dharana (Suppression of urge of Cry) | Pratishyaya (common cold), headache, Akshiroga (diseases of the eye), Hridroga (diseases of heart), Aruchi (loss of taste) and Bhrama (dizziness) | In such condition one must try to make the person cry or make him sleep comfortably listening to some soothing music or words. |



| | | |
|---|---|---|
| Nidra Vega Dharana (Suppression of urge of sleep) | Jrumbha (more of yawns), Angamarda (Body pain), Tandra (drowsiness), constipation, generalized body pains, Shiroroga (feeling of heaviness in head) and Akshigourav (feeling of heaviness in the eyes). | Such persons should regularly undergo mild oil massage all over the body and Swapna (sleep) during the day for half the time if they were awake during the night |
| Shramashwas Vega Dharana (Suppression of urge of breathe heavily on exertion) | If one tries to suppress the Vega of shwasa after heavy exercise or any physical work, then this urge may lead to Gulma (abdominal tumor), Hridroga (heart diseases), Sanmoha (fainting and delusions) and over a period of time can cause respiratory tract disorders. | Its treatment includes all measures for vitiated Vata Dosha and complete rest. In such conditions the person must take rest followed by Vata pacifying diet |
| Kasa Vega Dharana (Suppression of urge of coughing) | Shwasa (dyspnea), Aruchi (anorexia -loss of appetite), Hruda Roga (heart disease), Shosha (emaciation) and Hikka (hiccups) | The natural remedy for cough like Sitopaladichurna, Talisadichurna or Yashtirnadhuchurna with honey or warm water should be given to the patient repeatedly. |

**Dharaniya Vega-suppressible urges**

धारयेत्तुसदावेगानहितैषीप्रत्यचेह । लोभर्ईष्याद्विषमात्सर्यरागादीनांजितेन्द्रिय ॥ (अ.ह.सू. 4)

इमांस्तुधारयेदवेगानहितार्थीप्रेत्यचेहच । साहसानानशस्तानांमनोवाककायकर्मणाम ॥ (च.सू. 7/26)

One desirous of Hita (well-being) during his life time and after, should suppress urges relating to Manasa, Vaka and Kaya like Sahasa (work beyond one's own capacity), Ashasta (improper activities).

**Ashastama Manasa Karma-improper activities related to mind**

लोभशोकभयक्रोधमानवेगानविधारयेत । नैर्लज्जेर्ष्यतिरागाणामभिध्यायाश्चबुद्धिमान ॥ (च.सू. 7/27)

Lobha (greed), Shoka (grief), Bhaya (fear), Krodha (anger), Mana (vanity), Nirlajja (shameless), Irshya (jealousy), Atiraga (over attachment), Abhidya (desire for others property), one should suppress above said urges.

**Ashastama Vacana Karma- improper activities related to speech**

पुरुषस्यातिप्रस्यसूचकस्यानृतस्यच । वाक्यस्याकालयुक्तस्यधारयेदवेगमुत्थितम ॥ (च.सू. 7/28)

Parusha (hard words), Atimatra (talkative), Suchaka (back biting), Anrita (lying), Akalayukta (use of untimely words) one should suppress above said urges.

**Ashastama Deha Karma- improper body activities which are injurious to others**

देहप्रवृत्तिर्याकाचिद्विद्यतेपरपीडया । स्त्रीभोगस्तेहिंसाद्यातस्यावेगान्विधारयेत ॥ (च.सू. 7/29)

Streebhoga (adultery), Steya (theft), Himsa (hurting) one should suppress above said urges.

**Benefits of Dharaniya Vegas**

पुण्यशब्दोविपापत्वान्मनोवाककायकर्मणाम । धर्मार्थकामानपुरुषः सुखीभुक्तेचिनोतिच ॥ (च.सू. 7/30)

Being free from sins of Mana (mind), Vaka (speech) and Kaya (body), a happy man enjoys and acquires Dharma , Artha and Kama.

**Importance of Shodhana Chikitsa / Purifactory Therapiesa**

यतेतेचयथाकालंमलानाम्शोधनंप्रतिअत्यर्थसञ्चितास्तेहि क्रुद्धाः स्युर्जीवितच्छिदः । (अ.ह.सू. 4)

All our efforts should be made to clear out the Malas (Doshas and waste products) at appropriate times, accumulation leads to their aggravation and even death.

दोषाः कदाचित्कुप्यन्तिजितालङ्घनपाचनैः । येतुसंशोधनैः शुद्धानतेषांपुनरुभ्यदवः ॥ (अ.ह.सू. 4)

The Doshas which are mitigated by Langhana and Pachana therapies might sometimes become aggravated again but those which are cleared by Samshodhana Therapies will not get aggravated again.

यथाक्रमंयथायोगमतऊर्ध्वप्रयोजयेत । रसायनानिसिद्धनिवृष्ययोगांश्चकालवित ॥ (अ.ह.सू. 4)

The physician who knows the proper time of every therapy should administer them in proper procedure and proper degree; later on administer appropriate effective Rasayana (rejuvenators) and Vajikarana (aphrodisiacs) Yogas.

**Elimination of Doshas According to Rutu (Seasons)**

शीतोत्स्दवंदोशचयंवसन्तेविशोधयनग्रीष्मजंअभ्रकाले ।
घनात्ययेवार्षिकमाशुसम्यकप्राप्रोतिरोगान ऋतुजान्न जातु ॥ (अ.ह.सू. 4)

Accumulation of Doshas arising from cold season should be expelled during Vasanta or spring, arising Doshas in Grishma /summer should be expelled during Abhrakala or Varsha or rainy season, arising Doshas in Varsha be expelled during Ghanatyaya or Sarad or autumn. By this People will not become victims of diseases born by the effect of seasons.

# CHAPTER 10 Rasayana for Swastha

Every individual in this world want to live healthy for a long period of time. Even though the term Swastha is sufficient to cover all concepts of health, for the maintenance of this status Rasayana for Swastha is recommending. Rasayana Chikitsa i.e. the rejuvenation therapy is explained in Ayurveda for the healing and rejuvenation of living tissues.

Rasayana is one among the eight clinical specialties of Ayurveda. It is not only a drug therapy but a specialized procedure practiced in the form of rejuvenate recipes, dietary regimen and special health promoting conduct and Behavior i.e. Achara-Rasayana.

Rasayana means the way to attain excellent Rasa i.e., to attain longevity, memory, intelligence, youthful age, excellence of luster, complexion and voice, optimum strength of physique and sense organs, successful words, respect, ability and brilliance along with freedom from ailments.

**Historical Aspects**

Rasayana is described elaborately in the four Padas of the 1st chapter in Cikistha Sthana of charka Samhitha. In Susrutha Samitha the references are available in 27-29 chapters of Chikista Sthana & in Astangahrudya of Vagbhata from Uttara Sthana.

**Vyutapathi-Nirukti**

Etymologically the term Rasayana comprises of components, vis. Rasa and Ayana.

Rasa - Dhatu and
Ayana - Movement

Which help the Rasa Raktadi Dhatus to reach their destination proper-Shabdha Kalpa Druma.

Rasa is that which is getting transformed day by day- Amarakosha

Rasayana is nutritional transportation in the body. It refers to the acquisition, movement or circulation of nutrition to nourish the body and enrich tissue perfusion.

**Paribhasha-(Defination of Rasayana)**

लाभोपायोहिशस्तानांरसादिनांरसायनम । (च.चि. 1/1/7, अ.ह.उ. 39/1)

A procedure by which Rasadisapta Dhatu is sanctified in all respect through proper nourishment is known as Rasayana.

Acharya Sushruta while making a reference to the branch, terms it to be the science of Rejuvenation, which is the attainment of longevity, possessing anabolic capacity improvement of mental faculty and also gaining immunity against and overcoming any existing diseases.

Dalhana defines Rasayana as "A therapy through which the drugs prevents the senility, cures the diseases, preserve the youthful state and act as restorative."

यज्जराव्याधिविध्वंसिवयः स्तम्भकरम्तथा । चक्षुष्यंबृहणंवृष्यंभेषजंतद्रसायनम ॥ (भा.प्र.)

A therapy which stops or prevents the senility and cures the diseases is known as Rasayana.

रसायनञ्चतज्ज्ञेययज्जराव्यादिजनाशनम । यथाअमृतारुदन्तीचगुग्गुलुञ्चहरितकी ॥ (शा.सं.प्र.ख. 4/23)

Rasayana as which does the Vyadhi Nashana is nothing but Rasayana.

देहस्येन्दियदन्तानांद्रढिकरणमेवच । वलिपलितखलित्यवर्जनोऽपिचक्रिया ॥
पूर्ववैद्यप्रणीतंहितद्रसायनमुच्यते । (हा.सं. 1/23)

A therapy which strengthens the body, organ system, and tooth and prevents the wrinkling of skin, whitening hair, loss of hair, baldness is known as Rasayana.

**Types of Rasayana**

A comprehensive classification of Rasayana is available in Sushruta Samhita which was further improved by the commentator Dalhana.

Classification of Rasayana according to the classical description.

A) According to mode of administration
   i) Kutipraveshika Rasayana
   ii) Vatatapika Rasayana

B) According to objective
   i) Kamya Rasayana
      a) Pranakamya
      b) Medhakamya
      c) Shrikamya
   ii) Naimittika Rasayana
   iii) Ajasrika Rasayana

C) Special Rasayana drugs and measures
   i) Medhya Rasayana
   ii) Achara Rasayana



D) According to the effect
   i) Samshodhan Rasayana
   ii) Samshamana Rasayana

E) According to use Sushruta explains the concept of Rasayana in 4 chapters in ChikitsaSthana where he classifies them according to their utility.
   i. Sarvopaghata Shamaneeya
   ii. Medhayushya Kameeya
   iii. Swabhava Vyadhi Pratishedhaniya
   iv. Nivrutta Santapeeya

F) Rasayana based on drug, diet and life style.
   1. Aushdha Rasayana - Drug Based Rasayana.
   2. Ahara Rasayana - Dietary Rasayana.
   3. Achara Rasayana - Lifestyle Rasayana.

**Kutipraveshika Rasayana**

It is a type where Samshodhana karma is essential. After Samshodhan patient into a specially constructed therapy chamber called Trigarbhakuti. He has to follow specific code and conduct of life with strict diet control. It is said that if Kutipraveshika Rasayana is carried out as per the norms laid down it leads to complete bio-physical transformation of man.

**Vatatapika Rasayana**

It is indicated in those patients who do not have enough resources and who cannot afford intensive rejuvenative care. This therapy is used while leading normal life. Samshodhan karma is not essential in such cases.

**Ajasrika Rasayana**

It is used in the form of Satvika Ahara consisting of Ghrita, Ksheera etc. constant use of such nourishing diet produces nonspecific Rasayana Prabhava in the body.

**Naimittika Rasayana**

It is used in the management of specific disease are known as Naimittika Rasayana.

Some Rasayana agents possess Medhakara effect and hence they are specially known as Medhya Rasayana. Medhya means anything that is beneficial for Medha, which is responsible for Dhi (Intelligence), Dhruti (retention power) and Smruti (Memory).

Achara Rasayana means rejuvenating life style with social and personal conduct by which one can acquire the Rasayana effect. It includes improved personal behaviors,

social behaviors and Satvika ahara. Achara Rasayana is essentially a non pharmacological approach to social and mental health care leading in turn to positive health and longevity.

There are certain Rasayana drugs which when used may induce Vamana, Virechana karma in the body and thus the body gets purified. The vitiated Doshas are expelled for the body. These are called Samshodhan Rasayana. Samshamana groups of drugs produce Rasayana effect in the body restoring Doshasamya are internal homeostasis and metabolic constancy.

**Rasayana Prayojana**

Acharya Charaka describes the merits and uses of Rasayana therapy as it provides longevity (Dheergayu), promotes memory, intellect (Smriti, Meda), health (Arogya), youth preservation (Tarunyavaya), excellence of luster (Prabha), complexion (Varna), excellence of voice (Swaroudarya), excellent potentiality of body and sense organ (Deha, indriyabala), inpaliable utterance (Vaksiddhi), respect and brilliance.

Charaka further adds it prevents the ageing of body tissue (Vayasthapana), vitalization and reactivation (Nidra, Tandra, Shrama, Klama, Alasya, and Dourbalyahara), homeostasis of Tridosha, strengthens the flaccid muscles (AbaddhaMamsahara), and promotes digestion and metabolism (Agnisaudhookshana) and Delayed onset of aging.

The effect of Rasayana-Rasayana agent promotes nutrition through one of the following three modes:

1. Direct enrichment of the nutritional quality of Rasa (nutritional plasma) eg: Satavarai, milk, ghee etc.
2. Promoting nutrition through improving Agni (digestion & metabolism) - eg: Bhallataka, Pippali etc.
3. Promoting the competence of Srotas (microcirculatory channels in the body) – eg: Guggulu.

Chakrapani explains that a person undergoing Rasayana may attain healthy ageing (Sukhayu and longevity that exceeds 100 yrs. by preventing and cure of senility).

Dalhana explains the merits and uses of Rasayana as, it increases and maintains the optimum level of all body elements prevents and cures senility (Jarapaharana) diseases. (Rogapaharana)

Indu the commentator of Astanga Sangraha adds one more action to above list. He says that Rasayana has cosmetic effect on the body and complexion. Thus embellishes and glorifies the body beauty.



The rejuvenator group of herbs traditionally termed as 'Rasayana' has micronutrients which improve health, immunity, vigor, vitality and give longevity as well as protection against stress. All these actions of certain Rasayana herbs have now been scientifically proved through experimental as well as clinical studies.

**Probable Mode of Action of Rasayanaa**

Acharya Sushruta explains that, the basic objectives of Rasayana are,

1) Vayasthapana - preventing the aging of body tissues
2) Ayukara - provide longevity
3) Medhakara-m promotion of intelligence, learning and memory
4) Balakara - provide strength
5) Rogapaharana - prevention and cure of diseases by diseases by promoting body immune system.

These objective are fulfilled by the following actions of Rasayana,

1) Agni sandhookshana- promoting digestion and metabolism
2) Doshasamyakaram- achieving, homeostasis of Doshas
3) Dhatuvardhana- improving Dhatuposhana
4) Srotoprakritisthapana- promoting competence of Srotas
5) Manaprasannata- promoting mental endurance.

**Agni sandhookshana** - Agni has been given pivotal role in the delicate balance between health and diseases. According to charaka 'Agni' is responsible for life, the body tissue, strength and complexion of a person.

Charaka further opines that Rasayana promotes digestion and metabolism. Their by proper production of rasa (nutritional essence of food) and elimination of the toxic metabolites and pollutants is achieved which in turn promote Dhatu poshana.

**Doshasamyakaram** - Provocation of Vata is the prime responsible factor for the process of physical and mental aging. Bhavaprakasha opines that the rasa shoshana is the resultant of provacated Vata which results in cellular senescence. Hence prime importance should be given to treat vata. Aging also brings derangement in other Dosha like Kapha and Pitta. Charaka explained that Rasayana by its Achintya and Adbutaprabhava does the equilibrium of Vata, Pitta and Kapha. This becomes responsible to restore normal physical and mental activities.

**Dhatuvardhana** - Rasayana agents might enrich the nutritional quality of Poshaka Rasa as most of them physically contain high quality of nutrients in their bulk and when administered, they are added to the pool of nutrition present in the Poshaka Rasa and in turn help in improving in Dhatuposhana.

The improvement in Dhatus results in promotion of Ojus which is considered as the quite essence of all Dhatus of the body. It is this Ojus which is responsible for imparting Bala in an individual. Bala or resistance or Vyadhikshamatva is responsible for an individual to guard himself against diseases and infection.

**Srotoprakritisthapana -** The Rasayana drugs promote the competence of Srotas leading to the better bio-availability of nutrients to the tissues and improve the tissue perfusion. This is another mode through which Rasayana agent may help in promotion of nutritional status.

**Manaprasannata -** As Manas are Panchabhoutika its nourishment depends on the food. Rasayana by its enrich nutritional quality and Achintyaprabhava it becomes responsible to maintain all the psychological functions under normal status.

Thus Rasayana drugs by the virtue of their Rasa, Guna (physico- chemical property), Veerya (metabolic effect), Vipaka (bio-transformation) and Prabhava (inexplicable effect), promotes digestion, metabolism, maintains homeostasis of Dosha, enriches nourishment and promotes body and mental functions. Thus becomes efficient therapy in treating aging.

# CHAPTER 11 Ashtanidinditya Purusha (Eight Abnormal Constitution)

इहखलु शरिरमधिकृत्याष्टौ पुरुषानिन्दिताभवन्ति; तद्यथा–अतिदीर्घश्च, अतिह्रस्वश्च, अतिलोमच, अलोमाच, अतिकृष्णश्च, अतिगौरश्च, अतिस्थूलस्य, अतिकृशश्चेति ॥ (च.सू. 21/3)

Depending on the physical appearance, there are 8 types of Nindita Purusha.

1. Atidirgha - excessively tall
2. Atihrasva - excessively short
3. Atiloma - excessively hairy
4. Aloma - hairless
5. Atikrishna - excessively black
6. Atigaura - excessively white
7. Atisthula - excessively obese
8. Atikrisha - excessively emaciated

तत्रातिस्थूलकृशयोर्भूयएवापरेनिन्दिताविशेषाभवन्ति । (च.सू. 21/4)

Out of these eight Atisthula and Atikrusha are considered as Nindita Purusha. (most unwanted constitution)

Atisthula Ashta Dosha (Eight defect in obese)

अतिस्थूलयतावदायुषो ह्रासो जवोपरोधः कृच्छ्रव्यवायतादौर्बल्यंदौर्गन्ध्यंस्वेदाबाधः क्षुदतिमात्रंपिपासातियोगश्चेति भवन्त्यष्टौ दोषाः । (च.सू. 21/4)

Ayushohrasa (reduced lifespan), Javoparodha (Slow in movement), Krucchravyavyaata (difficulty in sexual intercourse), Daurbalya (weakness), Daurgandhya (Bad Smell), Svedabadha (excessive sweating), Kshudatimatra (excessive hunger), Pipasatiyoga (excessive thirst).

**Atisthulya Hetu (aetiology of excessive obese)**

तदतिस्थौल्यमतिसंपूरणादरुमधुरशीतस्निग्धोपयोगादव्यायामातअव्यवायाद्दिवास्वप्नाद्धर्षनित्यत्वादचिन्तनाद्बीजस्वभावाच्चचोपजायते । (च.सू. 21/4)

Atisthulya is caused by :

| | |
|---|---|
| **Aharaja Nidana– Related to food** | Atisampuranat- excessive intake of foodGuru Mdhura Sheeta Snigdhopayogaat- intake of heavy, sweet, cold, and unctuous foods. |
| **Viharaja Nidana- Related to regimen** | Avyayama- not doing physical exercise Avyavaya- Abstinence from sexual intercourse Diwasvapna- indulging in day sleep |
| **Manasika Nidana- Mental factor** | Harshanityatvat-uninterrupted cheerfulness Acintanat-lack of worries and |
| **Bijaswabhava** | Heredity |

तस्य ह्यतिमात्रमेदस्विनो मेदएवोपचीयतेनतथेतरेधातवः, तस्मादस्यायुषो ह्रासः, शैथिल्यात सौकुमार्याद गुरुत्वाच्चमेदसो जवोपरोधः, शुक्राबहुत्वा न्मेदसाऽऽवृतमार्गत्वाच्च कृच्छ्रव्यवायता, दौर्बल्यमसत्वाद्धातूनां, दौर्गन्धं मेदोदोषान्मेदसः स्वभावात स्वेदनत्वाच्च मेदसः श्लेष्मसंसर्गा द्विष्यन्दित्वाद्वहुत्वाद्वहुत्वादगुरुत्वात व्यायामसहत्वाचास्वेदाबाधः, तीक्ष्णाग्नित्वातप्रभूतकोष्ठवायुत्वाच्च क्षुदतिमात्रंपिपासातियोगश्चेति ॥ (च.सू. 21)

| अतिस्थूलस्य अष्टौ दोषा (8 defects of obese) | हेतुविशेषन (specific causes) |
|---|---|
| आयुषो ह्रास- reduced lifespan | There is excessive of fat in him and further only fat is accumulated but not the other Dhatus. |
| जवोपरोध-Slow in movement | Saithilya (looseness), Saukumarya (softness) Gurutva (heaviness) |
| कृच्छ्रव्यवायता-difficulty in sexual intercourse | Shukrabahutva (less quantity of semen) Medasavruta-margatva (obstruction of channels of semen by Medas) |
| दौर्बल्यं-weakness | Asamatvata Dhatunaama (equilibrium of Dhatu is disturbed) |
| दौर्गन्ध्यं-Bad Smell | Bad smell due to defect and nature of Medas and excessive sweating |
| स्वेदाबाध-excessive sweating | Sheshma Samsargata- Combination With Kapha Vishyanditvaata – Liquefactions Bahutvata- Abundant Gurutvata- heavy |
| क्षुदतिमात्रं- excessive hunger<br>पिपासातियोग-excessive thirst | Tikshnagni-increased digestive power Prabhutakos-thavayu- presence of Vayu in koshtha excessively. |



**Atisthula Purusha Dosha, Hetu Svarupa (Pathogenesis of obesity)**

मेदसाऽऽवृतमार्गत्वाद्वायुः कोष्ठेविशेषतः । चरनसंधुक्षयत्यग्निमाहारंशोषयत्यपि ॥
तस्मातसशीघ्रंजरयत्याहारंचातिकाक्षति । विकारांश्चाश्नुतेघोरानकांश्चित्कालव्यतिक्रमात ॥
एतावुपद्रवकरौविशेषादग्निमारुतौ । एतौहिदहतः स्थूलंवनदावोवनंयथा ॥
मेदस्यतीवसंवृद्धेसहसेवानिलाद्यः । विकारानदरुणानकृत्वानाशयन्त्याशुजीवितम ॥ (च.सू. 21/5-8)

Due to obstruction of passage by Medas, Vayu, specially moving in the kostha causes Agni Sandhukshana (stimulation of digestive fire) and Ahara Shoshana (Absorption of food). Hence the person digests the food very quickly and desire more food. If food is not taken in proper time, he is subjected to serous disorders. These Agni and Vayu are most troublesome factors which burn the Sthula as forest fire which burn the forest. Due to excessive increase of Medas, the Vayu etc. Doshas are aggravated all of a sudden, producing serious disorder leading to instantaneous death.

**Atisthula Lakshana-(features of obese)**

मेदामांसातिवृद्धत्वाच्चलस्फिगुदरस्तनः । अयथोपचयोत्साहोनरोऽतिस्थूलउच्यते ॥ (च.सू. 21/9)

The person is called Atisthula, due to excessive increase Meda and Mamsa, ativrudhdi of buttock, abdomen, and breast become pendulous. His strength is rendered disproportionate with his physical growth.

**Disadvantage of obese**

सततंव्याधितावेतावतिस्थूलकृशौनरौ । सततंचोपचयौहिकर्शनैर्बृंहणैरपि ॥
स्थौल्यकार्श्येवरंकार्श्यंसमोपकरणौहितौ । यद्यभौव्याधिरागच्चेतस्थूलमेवातिपीदयेत ॥ (च.सू. 21)

Sthula Purusha and Krusha Purusha are more prone to diseases. They are to be treated repeatedly with Karshana and Bruhana Cikitsa. Out of these two Karshya is better than Sthulya, because if both get affected with diseases, then Sthula person suffers more.

**Principles of management in obesity and emaciation**

गुरुचातर्पनं चेष्टं स्थूलानांकर्शनम्प्रति । कृशानांबृंहणार्थचलघुसंतर्पणंच्यत ॥ (च.सू. 21/20)

Guru, Atarpana substances do Karshana in Sthula person. Similarly Laghu Santarpana substances do Bruhana in Karshya persons.

**Management of obesity**

वातघ्नान्यन्नपानानिश्लेष्ममेदोहराणिच । रुक्षोष्णाबस्तयस्तीक्ष्णारुक्षाण्युद्वर्तनानिच ।
गुडूचीभद्रमुस्तानांप्रयोगस्तैफलस्तथा । तक्रारिष्टप्रयोगश्च प्रयोगोमाक्षिकस्यच ॥
विडगंनागरं क्षारः काललेओहरजोमधु । यवामलकचूर्णचप्रयोगः श्रेष्ठ उच्यते ॥

बिल्वादिपपञ्चमूलस्यप्रयोगः क्षौद्रसंयुतः । शिलाजतुप्रयोगश्चसाग्निमन्थरसः परः ॥
प्रशातिकाप्रियगुश्चश्यामाकायवकायवाः । जूर्णाह्वाकोद्रवामुद्गाः कुलथाश्चमुद्रकाः ॥
आढकीनांचबीजनिपटोलामलकैः सह । भोजनार्थंप्रयोज्यानिपानंचानुमधूदकम ॥
अरिष्टांश्चानुपानार्थे मेदोमांसकफापहान । अतिस्थौल्यविनासायसंविभज्यप्रयोजयेत ॥

(च.सू. 21/24-27)

Food and drinks having property of reduce Vata and reduce Kapha and Meda. Basthi prepared with Ruksha, Ushna, Tikshana Dravya, Ruksha Udavartana.

Administration of Guduchi, Devadaru, Musta, Triphala, Takrarishta, Makshika are indicated.Intake of vidanga, Nagara, Kshara, Bhasma of Loha mixed with Madhu.Yava Churna and Amalaka Churna with Madhu are advised. Bilwadipanchamula with Kshoudra, Shilajatu with decoction of agnimantha is indicated in obesity. Prashatika, Priyangu, Shyamaka, Yavaka, Yava, Jurnahva, Mudga, Kodrava, kulattha, Cakramudgaka, Adhaki, Amalaka are used as diet with Madudaka or Arishta which reduces Meda, Mamsa and Kapha.

अतिकार्श्य निदान–

वक्ष्यतेवाच्यमतिकार्श्यत्वतः परम ॥ सेवा रुक्षान्नपानानां लधनंप्रमिताशनम ।
क्रियातियोगः शोकश्चवेगनिद्राविनिग्रहः ॥ रुक्षस्योद्वर्तनंस्नानस्याभ्यासः प्रकृतिर्जरा ।
विकारानुशयः क्रोधः कुर्वन्त्यतिकृशंनरम ॥ व्यायाममतिसौहित्यं क्षुत्पिपासामयौषधम ।
कृशोनसहतेतव्ददतिशीतोष्णमैथुनम ॥ प्लीहाकासः क्षयः श्वासोगुल्मोऽर्शास्युदराणिच ।
कृशंप्रायोऽभिधावन्तिरोगाश्चग्रहणीगताः ॥ (च.सू. 21/10-14)

| | |
|---|---|
| **Aharaja Nidana Related to food** | RukshaAnnapanasevana- intake of Ruksha food and drinks<br>Langhana - fasting<br>Pramitasana- intake of food in inadequate quantity |
| **Viharaj Nidana Related to regimen** | Vegavinigraha- Suppression of Natural Urges<br>Nidraviningraha-Suppression of Sleep<br>Rukshasyodvartana- Massage with dry Substances<br>Snanasyabhyasa- repeated baths |
| **Manasika Mental factor** | Shoka-grief<br>Krodha- Anger |
| **Beejaswabhava** | Prakruti- Heredity |
| **Miscellaneous** | Kriyatiyoga- over administration of elimination therapies<br>Jara- old age Vikaranushaya- continued illness |

Karshya person cannot withstand the Vyayama, Atisauhitya (intake of food in large quantity), Kshuta (hunger), Pipasa (thirst), Amaya, Ausadha, Atisheeta, Atiushna, Atimaithuna etc. Karya person is susceptible to PlihaRoga, Kasa, Kshaya, Swasa, Gulma, Arsha, Udara, Grahani etc.



**Atikarshya Lakshana (features of emaciation)**

शुष्कस्फिगुदरग्रीवोधमनीजालसन्ततः । त्वगस्थिशेशोऽतिकृशः स्थूलपर्वानर्तोमतः ॥

Emaciated Sphika (buttocks), Udara (abdomen), Griva (neck), Dhanijalasanthata (vascular network in the skin), Sthulaparva (joint are predominantly seen), Twagasthisesa (appearance as if only skin and bone are present).

अतिकृशचिकित्सा–

प्रजागरंव्यवायंचव्यायामंचिन्तनानिच । स्थौल्यमिच्छनपरित्युक्तं क्रमेणाभिप्रवर्धयेत ॥
स्वप्नोहर्षः सुखाशय्यामनसोनिर्वृतिः शमः । चिन्ताव्यवायव्यायामविरामः प्रियदर्शनम ॥
नवान्नानिनवंमद्यंग्राम्यानूपौदकारसाः । संस्कृतानिचमांसानिदधिसर्पिः पयंसिच ॥
इक्षवः शालयोमाषागोधूमागुडवैकृतम । बस्तयः स्निग्धमधुरास्तैलाभ्यगसर्वदा ॥
स्निग्धमुद्वर्तनंस्नानंगन्धमाल्यनिषेवणम । शुक्लंवासोतथाकालमूद्दोषाणामवसेचनम ॥
रसायनानांवृष्याणांयोगानामुपसेवनम । हत्वाऽतिकार्श्यमाधत्तेनृणामुपचयंपरम ॥
अचिन्तनाच्चकार्याणांध्रुवम्संतर्पणेनच । स्वप्नप्रसगाच्चनरोवराहइवपुष्यति ॥ ( च.सू. 21 )

Person desirous of Sthaulya should avoid Prajagara (keeping awake at night), Vyayaya (sexual intercourse), Vyayama (physical exercise) and Cintana (metal exercise/ worries).

Person should gradually adopt diet and regimens Swapana (sleep ), Harsha (cheerfulness), Sukha Shayya ( comfortable bed), Manaso Nirvrutti ( indulgence of mind in its objects which calm it), Shama (calmness of mind ),Virama ( not indulging in Chinta, vyavaya, Vyayama etc.), Priyadarshan ( pleasurable sights), Nava Anna and Madya, Meat soup of Gramya (domestic), Anupa, Audaka (aquatics ) animals, Dadhi, Sarpi, Milk, Ikshu, Shali, Masha, Godhuma, Gudavaikruta, etc. Basthi- Madhura, Snigdha, Taila, Abhyanga, Snigdhama Udavartana, Snana, use of scents and garlands, Yathakala Doshanama Avasecana (elimination of Dosha according to season), Upasevana-intake of Rasayana and Vrusha Yoga. These remove Atikarshya and bring Upachaya (nourishment of the body), Acintanat Karyanam (free from anxiety about work), Santarpana (nourishing therapy), Swapnaprasanga (excessive indulgence in sleep) make person like Varaha .

**Prashastapurushalaksana/Aninditiya Purusha (desirable person)**

सममांसप्रमाणस्तुसमसम्हननोनरः । दृढेन्द्रियोविकाराणांनबलेनाभिभूयते ॥
क्षुत्पिपासातपसहः शीतव्यायामसंसहः । समपक्तासमजरः सममांसचयोमतः ॥ (च.सू. 21/18-19)

Samamamsa Pramana- person having proportionate musculature
Samasamhanana- person having proportionate compactness
Drudhendriya- process very strong sensory and motor organs
Vikaranam Na Balenabhibhuyate- can overcome the onslaught of disease
Saha- Can withstand- Kshuta (hunger), Pipasa (thrist), Atapa (heat of sun)
Samsaha- Can tolerate- Sheeta, Vyayama
Samapakta- proper digestion
Samajara- proper Aging
Samamamsa Caya- proper nourishment of muscle tissue.

# CHAPTER 12 Menstrual Hygiene

Menstruation is a phenomenon unique to the females. The onset of menstruation is one of the most important changes occurring among the girls during the adolescent years. The first menstruation (menarche) occurs between 11 and 15 years with a mean of 13 years.

Adolescent girls constitute a vulnerable group, particularly in India where female child is neglected one. Menstruation is still regarded as something unclean or dirty in Indian society. The reaction to menstruation depends upon awareness and knowledge about the subject. The manner in which a girl learns about menstruation and its associated changes may have an impact on her response to the event of menarche. Although menstruation is a natural process, it is linked with several misconceptions and practices, which sometimes result into adverse health outcomes.

Hygiene-related practices of women during menstruation are of considerable importance, as it has a health impact in terms of increased vulnerability to reproductive tract infections (RTI). The interplay of socio-economic status, menstrual hygiene practices and RTI are noticeable. Today millions of women are sufferers of RTI and its complications and often the infection is transmitted to the offspring of the pregnant mother.

Women having better knowledge regarding menstrual hygiene and safe practices are less vulnerable to RTI and its consequences. Therefore, increased knowledge about menstruation right from childhood may escalate safe practices and may help in mitigating the suffering of millions of women.

Why considering menstrual hygiene is important for all?

Globally, approximately 52% of the female population (26% of the total population) is of reproductive age. Most of these women and girls will menstruate each month for between two and seven days. Menstruation is a natural part of the reproductive cycle, in which blood is lost through the vagina. However, in most parts of the world, it remains taboo and is rarely talked about. As a result, the practical challenges of menstrual hygiene are made even more difficult by various socio-cultural factors. To manage menstruation hygienically, it is essential that women and girls have access to water and sanitation. They need somewhere private to change sanitary cloths or pads; clean water for washing their

hands and used cloths; and facilities for safely disposing of used materials or a place to dry them if reusable. There is also a need for both men and women to have a greater awareness of menstrual hygiene. Currently, cultural practices and taboos around menstruation impact negatively on the lives of women and girls, and reinforce gender inequities and exclusion.

Menstrual hygiene has been largely neglected by the water, sanitation and hygiene (WASH) sector and others focusing on sexual and reproductive health, and education. As a result, millions of women and girls continue to be denied their rights to WASH, health, education, dignity and gender equity. If the situation does not change, it may not be possible for development programmes to achieve their goals.

**What is menstruation**

Girls typically start to menstruate ('the time of menarche') during puberty or adolescence, typically between the ages of 10 and 19 years. At this time, they experience physical changes (e.g. growing breasts, wider hips and body hair) and emotional changes due to hormones. Menstruation continues until they reach menopause, when menstruation ends, usually between their late forties and mid-fifties. Menstruation is also sometimes known as 'menses' or described as a 'menstrual period'.

**The female reproductive system**

The menstrual cycle is usually around 28 days but can vary from 21 to 35 days. Each cycle involves the release of an ovum (ovulation) which moves into the uterus through the fallopian tubes. Tissue and blood start to line the walls of the uterus for fertilisation. If the egg is not fertilized, the lining of the uterus is shed through the vagina along with blood. The bleeding generally lasts between two and seven days, with some lighter flow and some heavier flow days. The cycle is often irregular for the first year or two after menstruation begins.

**Menstrual cycle**- Most women and girls suffer from period pains such as abdominal cramps, nausea, fatigue, feeling faint, headaches, back ache and general discomfort. They can also experience emotional and psychological changes (eg heightened feelings of sadness, irritability or anger) due to changing hormones. This varies from person to person and can change significantly over time.

Menstruation is a natural process linked to the reproductive cycle of women and girls. It is not a sickness, but if not properly managed it can result in health problems which can be compounded by social, cultural and religious practices.

**Cultural beliefs, social norms and myths**

Many cultures have beliefs or myths relating to menstruation. Almost always, there



are social norms or unwritten rules and practices about managing menstruation and interacting with menstruating women. Most cultures have secret codes and practices around managing periods. Some of these are helpful but others have potentially harmful implications. Many myths and social norms restrict women and girls' levels of participation in society. This can make their daily lives difficult and limit their freedom. For example, in some cultures, women and girls are told that during their menstrual cycle they should not bathe (or they will become infertile), touch a cow (or it will become infertile), look in a mirror (or it will lose its brightness), or touch a plant (or it will die).

**Infections related to the reproductive tract-**

Girls and women may be more at risk of infections during menstruation. Some of the common infections associated with the reproductive tract are noted below:

1. Bacterial Vaginosis
2. Vulvovaginal Candidiasis (Thrush)
3. Chlamydia
4. TrichomonasVaginalis
5. Gonorrhoea
6. Syphilis
7. Hepatitis B
8. HIV
9. Urinary tract infections
10. Pelvic Inflammatory Disease
11. Vaginitis

While menstruation may make a girl or woman more susceptible to infection, sexually transmitted infections (STIs) only occur through having unprotected sex. The term reproductive tract infection (RTI) includes sexually and non-sexually transmitted infections.

What hygiene practices should be followed during menstruation?

1. Change napkins regularly
2. Remember to take change of napkins whenever going out
3. Wash the genital area after each use of the toilet, also after urination
4. Keep the area between the legs dry otherwise soreness and chaffing may develop.
5. One can take bath every day during menstruation.
6. Do not wash inside of vagina with soap or any other product.

What if using cloth?

1. Ensure that clean, soft, dry and absorbent cloth is used.
2. In case, it is being reused, it must be washed thoroughly and dried in private but sunny place.
3. After drying, if possible it should be ironed.
4. Store in a clean and dry place
5. Do not share this cloth with anyone.
6. After multiple uses, dispose off this cloth.

How often to change sanitary napkin-

- Change at least once a day.
- Changing every six-eight hours is recommended.
- During heavy menses, may need to change every 3-4 hours.
- Do not keep till completely soaked.

What are advantages of sanitary napkin?

- Sanitary napkin can be used and disposed in a much easier way as compared to cloth.
- It has absorbent material layer, which provides a dry feeling.
- Decreases chances of infections.
- Helps in mobility and ease of daily routine work.

# Paper-I

# **Yoga & Nisargopachara** (Part - B)

# CHAPTER 13 Yoga

Yoga is a science of right living and it works when integrated in our daily life. It works on all aspects of the person: the physical, mental, emotional, psychic and spiritual. Yoga is a 5000-year-old Indian philosophy that combines exercise, breathing, diet, relaxation and meditation. It is a combination of physical and mental disciplines which make the body stronger and healthier and the mind calmer and more controlled, helping towards self-realization. It emphasizes the relationship of body, mind and breath, the synchronization of the breath and movement, the use of preparation, counter pose, sequences of linked postures and modification of postures to suit individual needs.

Yoga is the art of living. Yoga is good for your posture and structural balance (leading to mental balance), it promotes flexibility and suppleness, strength and stamina, tones the internal organs, improves concentration, teaches you how to breathe more effectively facilitates relaxation and calms the mind.

**Yoga shabdautpatti**

The word Yoga is existent for more than five thousand years. However, even today, it may be the most popular Indian word in the world. The term Yoga is derived from the root 'Yuj' or 'Yujir' which means union (Yujir Yoge). The union denotes that individual soul (Jivatman) with cosmic soul (Paramatman). According to another derivation word Yoga means 'concentration' (Yuj Samadhi). In Bhagavad –Gita, the word Yoga is used to express a sense of divine power and glory. The word Yoga has rich collection of meaning both in ancient and contemporary science and literature.

"Atha yoga-Anushashanam" another meaning of yoga is to become whole. Ultimately we only become whole when we are truly capable of helping others with the things that really matter; when we can help them understand how they came into this world, and what life is for, and whether it has to end with losing everything.

**Definitions**

योगश्चित्तवृत्तिनिरोधः । (प.यो.सू. 1/2)

Yoga= process of yoking; union
Citta = consciousness
Vrutti = patterning, turnings, movements
Nirodha = stilling, cessation, restriction

Patanjali in his Yogasutra defines Yoga as Cittavrutti is total of mental functions and Nirodha means cessation or control. Yoga can be simply defined as the process of gaining control over the mind.

प्रमाणविपर्ययविकल्पनिद्रस्मृतयः । (प.यो.सू. 1/6)

There are five types of Cittavrutti- right knowledge (Pramana), illusion (Viparyaya), imagination (Vikalpa), sleep (Nidra) and memory (Smruti).

Pramana—

प्रत्यक्षानुमानागमाः प्रमाणानि । (प.यो.सू. 1/7)

Right perception arises from direct observation, inference, or the words of others.

Viparyaya—

विपर्ययो मिथ्याज्ञानमतद्रूपप्रतिष्ठम । (प.यो.सू. 1/8)

Misperception is false knowledge, not based on what actually is.

Vikalpa—

शब्दज्ञानानुपाती वस्तऊशून्यो विकल्प । (प.यो.सू. 1/9)

Conceptualization derives from linguistic knowledge, not contact with real things.

Nidra—

अभाव प्रत्ययालम्बना वृत्तिर्निदा । (प.यो.सू. 1/10)

Deep sleep is a pattern grounded in the perception that nothing exists.

Smruti—

अनुभूतिविषयसम्प्रमोषः स्मृतिः । (प.यो.सू. 1/11)

Remembering is the retention of experiences.

अभ्यासवैराग्याभ्यां तन्निरोधः । (प.यो.सू. 1/12)

The methods mentioned for attaining Cittavrutti Nirodha are practice (Abhyasa) and detachment (Vairagya).

मनःप्रशमनोपायः योगइत्याभिधीयते । (योगवसिष्ठ 3/9/32)

According to Yogavasistha, Yoga is considered as a technique to pacify thoughts of the mind.

सिद्ध्यसिद्धयोः समो भूत्वा समत्वं योगमुच्यते । (भगवद गीता 2/48)

State of equanimity in gain or loss. When mind is detached from the material world it could maintain a desire free state. Desire free mind will not be influenced with gain or loss, win or defeat and pleasure or misery.



योगः कर्मसु कौशलम । (भगवद गीता 2:48)

Yoga is skill in action. Those who perform action with this mental state will be able to diffuse the effect of his Sancita Karma (accumulated fruits of present birth) and Prarabdha Karma (carried over fruits of last birth). This state of mind will pave the way for evolving into the state of super consciousness. Yoga is a technique to perform action without being attached.

दुःख संयोगोः वियोगः योग इत्येव संज्ञितं । (भगवद गीता. 6:23)

According to this definition Yoga is disunion or negation of union of the self with sorrow. Shankaracharya also considers Yoga as disunion or negation of all kind of miseries and miss happenings with the self.

आत्मेन्द्रियमनोऽर्थानां सन्निकर्षात प्रवर्त्तते । सुखदुःखमनारम्भादात्मस्थेमनसिस्थिरे ॥
निवर्त्ततेदुभयंवशित्वंचोपजायते । सशरीरस्ययोगज्ञास्तंयोगमृषयोविदुः ॥ (च.शा. 1/138-139)

Charakacharya explains Yoga as a state where mind gets attached to soul. When soul, sense faculty, mind and sensual objects come in contact, communication between the internal and external environment establishes.

Yoga has existed from Vedic times and its importance is described in several scriptures. In Upanishads such as Shvetashvataropanishad and Kathopanishad, yoga is referred as an essential means to achieve happiness. In Kathopanishad, for example, it is advised: "Treat the self as the person seated in the body as the chariot. Then, treat the intellect as the driver (charioteer), the mind as the reins and the senses as the horses. The one who has control of mind directed by intellect thereby controlling the senses leads the person to the spiritual goal. Otherwise a person's life will be as of a chariot driven by uncontrolled horses."

Bhagavad-Gita which is known as Yoga Shastra i.e. a scripture on Yoga, Lord Krishna emphasizes that the goal of everyone should be to achieve yoga, or state of equanimity. He beautifully describes the blissful state of a yogi (i.e. one that has achieved yoga). Then through Arjuna, He advises everyone to become a yogi. Lord Krishna says "Tasmat Yogi Bhava Arjuna".

Maharshi Patanjali has made great contributions in removing impurities in three domains namely though Ayurveda in body for good health, through commentary on Panini's grammar for good speech and through yoga for achieving pure mind. We are grateful to Maharishi Patanjali for systematically presenting a comprehensive process of yoga through Ashtanga yoga.

## Different Schools of Yoga

There are different methods in Yoga to cater the needs of different members of the

society. This is because each individual has a definite level in the birth cycle and evolution. One may be at primitive level and another may be about to reach the highest stage.

**Rajayoga**

राजयोग समाधिश्च उन्मनी च मनोन्मनी । अमरत्वं लग्नस्तत्वं शून्याशून्यं परं पदम् ॥
अमनस्क तथा व्दैतं निरालंबं निरंजनम । जीवन्मुक्तिश्च सहजा तुर्या चेत्येकवाचका ॥
(ह.यो.प्र. 4/3-4)

Rajayoga, Samadhi, Unmani, Manoumani, Amaratwa, Laya, Tatva, Shunya, Ashunya, Parama, Pada, Amanaska, Adwaitama, Niralamba, Nirajana, Jivana Mukti, Sahaja, Turya are all Synonymous.

Raja Yoga was the ultimate stage of yoga practice, one nearing Samadhi in historical context and in modern context; it refers to the Yoga school of philosophy in Hinduism. The term Rajayoga was introduced during the 15th century in Hathayoga Pradipika to distinguish the school bases on the Yogasutra of Patanjali from the more current school of Hathayoga. Raja Yoga is also referred to as the mental Yoga, or the Yoga of the Mind, because of its emphasis on awareness of one's state of mind. It is through this practice of concentration that one learns to calm the mind and bring it to one point of focus. It is at this point that we direct our attention inwardly, toward our true nature, which is Divine. You can achieve this by following the eight-fold path of Raja Yoga, which includes observation of the following:

1. Yamas (Abstentions) : Ahimsa (non-injury), Satya (truth), Asetya (non-stealing), Brahmacharya (chastity), Aparigraha (non-greed).
2. Niyamas (Moral Observations): Shucha (purity), Santosha (contentment), Tapas (austerity), Svadhyaya (study of the scriptures), Ishvara Pranidhana (surrender to God)
3. Asana: Steady pose, posture or seat
4. Pranayama: control of vital energy through breath work
5. Pratyahara: Withdrawal of the senses
6. Dharana: concentration of the mind
7. Dhyana: Meditation
8. Samadhi: Enlightenment, union with the Divine.

राजयोगं विना पृथ्वी राजयोगं विना निशा । राजयोगं विना मुद्रा विचित्रापि न शोभते । (ह.यो.प्र 3/119)

Without Rajayoga, this earth, the night and the Mudras, be they howsoever wonderful, do not appear beautiful.



**Importance of Rajayoga**

एकिभूतं तदा चित्तं राजयोगाभिधानकम । सृष्टिसंहारकर्तासौ योगश्चरसमो भवेत ॥ (ह.यो.प्र. 4/76)
अस्तु वा मास्तु वा मुक्तिरत्रैवाखंडितं सुखम । लयोभ्दवमिदं सौख्यं राजयोगदवाप्यते ॥ (ह.यो.प्र. 4/77)

The union of the mind and the sound is called as Rajayoga. The Yogi becomes the creator and destroyer of the universe, like, God. Perpetual happiness is achieved by this I do not care if the Mukti be not attained. This happiness, resulting from absorption is obtained by of Rajayoga.

राजयोगमजानंतः केवलं हठकर्मिणः । एतानभ्यासिनो मन्ये प्रयासफलवर्जितान ॥ (ह.यो.प. 4/78)

Those who are ignorant of the Rajayoga and practice only the Hatha Yoga, Maharishi opinion, that waste their energy fruitlessly.

**Hatha Yoga**

Hatha Yoga is a system of physical exercises and breathing control used in yoga. Science of Body purification and awakening of Pranic energy. Hathayoga is another important stream of Yoga suggested for common man. Hatha Yoga practices were closely was related to Tantra and other modes of worship. After the decline of Buddhism in India, Yogis like Matsyendra Nath, Gorakha Nath and few other Yogic components from the practice of Tantra, they picked up the useful, practical and noble practices of Yoga from the tantric system. A few texts written during 6th to 15th century

Goraksha Samhita-Yogi Gorakh Natha
Hatha Yoga Pradipika-Swami Swatmaram
Gheranda Samhita-Sage Gheranda
Goraksha Satakam-Guru Gorakshanath
Shiva Samhita-unknown author
Yoga Taravali-Sage Adi Shankaracharya
Hathayogaratnavali-Srinivas Bhatta Mahayogindra

**Definition and objective of Hathayoga**

हकारः किर्तितः सूर्यष्ठकारश्चन्द्रोच्यते । सूर्य चन्द्रमसोर्योगात हठयोगो निगद्यते ॥
हकारेण तु सूर्यस्यात स कारेणेनदरुच्यते । सूर्य चन्द्रसोरेक्यं हठ इत्याभिधीयते ॥ (योगशिखोपनिषद)

The word Hatha is a combination of two Bija Mantra 'ha' and 'tha'. 'Ha' means Pingala Nadi or sun principle. 'Tha' means Ida Nadi or moon principle. 'ha' represents mind, the mental energy and 'tha' represents Pranika, life force energy. Hathayoga means the union of the Pranika and mental forces. Usually Pranika and mental forces have

tendency to remain imbalanced either Pranika force is predominant and mental force is subservient, or the mental force is predominant and Pranika force is subservient. The imbaiance of Pranika and mental force may cause physical or mental unrest.

उदघाटयेत्कपाटं तु यथा कुंचिकया हठात । कुंदलिन्या तथा योगी मोक्षद्वार विभेदयेत ॥

(ह.यो.प्र. 3/98)

As a door is opened with key, so the Yogi opens the door of Muksha by opening Kundalini by means of Hatha Yoga.

**Raja yoga and Hathayoga**

हठं विना राजयोगो राजयोगं विना हठः ॥ न सिध्याति ततो युग्ममानिष्पत्तेः समभ्यसेत ॥

(ह.यो.प्र. 2/76)

No success in Raja Yoga without Hatha Yoga, and no success in Hatha Yoga without Raja Yoga. One should, therefore, practice both these well, till complete success is gained.

एकीभूतंतथाचित्तंराजयोगाभिधानकम । सृष्टिसंहारकर्तासौ योगीश्वरसमोभवेत ॥ (ह.यो.प्र. 4/77)

Yogi Swatmarama explains Raja yoga as a synonym of Samadhi. When Citta becomes one with Atman, the state is called Raja yoga. The union of the mind and the sound is called as Rajayoga. The Yogi becomes the creator and destroyer of the universe, like, God.

विभ्राजते प्रोन्नतराजयोगमारोढुमिच्छोरधिरोहिणीव । (ह.यो.प्र. 1/1)

The Yogi then acquires the power of creating and destroying like god himself. Swami Swatmarama proclaims that the Hathayoga practice is to be considered as the staircase to reach Raja yoga. Those who do not aim at success in Raja yoga and are mere practitioners of Hathayoga, and their efforts will be fruitless. Swami Vivekananda named Patanjali Yogasutra as Raja yoga. The term Raja yoga is not mentioned as such in Yoga sutra.

**Components of Hathayoga**

आसनंकुम्भकंचित्रंमुद्राख्यंकरणंतथा । अथनादानुसन्धानमभ्यासानुक्रमोहठे ॥ (ह.यो.प्र. 1/58)

Swami Swatmarama mentions that Hathayoga has four components. Asanas, different types of Kumbhakas, practice called Mudras, Nadanusandhana is the sequence in practice of Hathayoga.

हठस्यप्रथमाङ्गत्वादासनंपूर्वमुच्यते । (ह.यो.प्र. 1/19)

Asana being the first component of Hatha, in Hathayoga, it is given priority.



**Hatha Yoga Siddhi Laxana**

वपुः कृशत्वं वदने प्रसन्नता नादस्फुटत्वं नयने सुनिर्मले ।
अरोगता बिंदुजयोऽग्निदीपनं नाडीविशुद्धिर्हठयोग लक्षणम ॥ (ह.यो.प्र. 2/78)

When the body becomes lean, the face glows with delight, Anahata Nada manifests, and eyes are clear, body is healthy, Bindu under control and appetite increases, then one should know that the Nadis are purified success in Hatha Yoga Siddhi.

**Mantra Yoga**

Mantra is an invocation or a mystical formula, which aids the person to release the self and attain bliss and ultimate fulfillment. The sounds in a Mantra generate unusual mystic power. Mantra produces a set of vibration in the surrounding atmosphere & its force depends on the attitude of the person and the intensity of concentration. Mantras are performed with faith, the results cannot be analyzed measured, weighed, seen, but are felt.

The force of Mantra can be only felt. It should be performed with due faith and all rituals, and then it is fruitful. You must have complete faith in Mantra you are reciting and must know its meaning. Do the things as per prescribed methods. You will experience sensation and vibrations during or at the end of Japa, this is a sufficient proof to believe. Mantra requires faith, Japa, hard work and per laid dictums to realize the desired objects and vibrations. Each Mantra has a different use. The vibrations of sound create desired reactions within the body too.

Three ways to perform mantra—

Upanasu Japa : Only lip movement in there while chanting.

Manasika Japa : The Japa only in the heart without any sound or lip movements.

Vachanika Japa : Recite action in a low, medium or high tone.

**Laya Yoga**

Laya Yoga is an ancient form of meditation, with concentration on energy centers or chakras. Sage Gorakshnatha, an ancient sage of Nepal, and a disciple of Matsyendranath is the founder of Laya yoga. There are five main energy centers in the spine and two in the head. Laya yoga attempts to locate these energy centers and channelize them through meditation.

Laya essentially means to dissolve all Karmic patterns or conditioning and merge into the transcendental reality. It also means deep concentration and making an effort to obliterate the ego, thereby rising to a higher state of consciousness, called Turiya.

Laya Yoga involves techniques of meditation that cause the energy or Prana to move in certain ways, to awaken the Kundalini, the coiled up energy at the base of the spine. Laya yoga channelizes the energy forces in the Kundalini instead of merely controlling the mind. It is important that the Kundalini is activated through performance of Asanas, practice of Pranayama and making a conscious effort to guide this awakened energy in the spine and allowing it to immerse in the crown chakra.

The ultimate goal of Laya Yoga is to attain supreme consciousness through Pranayama (breathe control); it is a method to prevent fluctuations of the mind.

**Jnana Yoga**

Jnana Yoga is the knowledge of Brahman, Atman and the realization of their unity. It is one of the types of yoga mentioned in Hindu philosophies. It is also known as "Jnana Yoga". Jnana-yoga or the path of knowledge is the shortest but most difficult path for one to tread.

Jnana Yoga, the path of philosophy, is a systematic way of training the mind about the realities of life by contemplation. This will strip off the Avidya (ignorance) from our mind and the mind goes to its natural state of rest. Bhagavad Gita says that Jnana consists of properly understanding Kshetra (the field of the bodily activity) and Kshetrajna (the knower of the body that is the soul). Bhagavad Gita emphasizes that a person who went beyond the material world will understand the difference between these two.

Patanjali has mentioned about Videha and Prakritilaya. They are persons who have evolved to higher state of consciousness and who lost the life before attaining Moksha in the previous birth.

Sri Sankaryacarya is considered as an example for Prakritilaya. He accepted Samnyasa at the age of 6 year, completed his studies on all Vedas and Upnisads at the age of 12 year, brought out the commentaries on major Upanisad at the age of 16 and attained Moksha at an early age of 32 years. Just like him Jnanayogi believed to reach Moksha within a short span without undergoing the systemic practice of Raja yoga.

The Jnana Yoga is divided into three stages. First, hearing the truth that Atman is the only reality and that everything else is Maya. Second, reasoning upon this philosophy from all points of view. Third, giving up all further argumentation and realizing the truth.

This realization comes from certain basic concepts—

- The Brahman is real and everything else is unreal.
- Giving up all desire for enjoyment
- Controlling the senses and the mind



- Intense desire to be free

In Jnana Yoga, the first phase is Shravana (hearing). After the lecture hearing you must start cognizing about it, and then logically try to understand it, recapitulate that again and again, questioning it to the maximum possible extent, which is Manana. If necessary, discuss with the teacher and get logically convinced to start the experiment. Experiment is Nididhyasana.

Start dwelling on those truths which have been enunciated and logically accepted. This is Sadhana or deep meditation. This is also the deep contemplation of Jnana Yoga. As we go deeper and deeper into the meditation, we start unraveling higher and higher dimensions and we come to that conclusion that 'I am that Anandamayakosa' or bliss sheath. This is the core of Jnanayoga. In Gita it is told that from intensive meditation one acquires knowledge. The one who acquires knowledge also receives ultimate 'Shanthi'.

श्रद्धावाल लभते ज्ञानं तत्परः संयतेन्द्रियः। ज्ञानं लब्धा परां शान्तिम अचिरेणाधिगच्छति ॥ (4.39)

Which means: The man of Shradha, the devoted, who is the master of his senses, attains knowledge. Having attained this knowledge he goes promptly to the supreme peaceful state.

According to Swami Vivekananda, Jnana Yoga means "The realization of a man's own divinity through knowledge" (Swami Vivekananda. 2005, Vol. 5, p.292). The Vedas teach that the soul is infinite and is in no way affected by death. The Jnani has to come out of all forms, to get beyond all rules and books and be his own book.

**Karma Yoga**

Karma Yoga means that you can achieve a blissful state for yourself by engaging in acts of selfless service and keeping away from negative thoughts and actions.

Yoga means the merging of 'Jeevatma' in 'Paramatma'. For this Karma Yoga prescribes unselfish action. All actions are rewarded by results. Yet, an action becomes 'Niswartha Karma' only when it is done without desire for the fruits of action. All actions when carried out as on offering to God and with the adequate attention, become paths to Moksha. In the Bhagavad Gita it is thus mentioned about Karma Yoga – or the Yoga of action.

तस्माद असक्तः सततं कार्यं कर्म समाचर। असक्तो ह्याचरन कर्म परम आप्नोति पूरुषः ॥
(भगवद गीता. 3/19)

'Therefore, cons tantly perform your obligatory duty without attachment. By performing unattached action, man verily attains the supreme'. The results of the action are to be an offering to God. Here, it is required that a person sacrifices his personal ego.

He should see God in the society around him. The concept of action, without any desire for its fruits, is the core of Karma Yoga. "The manner in which a man realizes his own divinity through works and duty" (Swami Vivekananda).

**Bhakti Yoga**

Bhakti Yoga is a spiritual path or spiritual practice within Hinduism focused on the cultivation of love and devotion towards God. It means to realize God.

Bhakti Yoga is the science of emotion. Indian culture gives several techniques to refine the emotions and this is contained in what is called Bhakti Yoga. Bhakti Yoga, the science of emotions, helps to train our emotional faculty, makes us mature, to have love for our nation and the society in tune with universal brotherhood. This path of emotions broadens our vision to overcome our pettiness, gross selfishness, hatred, greed, jealousy and raises us to the highest levels of universal brotherhood and oneness. Surrender is the core emotion of Bhakti Yoga. This has been indicated clearly in the Bhagavad Gita.

तेषाम अहं समुद्धर्ता मृत्युसंसारसागरात । भवामि नचिरात पार्थ मय्य आवेशितचेतसाम ॥

(गीता. 12.7)

It means: 'Fix your mind on 'ME' alone, let your thought dwell on 'ME'. You will hereafter live in 'ME' alone. Of this there is no doubt'.

"Bhakti is the science of higher love. Bhakti Yoga does not say, give up, it only says Love; Love the Highest" (Swami Vivekananda).Love is the natural impetus to union in the human heart. The object of Bhakti is God. Bhakti is greater than Karma, greater than Raja Yoga, because these are intended for an object in view. The Jnani's hold Bhakti to be an instrument of liberation, the Bhakta looks upon it both as the instrument and the thing to be achieved. The infinite love of God which enters one's heart leaves no place for any other love to live there. Love banishes all fear and grants supreme bliss.

**Yoga Arambha Kala**

वसन्ते वापि शरदि योगारम्भं समाचरेत । तदा योगो भवेत सिद्धोविनायासेन कथ्यते ॥ (घे.स. 5/15)

Yoga should be commenced either in Vasanta or Sarad. For in these seasons success is attained without much trouble.

**Yoga Prayojana**

न तस्य रोग न जरा न मृत्युः । प्राप्तस्य योगग्निमयम शरिरम ॥

A person who has attained a body, purified by yogic fire will have no disease, no old age and no forget-fullness. The soul resides in psychical form, which is a slave to so many impressions and tendencies. But once the physical body is purified through the Yoga it



becomes free of effect of disease, old age and death and capable of experiencing oneness with the supreme soul.

**Ayurveda Yoga Sambandha- (Relation Between Ayurveda and Yoga)**

Both Yoga and Ayurveda are two very similar paths sharing a close relationship. Both these sciences, which have their origin in the Vedic texts, address health and health practices. Ayurveda is healing aspect; Yoga is spiritual and practical side of Vedic teaching.

Both Ayurveda & Yoga give holistic approaches for living life at its fullest. The two sciences have a common understanding of the health of the body as being dependent on the health and balance of the mind. Both sciences have common underlying principles the well being of an individual at the level of body and mind and the aim of helping an individual reconnect to their true nature through direct (Pratyaksha) and personal experience. Yoga prepares the body and mind of the individual for eventual liberation and enlightenment, Ayurveda describes the various ways to keep the body and mind healthy. Ayurveda is based upon understanding individualized needs and what is right only for individual not the masses and fulfilling those needs to bring complete harmony as with diet, herbs etc.

Ayurveda is an ancient Indian system of natural and holistic medicine. It uses the inherent principles of nature to help maintain health in a person by keeping the individual's body, mind and spirit in perfect equilibrium with nature. Ayurveda insists that within nature's balance lie all the remedies for good health. Ayurveda can create a wonderful sense of balance in your body, mind and spirit; and so can Yoga. Yoga is all about harmonizing the body with the mind and breath through the means of various Pranayama (breathing techniques), Asanas (yoga postures) and Dhyana (meditation).

Yoga includes physical, mental & spiritual practices or disciplines that aim to transform body and mind. Ayurveda, other than using the gross aspect of using medicines and therapies, also makes use of spiritual aspects like mantras.

Ayurveda use of simple diet, nutrition and natural herbal supplements to maintain health and rejuvenate and strengthen the body goes along with the yoga way of living. Providing understanding and guidelines for balance in body, mind and spirit, Ayurveda gives us a holistic approach to optimum healthy living.

Many people who practice Yoga do so to maintain their health and well-being, improve physical fitness, relieve stress, and enhance quality of life. In addition, they may be addressing specific health conditions, such as back pain, neck pain, arthritis, and anxiety. The basis of all Ayurvedic principles is the balancing of energies within us to

restore wholeness. Thus Ayurvedic treatment and Ayurvedic practices help us to attain our goals easily when combined with yoga.

**Satyabuddhi and Yogasiddhika Buddhi**

सर्वकारणवद्बुः खमस्वं चानित्यमेव च । न चात्मकृतकं तद्धि तत्र चोत्पद्यते स्वता ॥
यावन्नोत्पद्यते सत्या बुद्धिर्नेतदहं यथा । नैतन्ममेति विज्ञाय ज्ञः सर्वमतिवर्तते ॥ (च.शा. 1/152-153)

Satya means Yathartha (Cha. Vi .8/38) and Rogashunyata (Cha. Sha. 6/28). Anything that has cause is misery. It is not related with soul and ephemeral. Misery is not produced by soul, but due to ignorance one feels that, he is the owner of soul. This false belief exists till the dawn of Satyabuddhi i.e. real knowledge. The realization that the entire universe and the individual are one and the same is called Satyabuddhi. This is the state of realization of ultimate reality. It eliminates all miseries and leads to Moksha.

**Swasthya Rakshane Yogasya Mahatvam**

The word Yoga is derived from Sanskrit root 'Yujir' meaning is to unite to combine or to integrate and thus may be taken to mean a state of union or integration i.e. the union of the individual soul or consciousness with cosmic or total integration of physical, mental, intellectual and the spiritual aspects of the human personality. Yoga also refers to the ways, methods and practices adopted consciously to attain ultimate objective. Health is defined as a state of complete physical, mental and social wellbeing and not merely an absence of disease or infirmity. Yoga is not a religion; it is a way of living whose aim is 'a healthy mind in a healthy body'.

Man is a physical, mental and spiritual being; Yoga helps promote a balanced development of all the three. The art of practicing yoga helps in controlling an individual mind, body and soul. It brings together physical and mental disciplines to achieve a peaceful body and mind, it helps to manage stress and anxiety and keep you relaxing. It also helps in increasing flexibility, muscle strength and body tone. It improves respiration, energy and vitality. Practicing yoga might seem like just stretching, but it can do much more for your body from the way you feel, look and move.

The practices of yoga are Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Samadhi (Ashtanga Yoga), Mudra, Bandha, Shatkarma (Dhouti, Neti, Basti, Trataka, Nouli and Kapalabhati), and Kundalini Yoga. Practicing of Yama and Niyama i.e. the preparatory step before the actual practice of Yoga is developed and regulated way of life. These advocated ways of living itself provide many benefits and keeps one's life less stressful.

In Yama person control some activity or behavior and rules of conduct by following Ahimsa, Satya, Asteya, Bramcharya and Aparigraha.



In Niyama person follow the principles for social well being by Shaucha, Santosha, Tapa, Svadhyaya and Ishwarapranidhana.

Practice of Asana will encourage various vital organs and endocrine gland to function more efficiently leading in turn to an overall development of the body and mind. The Asana's are the methods to achieve perfect mental and physical relaxation. The practice of Asana brings about a number of physiological, biochemical and psychological changes in the body. Among such change reduction in body weight, reduction in rate of respiration, increased chest expansion, increased vital capacity, improved adrenocortical function etc. are notable.

Pranayama is concerned with the controlled breathing exercise and in a broader sense the control of the vital force, basically Pranayama consists of three parts Puraka, Kumbhaka and Rechaka. Pranayama practice increase vital capacity of lungs. Systemic physiological vitalization and brings psychosomatic relaxation. Pranayama procedure enables one to achieve great benefits are regard to the mental and physical wellbeing.

Pratyahara (self-restrain), Dharana (Concentration), Dhyana (meditation), Samadhi (state of complete relaxation) are helps to keeps mental and physical fitness. Especially meditation will bring significant biochemical changes in blood, indicative of accelerated neuro-humoral activity and conforming electrophysiological changes. Thus Ashtanga Yoga is a comprehensive discipline of mental, physical and spiritual development of an individual.

Mudra (Symbolic Gestures), Bandha (Blocking or locking the Passage of Prana), these two will help in retaining the Prana and provides stability and improve the concentration.

The Shatkarma Neti (cleansing the nasal passage), Dhouti (cleansing the stomach), Basti (cleansing the rectum and colon), Trataka (cleansing of eye), Kapalabhati (cleansing naso-pharynx and nasal air sinuses) and Nauli (massage to abdominal viscera) all these procedures consisting of the purification of the body by the nasal, oral, rectal, urinary or any other routes.

Kundalini Yoga-Awaking the Kundalini Shakti of the individual is necessary to increase level of consciousness. Thus Yoga will help in maintenance of physical, mental and social or spiritual health of the individual.

**Yogabhyasa Pratibhandhaka**

अत्याहारः प्रयासश्च प्रजल्पो नियमग्रहः । जनसङ्गश्च लौल्यश्च षडभिर्योगो विनश्यति । (ह.यो.प्र. 1/15)

In the process in Yoga one may face various obstacles. Every person has certain

inhibitions due to Tamas and has certain over activeness due to Rajas. Overeating (Atyahara), Exertion (Prayasa), talkativeness (Prajalpo), excessive adhering to rules (Niyama Graha), being in the company of common people (Janasanga) and unsteadiness (Loulya) are the six causative factors which leads to obstruct Yoga.

**Yoga Bhadhaka Tatva**

व्याधिस्त्यानसंशयप्रमालस्याविरतिभ्रान्ति दर्शनालब्ध भूमिकत्वाऽनवस्थितत्वानि चित्तविक्षेपास्ते अन्तरायाः । (यो.सू. 1/30)

- Vyadhi - Diseases
- Styana - Hindrance
- Samshaya - Doubt
- Pramada - Indifference
- Alasya - Laziness or inertia
- Avirati - Sensuality
- Bhrantidarshana - Mistaken notion or illusion
- Alabdhabhomikatva - non-attainment
- Anavasthitatva - Instability.

**Yogasiddhikara Bhavas as per Hathayogaa**

उत्साहवसाहसाधैर्यात तत्वज्ञानाच्च निश्चयात । जनसङ्गपरित्यागात्षडभिर्योगः प्रसिद्धति ॥ (ह.यो.प्र. 1/16)

- Utsaha - Enthusiasm
- Sahasa - courage
- Dhairya - willpower
- Tatvajnana - discrimination
- Nishcaya - determination
- Janasanga Parityaga - avoiding the company of common people are six causes that bring success in Yoga.

क्रियायुक्तस्य सिद्धिः स्यादक्रियस्य कथं भवेत । न शास्त्रपाठमात्रेण योगसिद्धि प्रजायते । (ह.यो.प्र. 1/67)

One who performs his deeds can get Siddhi, otherwise with only reading one not get the fruit of Siddhi of Asana, Pranayama and Mudra. Nishchaya means faith; devotion towards Shastra and Guru can lead to Yoga Siddhi. Associated people leads to desire, hatred, jealousy etc. so these when avoided assist Yoga Siddhi.



**Mitahara and Pathyapathyani During Yogabhyasa**

**Mitahara (proper Diet)**

सुस्निग्धमधुरश्चतुर्थाशविवर्जितः । भुज्यते शिवप्रीत्यर्थे मिताहारः स उच्यते ॥ (ह.यो.प्र. 1/60)
मिताहारं विना यस्तु योगारम्भं तु कारयेत । नानारोगो भवेत्तस्य किञ्चिद्योगो न सिध्यति ॥ (घे.सू. 5/16)

Proper diet is defined as Snigdha and Madhura food, leaving one fourth of the stomach free and eaten as offering to please Shiva. Shiva is the inner consciousness, the atman. Everything the Yogi should be considered as Prasada or offering to supreme beings.

**Pathyahara**

पुष्टं सुमधुरं स्निग्धं गव्यं धातुप्रपोषणम । मनोभिलषितं योग्यं योगी भोहजमाचरेत ॥ (ह.यो.प्र. 1/63)
शाल्यन्नं यवपिष्ठं वा गोधूमपिष्टकं तथा । मुद्गंमाषचणकादि शुभ्रं च तुषवर्जितम ॥ (घे.सू. 5/17)

Yogi should eat food that is Pushtam, Madhura, and Snigdha, products of cow's milk and nourishing food of their own choice suitable for the practice Yoga.

गोधूमशलियवषष्टिकशोभनान्नं क्षीराज्यखण्डनवनीतसितामधूनि ।
शुण्ठीपटोलक अलादिकपञ्चशाकं मुद्रादिदिव्यमुदकं च यमीन्द्रपथ्यम ॥ (ह.यो.प्र. 1/62)
पटोलं पनसं मानं कक्कोलं च शुकाशकम । द्राढिकां कर्कटिं रम्भां डुम्बरीं कण्टकण्टकम ॥
आमरम्भां भालरम्भां रम्भादण्डं च मूलकम । वार्ताकीं मूलकं ऋद्धियोगी भक्षणमाचरेत ॥
बालशाकं कालशाकं तथा पञ्चशाकं प्रशंसीयाव्दास्तूकं हिलमोचिकाम ॥ (घे.स. 5/18-19)

The most conducive foods for Yogi are wheat, rice, barley, Shashtika rice, milk, ghee, sugar, butter, sugar candy, honey, dry ginger, Patola, the five leafy vegetables (Jivanti, Vastuka, Matsyaksi, Meghanada, Punarnava), Vastuka Shaka, Brinjal, green gram, and rain water are consider to be wholesome food for advanced Yoga.

**Apathyahara**

कटवम्लतीक्ष्णलवणोष्णहरितशाक सौवीरतैलतिलसर्षपमद्यमत्स्यान ।
अजादिमांस दधितक्रकुलत्थकोलपिण्याकहिङ्गुल लशुनाद्यपथ्यमाहुः ॥
भोजनमहितं विद्यात्पुनरौयुषर्णकृतं रुक्षम । अतिलवणमम्लयुक्तं कदशनशाकोत्कटं वर्ज्यम ।
वन्हि स्त्रीपथिसेवन्नमहौ वर्जनमाचरेत । (ह.यो.प्र. 1/63-69)
योगारम्भे वर्जयेच्च पथस्त्रौवहिसेवनम । नवनीतं घृतं क्षीरं गुडं शर्करादि चैक्षवम ॥
पक्वकरम्भां नारिकेलं दडिम्बमशिवासवम । द्राक्षागलवनी धात्री रसमाल्मावर्वजितम ॥ (घे.स. 5/26-27)

The food those which are prohibited for Yogis are pungent, sour, penetrating, salty, hot, green leafy vegetables, sour gruel, oil, sesame, mustard, alcohol, fish, meat, curd,

buttermilk, horse gram, fruit of Jujube, oil cakes, asafetida and garlic. Unhealthy diet should not be taken, that which is reheated after becoming cold, which is dry, which is excessively salty or acidic, stale or has too many vegetables, Rajasika and Tamasika Ahara and Stree Sahavasa Varja etc.

# CHAPTER 14 Panchakosha Theory

Pancha Kosha Yoga is a method of Yoga practice which was developed by Bethsabe. It is based on the ancient texts of the Indian philosophy Taittiriya Upanishad as well as inspirations of the teacher Selvarajan Yesudian.

Pancha : five
Kosha : body, cell, envelope
Yoga : union

Pancha Kosha Yoga is the union of the five bodies of which the human being is made up. Healthy living can be attained only if an individual is healthy in all spheres of his life. Leading a virtuous life leads to a healthy existence at physical, mental, intellectual and spiritual level. Eating right kind of food, breathing a pure Prana strengthens the Annamaya and Pranamaya Kosha. Engaging in contemplation and reflection strengthens the Manomaya and Vijnanamaya Kosha. Engaging in meditation and other spiritual activities strengthen the Anandamaya Kosha.

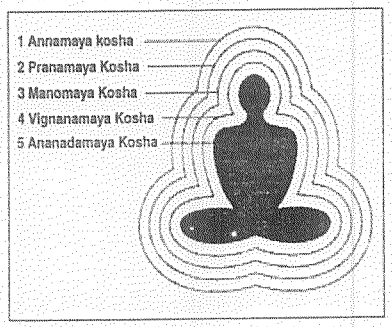
When all the five Koshas function in harmony it enriches the Ojas which results in nourishing the Tejas and Bala required for effective functioning of mind and body.

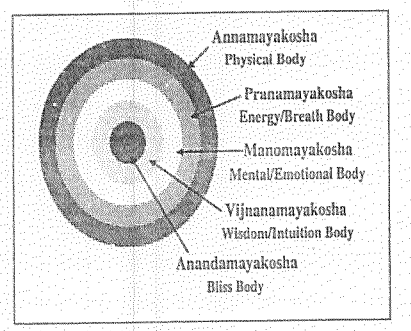
1. Annamaya Kosha or the Food Sheath
2. Pranamaya Kosha or the Energy Sheath
3. Manomaya Kosha or the Mental Sheath
4. Vijnanamaya Kosha or the Intellectual Sheath
5. Anandamaya Kosha or the Bliss Sheath

The following five bodies can be distinguished by Taittiriya Upanishad:

| Sanskrit | Translation | Explanation | Activated by |
|---|---|---|---|
| Annamaya Kosha | Full of food | Physical body | Asanas |
| Pranamaya Kosha | Full of energy | Energetic body | Pranayama's |
| Manomaya Kosha | Full of instinct & | Psychic body emotion | Relaxation with affirmations |
| Vijnanamaya Kosha | Full of knowledge | Consciousness body | Ethics and moral |
| Anandamaya Kosha | full of bliss | Transcendental body | Meditation |

All these Koshas are having different attributes and functions. The first layers is the gross body which is made up of food; the second is the vital force of human being; the third one is mental body which governs all the mental activities and emotions; the fourth one is the intellectual part of the body and the last one is the bliss, the essential true nature which is devoid of all afflictions.




**Annamaya Kosha**

अन्नाद्वै प्रजाः प्रजायन्ते । याः काश्च पृथिवीश्रिताः । अथो अन्नेनैव जीवन्ति ।
अथैनदपि यन्त्यन्ततः । (तैत्तिरिय उपनिषद 2:2)

Anna means matter, Annam literally means food; Taittiriya Upanishad calls food the medicament of all. Annamaya Kosha is a representation of the gross physical body. This sheath is regarded as the medium of enjoyment for gross objects through the physical senses. According to this belief, all living beings in this world are born from food and remain alive by the consumption of food. In fact even after death, the body can be consumed as food by animals, insects or other beings. However, our physical health depends significantly on the foods that we eat and therefore, a diet that a person follows can be used to determine his or her nature. Food is also regarded as a medicine, as it can help improve a person's overall health.

Annamaya Kosha is made up of inert matter and it later goes back into mud again.

**Pranamaya Kosha**

तस्माद् वा एतस्मादन्नरससमयात । अन्योऽन्तर आत्मा प्राणामयः । (तैत्तिरिय उपनिषद 2:2)

Pranamaya Kosha is the second layer of our personality. The word Prana means source of energy. Every physical activity needs energy. Our vital functions which the Prana primarily governs are breathing, heart beats, circulation, and digestion etc.

Taittiriya Upanishad explains that this layer of our personality is almost like soul of



the Annamaya Kosha. It because of this Prana that we live. Prana which according to its location, movement and purpose has been divided into five major and five minor components. Yogic literature mentions the presence of 72,000 pathways along which the Prana moves in human body. The moment Prana leaves the body; all activities come to an end.

**Manomaya Kosha**

तस्माद् वा एतस्मात प्रानमयात । अन्योऽन्तर आत्मा मनोमयः ॥ (तैत्तिरिय उपनिषद 2:3)

Taittiriya Upanishad states that the soul of Pranamaya Kosha is Manomaya Kosha. Manomaya Kosha is that layer of our personality which we call as mind (Citta). This sheath deals with the emotional, mental or perceptual part of the body, which comprises not just the mind, but also the organs within the body. The Manomaya Kosha influences the Prana Kosha and channels the ways we think. When Prana or life and Anna or food, operate together, Mana or the awareness does not really exist, because we do not think or feel anything else. The thoughts that originate within the body during the first sheaths can manifest themselves in the form of a disease that affects the body. All the diseases that involve the Manomaya Kosha can be treated by the Yoganga that have been prescribed through Ashtanga Yoga.

According to the Ayurveda and Yoga the seat of the most of the diseases is Manomaya Kosha. With the interaction of the world the mind is getting afflicted in many ways and the continued worries and stresses are percolating through the Annamaya Kosha or the Physical body gradually. This induces unwanted chemical changes in the body and it also affects the central nervous system in a wrong manner.

The Brahmari Pranayama, Nadanusanda practices, Meditations and hearing/ chanting devotional music are the remedial means in the Yoga to attune the Manomaya Kosha.

**Vijnanamaya Kosha**

तस्म्द् वा एतस्मान्मनोमयात । अन्योऽन्तर आत्मा विज्ञानमयः ॥ (तैत्तिरिय उपनिषद 2:4)

The Upanishad reveals that the self of Manimaya is Vijnanamaya. Vijnanamaya means composed of Vijnana, or intellect, the faculty which discriminates, determines or wills. It is the sheath composed of more intellection, associated with the organs of perception. This level is basically that of knowledge. Knowledge is our understanding and appreciation of the fundamental of life, real source of joy and happiness, the reality of things outside etc. we undertake a lot of analysis at this level and finally discriminate what is right and wrong. Vijnanamaya Kosha is dealing with the present i.e. here and now. Yogic counseling, study of scriptures, acquaintance with the vice and virtuous people are the means to strengthen Vijnanamaya Kosha.

### Anandamaya Kosha

तस्माद वा एतस्माव्विज्ञानमयात । अन्योऽन्तर आत्मानन्दमयः ॥ (तैत्तिरिय उपनिषद 2:5)

Anandamaya Kosha is the soul of Vijnanamaya Kosha. This forms the last layer. Ananda refers to the bliss that a human can experience from any channel. Hence, the Anandamaya Kosha can be described as the transcendental body or the blissful body which in turn consists of the casual body of the Brahma. Since the self is the cause of all things, everything gets dissolved into it. Things are born, they grow and then they eventually die all because of Ananda. This shows that Ananda is the root of all human life. Hence, Ananda is the incarnation or a form of the Brahma. This bliss or Ananda comes from the Brahma. It is our ignorance that covers the bliss, just like how the skin covers the body. This is one of the Koshas that is not bound by either time or space.

In Yogic context deep meditation, state of Samadhi, doing virtual deeds are the means for the Anandamaya Kosha.

### Health percepts of Pancha Kosha

Recently all medical systems acknowledged that more than 80% of the deceases of today, including diabetes (type II), cancer, peptic ulcer, arthritis, digestive disorders etc. are somatic diseases (Adhija Vyadis) or the diseases caused by the mind. By balancing and harmonizing the mind through various practices and techniques it is proven that Yoga can cure most of all ailments. In this connection the quotation, "For those wounded by civilization, yoga is the most healing salve" is worthwhile.

Yoga explains this phenomenon in such a way that, with the interaction of the worldly affairs the mind (Manomaya Kosha) is getting disturbed by the jealousy, hatred, worries, dissatisfaction, confusions etc. If this state of disturbance is continued for a long period the same percolates to the physical body in the form of diseases. Similarly, unfavorable physical conditions affect the mind adversely and in course of time in return it reflects in the body as a kind of aliment. From this fundamental theory on Koshas and diseases the importance of keeping all Koshas healthy and balanced is evident.

Since the body-mind relation or Annamaya Kohsa and Manomaya Kosha relation are very strong it has to be seen as the two sides of a coin, having no individual existence; the disturbance in one immediately affects the other. As the breathing (Pranamaya Kosha) is the bridge between the body and mind, the Pranamaya Kosha has also a vital role in this scenario. Again, since the intellect or Budhi (Vijnanamaya Kosha) governs the mind through the thought process, Vijnanamaya is also responsible for the diseases in a body. Finally, being Ananda or bliss original state, the Anandamaya Kosha also a part of total health of a human being.

# CHAPTER 15 Astanga Yoga

यम नियमासन प्राणायाम प्रत्याहार धारणाध्यान समाधयोष्टावाङ्गानि ॥ (यो.सू. 2/29)
यमनियमासन प्राणायाम–प्रत्याहार–धारणा–ध्यान समधयोष्टङ्गानि । (शाण्डिल्लोप 1/2)

Patanjali has propounded the comprehensive and multi-objective Anataranga and Bahiranga practices of Yoga through the classical Ashtanga Yoga in the form of Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi.

### Yama

अहिंसा सत्यास्तेय ब्रह्मचर्यापरिग्रहा यमाः । (यो.सू. 2/30)

अहिंसा सत्यमस्तेयं ब्रह्मचर्य क्षमा धृति । द्यार्जवां हिताहारः शौचं चैव यमा दशं ॥ (ह.यो.प्र. 1/17)

Yama is the first step of Patanjali Ashtanga Yoga. Patanjali has described five Yamas. The literal meaning of word Yama is control or abstinence.

1. Ahimsa - non-violence
2. Satya - Truth
3. Asteya - non-stealing
4. Brahmacarya - Abstinence
5. Aparigraha - non-hoarding

According to Hatha Yoga Pradipika described ten Yamas

1. Ahimsa - non-violence
2. Satya - Truth
3. Asteya - non-stealing
4. Brahmacarya - Abstinence
5. Kshama - forgiveness
6. Dhruti - endurance
7. Daya - compassion
8. Arjava - meekness or straight forward
9. Mitahara - moderation in diet
10. Shaucha - cleanliness

### Ahimsa

अहिंसा प्रतिष्ठायां तत्सनिधौ वैरत्यागः । (यो.सू. 2/35)

अहिंसा सर्वथा सर्वदा सर्वभूतानां अनभिद्रोहं । (याज्ञवल्कयसंहिता)

It means to avoid causing pain or hurting any living being mentally, verbally, or physically. The practice of ahimsa generates a broad based feeling of love and brotherhood which purifies the mental beings, the Citta. Avoiding the feeling of hatred to an individual is also a kind of ahimsa or non-violence. Mahatma Gandhi adopted only Satya and Ahimsa as foundation of his philosophy.

**Satya**

सत्यप्रतिष्ठायां क्रियाफलाश्रयत्वम ॥ (यो.सू. 2/36)

The literal meaning of Satya is truthfulness. One must be truthful in his speech, act and thought.

**Asteya**

अस्तेयप्रतिष्ठायां सर्वरत्नोपस्थान । (यो.सू. 2/37)

मनसा वाचा कर्मणा परद्रव्येषु निस्पृहः । अस्तेयमिति संप्रोक्त ऋषिस्तत्वदर्शिभिः ॥ (याज्ञवल्कयसंहिता)

It refers to the negation of the tendency of utilizing the wealth, belongings or thoughts of others in once own interest or benefits. This is essentially the practice of non-stealing in terms of money material or even thoughts and idea. The practice of Asteya not only brings about individual Citta Suddhi, but also reduces the amount of social tension and conflicts which may otherwise results due to stealing tendencies.

**Brahmacarya**

ब्रह्मचर्यप्रतिष्ठायां वीर्यलाभः । (यो.सू. 2/38)

कर्मण मनसा वाचा सर्वावस्थासु सर्वदा । सर्वत्र मैथुन त्यागो ब्रह्मचर्य प्रचक्षते । (गरुड पुराण 238/6)

Brahmacarya means not to deviate from one's own Svadharma or one's own original nature. It is not only abstinence from sexual pleasure although the same is an important aspect of Brahmacarya as it helps an aspirant to progress efficiently on the path of Yoga.

**Aparigraha**

अपरिग्रहस्थैर्य जन्मकथंता संबोधः । (यो.सू. 2/39)

The tendency of lustfully hoarding wealth and consumable materials in one's own selfish interest is called Parigraha and negation of this tendency is Aparigraha.

**Niyama**

शौच संतोष तपः स्वाध्याययेश्वर प्रणिधानानि नियमाः । (यो.सू. 2/32)

तपः संतोष आस्तिक्यं दानमीश्वरपूजनम । सिद्धांतवाक्यश्रवणं ह्रिमती च तपो हुतम ॥



नियमा दश संप्रोक्ता योगशास्त्रविशारदैः ॥ (ह.यो.प्र. 1/18)

Niyama means observances. Under the heading Niyama, Patanjali suggests certain good habits, which help the development of total personality.

There are five Niyamas namely according to Patanjali

1. Shaucha - cleanliness
2. Santosha - contentment
3. Tapas - penace
4. Swadhyaya - self study
5. Ishvarapranidhana - dedicating to God

According to Hatha Yoga Pradipika described ten Niyamas

1. Tapa - penance
2. Santosha - contentment
3. Astikya - belief in god
4. Dana - charity
5. Eshwarapoojana - worship of God
6. Sidhantavakyashravana - hearing discourse on the principles of religion
7. Hri - to be ashamed of doing undesirable acts
8. Mati - intellect
9. Japa - chanting mantras
10. Huta - scarifies the sensual experience for spiritual experience.

**Shaucha-cleanliness**

शौचात्स्वाङ्गजुगुप्सा परैरसंसर्ग । (यो.सू. 2/40)

Shaucha refer to observance of cleanliness in physical, mental and social aspects of life. Cleanliness of the body, the clothing, the residences etc. is Bahya Shuddhi i.e. external cleanliness. Utilization of clean food and clean behavior with different individuals is also considered as Bahyashuddhi. On the other hand purification of the Antah-Karana by depleting emotions like Raga, Dvesha etc. with help of Japa, Tapa, clean thoughts and friendship etc. is considered Abhyantara Shaucha or internal cleanliness.

Hata Yoga described for Bahya Shaucha many process for cleaning body, brushing the teeth etc. and for Abhyantara Shaucha Dhouti, Basti, Neti, Trataka, Kapalabhati etc.

**Santosha-contentment**

सन्तोषदनुत्तमः सुखलाभः । (यो.सू. 2/42)

Santosha is the second Niyama. Santosha means remaining contented with whatever facilities and circumstances, one is put to continuing the duties and remaining contented with whatever rewards comes forth. Contentment gives a superlative happiness.

**Tapa-penance**

कार्येन्दियसिद्धिसिद्धिक्षयात तपसः । (यो.सू. 2/43)

Penance produces purity of body and Indriya, Mana Shuddhi etc. Tapas is a practice of body and mind to perfect them. Constant practice of tapas enables Yogi to overcome the suffering caused by heat, cold, sun, rain, hunger and thirst. By destroying the impurity of internal organ and the body gets the powers to withstand the extreme situations.

**Swadhyaya-study of scriptures or self study**

स्वाध्यायादिष्ट देवतासं प्रयोगः । (यो.सू. 2/44)

A regular time is to be devoted for the study of scriptures texts. Swadhyaya has stated that Japa is Swadhyaya. It includes both Swara and Mana. Japa has two types Vachika and Manasika. In Manasika Japa are also two types without Dhyana and with Dhyana. While doing Japa of particular Mantra, Omkara etc and reading spiritual texts are means salvation. Person can unite himself with desired God.

**Ishvarapranidhana-dedicating to God**

समाधिसिद्धिरीश्वरप्रणिधानात । (यो.सू. 2/45)

Dedicating to Eshvara one can attain ultimate Samadhi. Dedicating to divinity or surrender to the God is an important methods to attain the highest state of existence i.e. Moksha or liberation. This path of yoga is called Bhakti yoga.

# CHAPTER 16 Asana

Asana is third part of Yoga, the synonyms for Asana is Mudra, Bhangima, Havabhava, Kayikaceshtha, Samsthiti, Sthiti etc. which includes different yogic postures, it helps to attain further steps of Yoga. Control over physical body leads to control over mind, which enhance all over development of being. The detailed description of Asanas is available only in the texts of Hatha-Yoga. The Asanas have definitely been mentioned in Upanisads but they have not been described in detail.

Amrutanadopanishad and Swetasvaropanisad just mention Asana.

सुखासनवृत्तिश्चिरवासश्चैवमासनं नियमो भवति । (मण्डल ब्रह्मनोपनिषद 1/1-5)

Mandala Brahmanopanishada has considered asana as the posture for continued and comfortable sitting.

स्थिर सुखमानसनम् । (यो.सू. 2:46)

आसनेन रुजं हन्ति ॥ (योग.चूडा.उ. 109)

Asana is a posture in which an individual may stay stably and comfortably for a prolong period. Asana may vary from individual to individual based on the above mentioned principles.

हठस्य प्रथमांगत्वादसनं पूर्वमुच्यते ॥ कुर्यात्तदासनं स्थैर्यमारोग्यं चांगलाघवम ॥ (ह.यो.प्र. 1/19)

Asana is the first step of Hathayoga, which produces Laghavata (lightness of the body), Sthairya (enhances strength) and Arogya (health).

**Total number of Asanas**

आसनानि समस्तानि यावन्तो जीवजन्तवः । चतुरशीतिलक्षाणि शिवेन कथितानि च । (घे.स. 2/1)

There are eighty-four lakhs of Asanas described by Shiva the postures are as many in number as there as number of species of living creatures in this universe.

तेषां मध्ये विशिष्टानि षोडशोनं शतं कृतम । तेषां मध्ये मर्त्यलोके व्दात्रिशदासनं शुभम ॥ (घे.स. 2/1)

Among them eight-four are best and among these eighty four thirty two have been found useful for mankind in this word.

अथ आसनानां भेदाः ।

सिद्धं गुप्तं तथा मात्स्यं मुक्तं वर्जञ्च स्वस्तिकम । सिंहञ्च गोमुखं वीरं धनुरासनमेव च ॥

मृतं गुप्तं तथा मात्सयं मत्सेयन्द्रासनमेव च । गोरक्षं पश्रिमोत्तानं उत्कटं सङ्कटं तथा ॥
मयूरं कुककुटं कूर्म्मं तथाचोत्तान कूर्म्मकम । उत्तानमण्डुकं वृक्षं मण्डुकं गरुडं वृषम ॥
शलभं मकरं चोष्ट्रं भुजङ्ग्यासनम । व्दात्रिंशदासनानितु मर्त्तलोकेहि सिद्धिदम ॥ (घे.स. 2/3-6)

Total 32 Asanas explained by Gheranda Samhita.

| | | |
|---|---|---|
| Siddhasana | Padmasana | Bhadrasana |
| Muktama | Vajrama | Swastika |
| Simham | Gomukha | Vira |
| Dhanur | Mriamasana | Guptam |
| Matsyam | Matsendra | Goraksha |
| Paschimottasana | Utkatam | Sankatam |
| Mayuram | Kukkutam | Kurma |
| Uttana Manduka | Uttana Kurmakam | Vriksha |
| Manduka | Garuda | Vrisham |
| Salabha | Makara | Ushtram |
| Bhujangam | Yoga | |

| **Upanisada** | **Number of Asana and Names** | |
|---|---|---|
| Yoga cudamani | 2 | Siddhasana, Kamal |
| Yoga Kundala | 2 | Padamasana, Vajrasana |
| Amrutanda | 3 | Padamasana, Swastikasana, Bhadrakasana |
| Dhyana Bindu | 4 | Siddhasana, Padamasana, Simhasana, Bhadrasan |
| Yoga-Tattva sandilya | 8 | Svastikasana, Gomukhasana, Padamasana, Virasana, Simhasana, Bharadasana, Muktasana, Mayurasana. |
| Darshana | 9 | Svastikasana, Gomukhasana, Padamasan, Virasana, Simhasana, Bharadasana, Muktasana, Mayurasana, Sukhasana |
| Varaha | 11 | Charasana, Padamasana, Kuramasana, Mayurasan, Kukkutasana, Virasana, Svasthikasana, Bhadrasana, Simhasana, Muktasa, Gomukhasana. |

**Classification of Asanas** : Yogasana may be classified broadly into three types.



1. Meditative Asanas - These are the postures which are considered conducive to practice of meditation. Dhyana if he is comfortably stabilized in meditative postures like Padmasana, Siddhasana, Bhadrasana, Swastikasana, Vajrasana etc.
2. Relaxative Asanas - These are the posture which produce mental and physical relaxation such as Shavasana, Makarasana etc.
3. Cultural Asanas - The Asanas like Simhasana, Gomukhasana, Dhanurasana, Matsyendrasana, Mayurasana, Kurmasana, etc. practised for physical culture. The Asanas are described in great detail in texts of Hathayoga such as Gheranda Samhita, Shiva Samhita and Hathayoga Pradipika etc.

**Asana and its importance**

आसनसिद्धिउपाय–प्रयत्नशैथिल्यानन्तसमापत्तिभ्याम । (यो.सू. 2/47)

Control on the body by Prayatna, Prayasa, Cheshta, cause Shaithilyata.

**Utility of Asana and their effect on the health**

1. One can control his mind efficiently, only when he controls his body properly. This is brought about by Asana and thus helps in attaining the ultimate goal the salvation or Moksha.
2. By practicing Asana one can develop mental equilibrium, balance, endurance and great vitality.
3. Each Asana helping to stretch and stimulate specific group of muscles and finally make them relax deeply.
4. Asanas will help to reduce the Basal Metabolic Rate. Along with the reduction in Basal metabolic rate most of the vital organs gets relaxed.
5. Asanas are not just strengthening the muscles. But they also train the muscle to loosen and relax.
6. Asanas not only develop the body and soul, they prevent diseases, gave one relief from diseases. They invigorated the nerves, the lungs the muscles, the skin, and the various glands inside the body.
7. Many chronic diseases which could not be cured by drugs have been successfully cured by Asanas.

Utility of Asana can be taken as two folds.

1. Spiritually, it helps in controlling the mind and to attain Moksha.
2. Preservation of health (preventive) and cure the various diseases (curative).

**Difference between Yogasana and Vyayama –**

| No. | Yogasana | Vyayama (exercise) |
|---|---|---|
| 1. | स्थिर सुखमानसनम् । (यो.सू. 2:46) Stable and comfort posture. | शरिरायस जनकं कर्म व्यायाम । Causing fatigue to the body. |
| 2. | Mode of approach– Both internal and external i.e. body and mind. | Only external approach i.e. physical body development will be there. |
| 3. | Mode of Performance Slow, steady and rhythmic | Vigorous movement, no maintenance periods |
| 4. | Importance is not given for proceeding or receding period. | Importance is given for proceeding and to some extent receding time. |
| 5. | Mainly the effect is felt on the trunk region of the body | Peripheral parts or extremities are well exercised. |
| 6. | All the movements are synch-ronized with breathing. A correct method of breathing is sought. thus helps to relax ourselves | No attention is given for breathing instead it makes a person to breath rapidly, so does not give a sense of relaxation. |
| 7. | Spine is stretched in all directions. It strengthens the spinal column and makes it highly flexible or elastic. | It exerts strain on spinal column, usually leads to degenerative changes and injuries of spinal column. |
| 8. | Complementary postures are included in order to give exercise in all the directions. | No complementary movements' only single portion of the body is exercised in a single direction. |
| 9. | Includes relaxative posture in between practice like Shavasana, Makarasana. | Does not include such relaxative posture or exercise. |
| 10. | Effect is felt on the both super-ficial as well as deep muscles like muscles of back. | Effect is more on superficial muscles. |
| 11. | Does not aim at muscle building or body building. | Mainly aim at muscle and body building. |

**Hints and cautions for the practice of Asana**

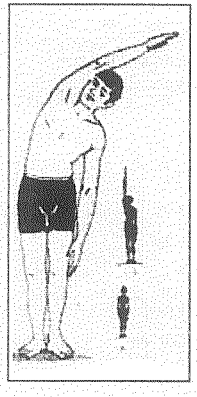
1. Without the practice of the principles of Yama and Niyama, which lay down firm foundations for building character, for that practice of Asana without the backing of Yama and Niyama is not possible.
2. The Asanas are to be practiced regularly without interruptions.
3. **Cleanliness and food-** Before starting to practice Asana, the bladder should be emptied and the bowel evacuated. If student is constipated or it is not possible to evacuate the bowels before practice of Asana start with Shirshasana and Sarvangasana and their variations. Attempt other asana only after evacuation.
4. **Bath-**Asana comes easier after taking bath. After doing them, the body feels sticky due to perspiration and it is desirable to bath some 15 minutes later. Taking a bath before and after practicing Asana refreshes the body and mind.
5. **Foods-**The best time to practice is either early in the morning or late in the evening.
6. **Sun-** Do not practices Asana after being out in the sun for several hours.
7. **Place-** They should be done clean airy place, free from insects and noise. Do not do them on a bare floor or uneven place but on folded blanket laid on a level floor.
8. **Caution-** No undue strain should be felt in the facial muscles, ears and eyes or in breathing during the practice.
9. **Closing of the eyes-** In the beginning, keep the eyes open. Then you will what you are doing and where you go wrong.
10. Mirror- If you are doing the Asana in front of mirror keep it perpendicular to the floor and let it come down to ground level.
11. The Brain- During the practice of Asana, it is the body alone which should be active while the brain should remain passive, watchful and alert.
12. Breathing- In all Asana, the breathing should be done through the nostril only and not through the mouth. Do not restrain the breath while in the process of the Asana.
13. Shavasana- after completing the practice of Asana always lie down in Shavasana for at least 10-15 minutes as this will remove fatigue.
14. Menstruation- Avoid Asana during the menstrual period but flow is in excess of normal Konasana, Baddhakonasana, Vajrasana, Janushirshasana, Pashimottasana, Uttanasana may be performed with beneficial effect.
15. Pregnancy- All Asana can be practiced during the first three months of pregnancy.
16. After Delivery- No Asana should be done during first month after delivery.
17. Effects of Asanas- Faulty practice causes discomfort and uneasiness within a few days. This is sufficient to shows that one is going wrong.

**Yogasana-Classification**

1. Standing Postures
2. Sitting postures
3. Supine postures
4. Prone postures
5. Suryanamaskara

**Standing Postures**

**Ardhakatichakrasana-(half Moon Pose)**



Ardha means half, Kati means waist & Cakra is wheel. In this posture semicircle is formed at the waist by lateral bending.

**Procedures**

Sthiti - Tadasana

Step 1 - Slowly raise the right arm, till the arm or bicep muscle touches the ear with inhalation, palm facing sideways, stretch the arm to the maximum.

Step 2 - Slowly bend the body to the left at waist as far as possible with exhalation. Slide the left arm down as far as possible over the thigh. Allow the hand to hang freely. Final posture. Maintain the position for some time with normal breathing.

Step 3- Return to initial position with inhalation. Slowly straighten the body. Keep the spine erect.

Step 4 - bring the right hand slowly downwards until touches the right thigh.

Relax in Sthiti-Tadasana

Repeat the same on the other side.

**Effects and benefits**

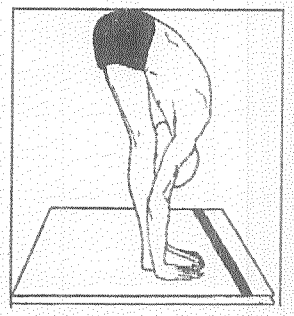
1. Enhances flexibility & digestive power.
2. Reduce stiffness of back, leg, reduce waist line.
3. Lateral thoracic muscles are trenched, lungs capacity increases and excess fat around the waist reduces.

**Padahastasana (Standing Forward Bend Pose)**

In Sanskrit language "Pada" stands for foot while "Hasta" stands for hands while Pada & Hasta together means hand to foot. In fact Padahastasana is a third and tenth posture in the sequence while practicing Surya Namaskar.



**Procedures**



Sthiti - Tadasana

Step 1- Slowly raise the hands sideways up to the shoulder level with (inhalation).

Step 2- Raise the hand up above the head with biceps touching the ears, palms facing forward with inhalation.

Step 3- Bend body forward till body comes with horizontal position, parallel to ground with exhale.

Step 4- Bend further to touch the knees with the forehead, till palms can rest on the ground exhale and normal breath, final posture.

Step 5- Come to back with horizontal position, parallel to ground with inhalation.

Step 6- Come back with raising the hand up above the head with biceps touching the ears, palm facing forward with inhalation.

Step 7- Slowly down the hand sideways on thighs with exhalation.

Relax in Sthiti - Tadasana

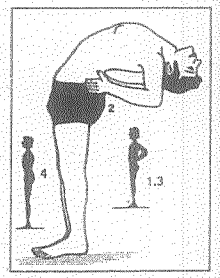
**Effects and benefits**

1. Padahastasana benefits you for strengthening abdominal organs.
2. It eliminates possibilities of bloating of abdomen (tones up all abdominal organs), constipation, indigestion and other gastric problems.
3. It builds spine more flexible, resilient and straight.
4. It removes extra fat from abdomen region.

**Contraindication**

1. If one suffering from back problems like slip disc, sciatica, severe blood pressure practices this Asana then it increases disorder even more.
2. This Asana cannot be practiced without any consultancy of doctor or experts.

**Ardhachakrasana**




Ardha means half, Cakra means circle. This posture appears like a half circle.

This Asana flexes the body backwards from the waist region.

**Procedure**

Sthiti - Tadasana

Step 1-Stand erect, support the back at the waist by the palm and exhale.

Step 2-Bend backwards from lumbar region with inhalation, neck fully extended. Remain in this posture for some time then to erect posture.

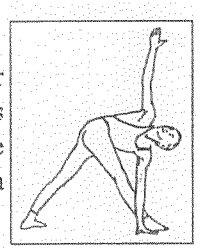
Relax in Sthiti - Tadasana

**Effects and benefits-**

1. It is beneficial in lower back ache.
2. It stimulates blood circulation & spinal nerves.

Caution - Hypertension and vertigo patients should do this asana with care.

**Trikonasana-Triangular Posture**



In Sanskrit language "Trikona" stands for "three angles" or "triangle" and also while practicing this asana the body structure seems to be triangular shape that is why this asana is renowned as Triangle Pose. This asana is also famous by the name Utthita Trikonasana which means "Extended Triangle Pose".

**Procedure**

Sthiti - Tadasana

Step 1- Now keep your feet slightly further apart exactly equal to the distance between two shoulders.

Step 2 - Now inhale deeply and raise both arms in upward direction such that they parallel to the ground and palms facing in downward direction.

Step 3 - Exhale and turn torso to the left with a bend at waist such that right hand is in touch with the left ankle. Palm of right hand is kept along the outside of left ankle by extending left hand straightly upward.

Step 4 - Keep both hands and legs firmly straight and avoid bending at elbows and knees.

Step 5 - Turn head on left side upward direction and gaze at left hand fingertips.

Step 6 - Now inhale and get back to initial posture with both arms stretched out.

Step 7 - Retain this posture by holding breathe as long as one feels it comfort and ease.

Step 8 - Now exhale and repeat same 4 – 8 steps on other side

Relax in Sthiti - Tadasana

Time Duration for Trikonasana



It is suggested that one should practice triangle pose for 2-3 times on both sides as long as one can hold breathe during forward bending posture.

Contraindication-slip disc, sciatica

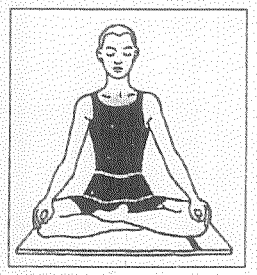
**Effect and benefits**

1. Trikonasana benefits you to stimulate blood flow in the body.
2. It stretch and provides relaxation to the shoulders, back, arms and legs.
3. It stretches thighs, calves & hamstring muscles and making them fit and strong.

**Sitting Postures**

Sitting postures are commonly used for meditation by the Yogis. These postures provide good stability to the body. It also help to attain effortlessly for a longer periods.

**Swasthikasana - (Auspicious Pose)**



Swasthikasana is an easy meditation pose for those who cannot attempt the more difficult Asanas like Padmasana, Siddhasana. Swasthikasana is one of the Dhyanatmaka Asana. The position of the legs resembles the symbol of the Swastika. Sanskrit root words- 'Su' meaning good, 'Asti' means to be or existence and 'Ka' means to make. This Asana can be prescribed as one that helps to realize the unity of existence.

जानूर्वोरंतरे सम्यककृत्वा पादतले ऊभे । ऋजुकायः समासीनः स्वस्तिकं तत्प्रचक्षते ॥

(ह.यो.प्र. 1/21, घे.स. 2/13)

**Procedure**

Sthiti - Dandasana

Step 1 - Spread both legs and keeps at a distance of 1 to 1.5 feet

Step 2 - Bend the left leg in knee joint and place its sole touching inner side of the right thigh.

Step 3 - Bend right leg at knee and place its foot in between the thigh and the calf of the leg.

Step 4 - Keep the wrists of the both hands on respective knee and take Dhyana Mudra, continue normal breathing for some time and then come to the earlier position.

Relax in Sthiti - Dandasana

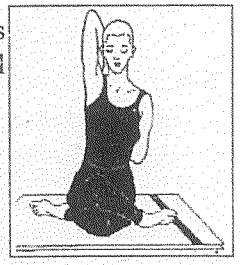
Contraindication- suffering from sciatica and sacral infection.

**Effect and benefits**

1. Swasthikasana is good for Dhyana and Pranayama.

2. Increases the concentration.
3. Even those suffering from varicose veins and aching legs muscles can do it Swasthikasana.

**Gomukhasana-(Cow Posture)**



'Go' means cow 'Mukha' means face. Gomukhasana benefits those with diabetes, stiff back or shoulder, backaches and sexual aliments.

पादौ च भूमौ सम्स्थाप्य पृष्ठपार्श्वे निवेशयेत ।
स्थिरकायं समासाद्य गोमुखं गोमुखाकृति ॥ (घे.स. 2/16)
सव्ये दक्षिणगुल्फं तु पृष्ठपार्श्वे नियोजयेत ।
दक्षिणोऽपि तथा सव्यं गोमुखं गोमुकाकृति ॥ (ह.यो.प्र. 1/21)

**Procedure**

Sthiti- Dandasana

Step 1- fold the left knee back; place it next to right buttock.

Step 2- fold the right leg and place it on top of the left thigh.

Step 3- the knee of the both the legs should be close to each other, one above the other.

Step 4- bend your left arm and place it behind the back.

Step 5- bend your right arm, take it over the right shoulders and place it on the back as far as it can go.

Step 6- now try to touch the two hands behind the back. Initially you may be able to just touch the fingers. Later as you develop flexibility, you will be able to catch the left hand with the right hand.

Step 7- keep the trunk erect and expand your chest. Also pull the head a little to the back.

Step 8- maintain this position for as long as comfortable. In the final position, breathe normally and deeply, with awareness on the breathe.

Step 9- release the hands, straighten the legs and repeat the pose on opposite side for same time duration.

Relax in Sthiti-Dandasana

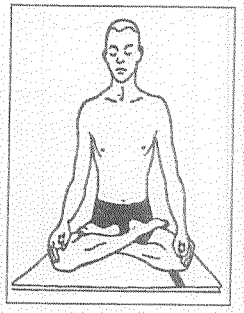
**Effect and benefits**

1. Beneficial in muscle cramps of legs.



2. It can remove stiff shoulder and back pain.
3. It helps in the treatment of sciatica.
4. It helps to develop the chest.
5. It stimulates the kidneys and can help suffering from diabetes.

**Padmasana-Lotus Pose**



Padmasana is an important meditative Asana and mentioned in most yogic texts. In Sanskrit, 'Padma' means lotus and 'Asana' means pose. Padmasana is mentioned in yogic text Hathayoga Pradipika, as one of the main Asanas for meditation that can destroy all diseases. Ancient statues of Shiva, Buddha and Mahavira are all depicted as sitting in Padmasana. The hand Mudras may vary, but the legs are always shown seated in the lotus pose.

वामोरूपरि दक्षिणां हि चरनं संस्थाप्स वामं तथा दक्षोरुपरि पश्चिमेने विधिना कृत्वा कराभ्यां दृढम ।
अङ्गुष्ठौ हृद्ये निधाय चिबुकम् नासाग्रमालोकयेदेतद्व्याधिविनाशनाशनकरं पद्मासन प्रोच्यते ॥
(घे.स. 2/16 ह.यो.प्र. 1/46)

उत्तानौ चरणौ कृत्वा ऊरुसंस्थौ प्रयत्नतः । ऊरुमध्ये तथोत्तानौ पाणि कृत्वा ततो दृशो ॥
नासाग्रे विन्यसेद्राजदंतमूले तु जिव्हाया । उत्तंभ्य चिबुकं वक्षस्युत्थाप्य पवनं शनैः ॥
इदं पद्मासनं प्रोक्तं सर्वव्याधिविनाशन । दुर्लभं येने केनापि धीमता लभते भुवि ॥
कृत्वा संपुतितौ करौ दृढतरं बध्वा तु पद्मासनं । गाढं वक्षसि सन्निधाय चिबुकं ध्यायंश्च तच्चेतसि ।
वारं वारमपानमूर्ध्वमनिल प्रोत्सारयन्पूरित । न्यंचन्प्रानमुपैति बोधमतुलं शक्तिप्रभावान्नरः ॥
पद्मासने स्थितो योगी नाडीव्दारेन पूरितम । मारुतं धरयेद्यस्तु स मुक्तो नात्र संशयः ॥
(ह.यो.प्र. 1/47-51)

**Procedure**

Sthiti - Dandasana

Step 1 - bend the right leg at the knee joint, fold it upon itself and set the heal against the opposite hip joint, sole upturned.

Step 2 - left leg bend and holding the left foot with the hand place it over the right at the foot the heel being near the umbilicus.

Step 3 - sit in position comfortably with hands placed one above other, keeps the neck, hands and spine straight. Fingers in Jnana Mudra.

Step 4 - change the position of the legs after sometime performs the posture with opposite way.

Step 5 - relax with eyes closed and deep breathing.

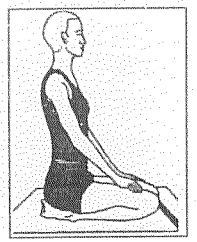
Relax in Sthiti-Dandasana

**Effect and benefits**

1. Padmasana is one of the most important meditative Asana posture.
2. It is also recommended for the practice of Pranayama, it keep the mind attentive and alert.
3. Helps to arose Kundalini power.
4. Beneficial for increase the mobility of the ankle joint.
5. Since the blood is made to flow more towards pelvic region, coccygeal and sacral region, so that all nerves will gets toned up.
6. Enhance blood circulation in lumbar and abdominal region.
7. Removes the excessive fat around the hips and thighs.

Contraindication-avoids stages of acute osteoarthritis, sprains, inguinal hernia, and hydrocele.

**Vajrasana-diamond Pose**



Vajra means Diamond or thunderbolt. Normally Asanas should perform on an empty stomach but, Vajrasana is one of the few exceptions. This Asana can be done immediately after the meal. In fact it is more effective after the meal and aids in proper digestion. Tighten the thigh like the diamond and knees and the feet by the sides of anus, this is Vajrasana which gives Siddhi to Yogis.

जङ्घाभ्यां वज्रवत्कृवा गुदपार्श्वे पदावुभौ । वज्रासनं भवेदेतद्योगिनअं सिद्धिदायकम ॥ (घे.स. 2/12)

**Procedure**

Sthiti- Dandasana

Step 1-Sit erect with legs straight.

Step 2- Bend at the knee and place it by the sides of the thighs.

Step 3- Tighten the thigh and breath normally.

Step 4- release the hands, straighten the legs for same time duration.

Relax in Sthiti-Dandasana

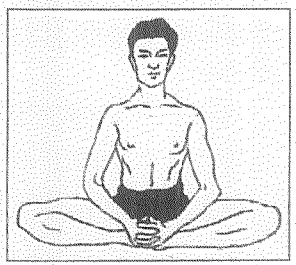
**Effect and benefits**

1. It increases the blood flow to lower pelvic region.
2. It helps to prevent acidity and ulcers by improving the digestion.



3. It is good meditative pose for those suffering from sciatica and severe lower back problems.
4. It helps in improving concentration.
5. This Asana strengthen the muscles in back, neck and chest regions.
6. It expands the chest and is good for lung problems.

**Bhadrasana-Gracious or Blessed Position**



गुल्फौ च वृषणस्याधो यत्क्रमेण समाहितः ।
पादांगुष्ठौ कराभ्याञ्च धृत्वा च पृष्ठदेशतः ॥
जालन्धरं समासाद्य नासाग्रमवलोकयेत ।
भद्रासनं भवेदेतत्सर्वव्याधिनाशकम ॥

(घे.स. 2/9, 10 ह.यो.प्र. 1/9)

**Procedure**

Sthiti- Dandasana

Step 1- fold the legs stretched forwards wide keep the right ankle below the right buttock besides the right part of genitals.

Step 2- place the left ankle in the same way both heals in contact, sole facing each other toes flexed and balanced.

Step 3- cross the hands towards the back and hold the toes of the feet.

Step 4- sit comfortable and stable.

Step 5- release the hands, straighten the legs.

Relax in Sthiti- Dandasana

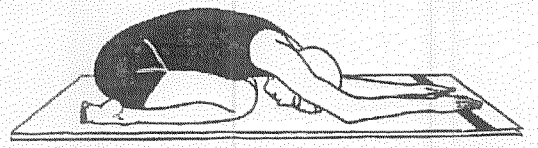
**Effect and benefits**

1. Destroys all sorts of diseases.
2. Improves the mobility of joints
3. Meditative posture.
4. It awakens the Kundalini Shakti.
5. Strengthens the upper extremity.
6. Useful in genitourinary deformity.
7. Indicated in impotency.

Contraindications- piles, fistula in ano, joint pains etc.

**Shashankasana (Hare Pose)**

The Asana resembles a Hare in the final position. Benefits of Shashankasana include



relaxation, relieving of depression and good upper body stretch. Shashankasana is an easy asana to perform and can be done by anyone regardless age.

**Procedure**

Sthiti - Dandasana

Step 1 - Sit in Vajrasana, place your hands on the thigh and breathe in a relaxed manner.

Step 2 - Raise both your hands above the head, palms facing forward. The arms should be in line with the shoulders.

Step 3- Slowly bend down and bring the hands forward, till the hands and forehead touched the ground. Exhales while you bending forward.

Step 4- In the final position the forehead and hands rest on the ground. Rest in this position for as you are comfortable. In final position slow rhythmic and relaxed breathings can be done.

Step 5- Exhale slowly and come back to the starting position.

Step 6- Repeat this process for 5 to 10 rounds.

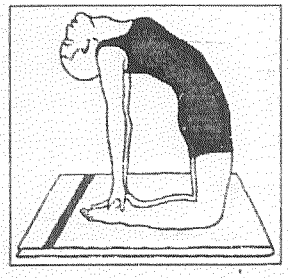
Relax in Sthiti- Dandasana

**Effect and benefits**

1. This asana relaxes the mind and relieves.
2. It tones the pelvic muscle and relieves sciatica pain.
3. It can help in sexual disorders.
4. It gives a good relaxing stretch to upper body.

**Ushtrasana - (Camel Posture)**

अध्यास्य शेते पद्युगमव्यस्तं पृष्ठे निधायापि धृतं कराभ्याम ।
आकुञ्चयेत्सम्यगुदस्यगाढ मौष्ट्रञ्च पीठं योगिनो वदन्ति ॥
(घे.स. 2/41)



**Procedure**

Sthiti- Dandasana

Step 1- Kneel on the floor, keeping the thighs and feet together, toes pointing back and resting on the floor.



Step 2- Rest the palm on the hips, stretch the thighs, curve the supine back and extend the ribs.

Step 3- Exhale; place the right palm over right heel and left palm over the left heel. If possible place the palms on the soles of the feet.

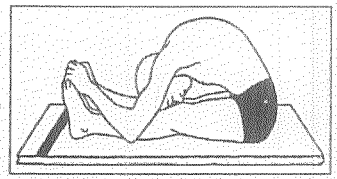
Step 4- Press the feet with the palms throw the head back and push the spine towards the thighs, which should be kept perpendicular to the floor.

Step 5- Contract the buttocks

**Benefits**

1. This Asana applies a wonderful stretch to the whole chest and abdomen, at the same time imparting a thorough massage to the internal organs.
2. As a result, it is useful for alleviating various abdominal ailments associated with the kidneys, pancreas, intestines, liver, etc.
3. Shallow breathing is often caused by inflexibility of the rib cage. Ushtrasana expands the rib cage and the associated muscles are made suppler. As a result deeper breathing is facilitated.
4. The spine is given a wonderful backward bend, loosening up the vertebrae and stimulating the spinal nerves. The shoulders are pulled backwards while the chest is pushed forwards, helping to correct rounded shoulders and a stooping back.
5. The front of the neck is fully stretched, applying a good massage to the nerves and organs in this region. In particular, the all important thyroid gland is regulated. Those people who suffer from backache, neck ache or general stiffness in the spine will gain relief through regular practice of this Asana.

**Pashchimottanasana-(Back Stretching Pose)**



प्रसार्य पादौ भुवि दण्डरुपौ संन्यस्तभालं चितियुग्ममध्ये ।
यत्नेन पादौ कराभ्यां योगीन्द्रपीठं पश्चितोत्तानमाहुः ॥
(घे.स. 2/24)

प्रसार्य पादौ भुवि दंडरुपौ दोर्भ्यां पदाग्रद्वितयं गृहित्वा ।
जानुपरि न्यस्तललाटदेशो वसेदिदं पश्चिमतानमाहुः ॥
इति पश्चिमतानमासनाग्र्यं पवनं पश्चिमवाहिनं करोति ।
उद्यं जठरानलस्य कुर्यादुदरे कार्श्यमरोगतां च पुंसाम ॥ (ह.यो.प्र. 1/30-31)

This Asana has many other names. The most common are Ugrasana (fierce or powerful pose) and Paschimottanasana, which has the same meaning as Paschimottanasana.

There are many meanings associated with the name of this Asana. Literally, the word Paschima means 'the back', or 'posterior'; it also means 'the west'. The word Utthana means 'to stretch'. Therefore, the usual English name of this Asana is 'the back stretching pose'.

This Asana is widely mentioned in many ancient texts. The Hatha Yoga Pradipika says: "Knees straight and fore head on the knees, hands on toes in a sitting position. It directs vital energy into the back especially in the Sushumna; the digestive power is increased, the obesity reduced. Man becomes free of diseases and maintains the body in a healthy condition."

It is similarly described in such books as the Gheranda Samhita and the Shiva Samhita. Infect, the Shiva Samhita is more specific in praising this Asana.

**Procedure**

1. Sit on the floor with the legs stretched out in front of the body.
2. Place your hands on the knees, palms facing downwards. Relax the whole body, especially the back muscles.
3. Breathe in deeply. Then, while exhaling, slowly bend your head and trunk forwards. As you move forwards, slide your hands along the legs towards the feet.
4. Don't bend your legs. Bend forwards as far as the flexibility of your back will allow.
5. Don't strain under any circumstances. The aim is to hold your big toes with the fingers and to touch your fore head to the knees; however many people, especially beginners, will find this impossible at present.
6. Merely bend forwards as far as you are able. If possible, grasp your big toes with your hands. If you cannot manage this, hold your feet at the heels. Otherwise grasp your ankles.
7. If this is impossible, hold your calves. Stay in this position. Consciously relax your back muscles again.

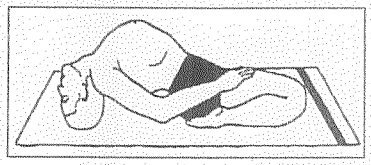
**Benefits**

1. The Asana stretches and tones the spinal and hamstring muscles and the associated nerves. Because it improves the efficiency of the spinal nerves in particular, it has beneficial repercussions throughout the entire body.
2. It loosens the hip joints. It helps to remove excess fat in the abdominal region.
3. The Asana tones all the abdominal organs, including the liver, pancreas, spleen, kidneys and adrenal glands.
4. As such it helps to remove diabetes, flatulence, constipation, etc.



5. It has been found useful for alleviating various types of sexual maladies, for the asana gives a direct massage of the pelvic region.
6. This is an Asana that is traditionally well known for its utility in harmonizing nervous and pranic energies within the body. As such it is very useful for helping to bring about states of meditation.

**Suptavajrasana - (Sleeping Thunderbolt Pose)**



The Sanskrit word Supta means 'sleeping' and Vajra is the name of a pranic channel (Nadi) connected with sexual energy. Vajra also means 'thunderbolt' the so-called weapon of Indra, the king of the gods in Hindu mythology. In this context, it is also associated with sexual energy. This asana is so called because it helps to transmute sexual energy into more subtle forms of energy.

**Procedure**

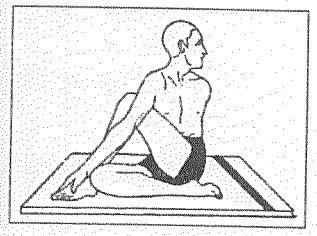
1. Sit in Vajrasana.
2. The knees can be together or separated lean slightly backwards.
3. Place the hands on the floor slightly behind and to the side of the buttocks.
4. Support the weight of the body on the straight arms.
5. Bend one of the arms, allowing the forearm and elbow to rest on the ground; to do this you will have to twist your body to one side.
6. Ther lowly bend the other arm so that both elbows rest on the ground.
7. At this stage the trunk and head should be supported above the ground behind the buttocks.
8. Then take the final pose.

**Benefits**

1. Supta Vajrasana gives an excellent massage of the abdominal organs, there by helping to alleviate various types of digestive disorders.
2. The rib cage and lungs are given an accentuated stretch which helps to improve the breathing process by allowing the chest to expand to full capacity during respiration. It is therefore a good Asana for those people who suffer from asthma, bronchitis or any other lung ailments.
3. Supta Vajrasana loosens up the whole spine and removes any tendency towards round shoulders. The associated nerve connections and blood supply are rendered more efficient. The nerves in the neck and the thyroid gland are particularly influenced.

4. The pelvic region is also given a good stretch; this Asana is therefore useful for ladies in preventing or removing various forms of sexual malfunctions.

**Ardhamatsyendrasana (Half Spinal Twist)**



This Asana is named after the great Yogi Matsyendranath, who is reputed to have performed meditational practices in the full form of this Asana called Matsyendrasana. This is one of the most difficult Asanas in yoga, requiring a 'rubber body'. For this reason we will concern ourselves only with the easier half form of the asana at this stage.

The Sanskrit word Matsya means 'fish', which explains how Matsyendranath and the Asana which we will shortly discuss got their names.

**Procedure**

Stage 1: starting position

1. Sit on the floor with both legs stretched in front of the body.
2. Bend the right leg and place the right foot on the outside of the left knee.
3. Adjust the position of the right foot so that the sole is flat on the floor with the ankle in touch with the side of the left knee; the foot and toes should point forwards.
4. Place the left hand on the left side of the body; this will act as support for the next body adjustment.
5. While leaning on the left arm, fold the left leg backwards to the right.
6. Place the left heel so that it is in contact with the right buttock.
7. The legs should now be in the position as shown in the above figure.
8. Then slowly and gently twist the trunk to the right.
9. Place both hands on the floor on the right side of the body, making the arms straight.
10. Then try to grasp the right ankle with the left hand; don't strain.
11. The left arm should be adjusted so that it is straight and so that the back of the arm is in contact with the right knee and calf; the right knee should be as close as possible to the left armpit.

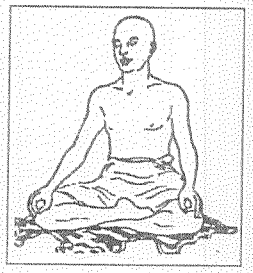
**Benefits**

1. It has been found useful for helping to treat all manner of ailments, including diabetes, indigestion, rheumatism and constipation.
2. Ardha Matsyendrasana has been found beneficial in the treatment of backache, neck ache and headache as well as general body stiffness.



3. It helps to remove any tendency towards round shoulders and has been found useful by many people who have mild cases of sciatica and slipped disc.
4. Contributes much to bringing the spinal muscles and nerves into optimum health.

**Siddhasana-(Male Accomplished Pose)**



The Sanskrit word Siddha has many meanings and implications. It means 'power' and 'perfection', so that this Asana can also be called the perfect pose or the powerful pose. The word Siddhi is derived from Siddha and means a psychic power or faculty developed through Yogic practices. This includes clairvoyance, telepathy as well as many other lesser known powers such as the ability to disappear at will.

Siddhasana is believed to be the Asana that helps to develop these powers.

It is an excellent meditative Asana and the equal of Padmasana. It is often used in specific practices for it applies pressure in the region between the anus and the sexual organs (Mooladhara Chakra). Siddhasana can only be practised by men. The female equivalent is called Siddha Yoni Asana.

योनिस्थानकमडघ्रिमूलघटितं संपीडा गुल्फेतरं । मेढ्रोपर्यय सन्निधाय चिबुकं कृत्वा हृदि स्थापितम ।
स्थाणुः संयमितेन्द्रियोऽचलदृशा पश्यन भ्रु वोरन्तर मेवमोक्षविधायते फलकरं सिद्धासनं प्रोच्यते ॥

(ह.यो.प्र. 1/37, घे.स. 2/7)

**Procedure**

1. Sit with the legs stretched in front of the body.
2. Fold your right leg and place the sole of the right foot against the inside of the left thigh.
3. Your right heel should be placed so that it presses against the area between the anus and the genitals (the perineum). This is an important aspect of Siddhasana.
4. Adjust your body until you are comfortable and the heel is firmly applied against the perineum.
5. Then fold your left leg and place the left foot on top of the right calf. If possible, try to adjust the position of the left heel so that it presses into the pelvis immediately above the genitals.
6. Your genitals should therefore lie between the two heels. If you find this last position difficult, do not worry; merely place your left heel as near as possible to the required position.
7. Adjust the position of the left toes so that they can be pushed into the space between your right calf and thigh.

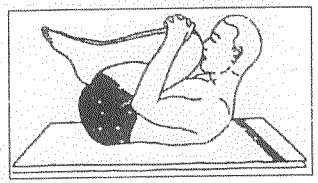
8. The left toes should fit into this space without any pain or general discomfort.
9. If necessary, this space can be enlarged slightly by using the hands or temporarily adjusting the position of the right leg.
10. Then grasp your right toes, either from below or above your left leg and pull them upwards into the space between your left thigh and calf. Adjust the body so that it is comfortable.
11. The knees should be in contact with the ground. The heels should preferably be one above the other. Hold the spine and head upright, yet relaxed.

**Benefits**

Siddhasana gives essentially the same benefits as Padmasana. It differs, however, from Padmasana in that one of the heels applies pressure in the region of the perineum. This pressure is necessary in various yogic practices such as Moolabandha and Vajroli Mudra. These are used a great deal in Kriya Yoga techniques together with Siddhasana. This pressure is important, for it is concerned with awakening a psychic centre in this area called the Mooladhara chakra.

**Supine Postures**

**Pavanamuktasana**



The Sanskrit word Pavan means 'wind' and the word Mukta means 'release' or 'free'. Hence this is a wind releasing pose because it is very useful in removing wind or flatulence from the intestines and stomach. It is especially useful for beginners for though simple, it gives many benefits. Even the unhealthiest person can do this Asana.

**Procedure**

Stage1

1. Place a blanket on the floor. Lie flat on your back. Relax the whole body.
2. Bend the right leg and bring the thigh and knee as near as possible to the chest.
3. The other leg should remain straight. Place the hands over the knee and interlock the fingers.
4. Gently pull the knee nearer the chest. Relax the whole body keeping the straight leg, back and head on the floor.
5. Breathe in deeply and slowly while simultaneously raising the head and shoulders.
6. At the end of inhalation the forehead, nose, chin or neck should touch or be as close as possible to the right knee.



7. Hold your breath for a short time in the raised pose. Then exhale slowly and lower the head and shoulders to the floor to resume the starting position. This is 1 round.
8. Inhale while again raising the body and repeating the procedure. Do a number of rounds.
9. Then straighten the bent leg and relax the whole body for a short time.

Stage 2

Bend the other leg towards the chest and repeat the same procedure as given in stage 1.

Do the same number of rounds. On completion, straighten the left leg and relax the whole body.

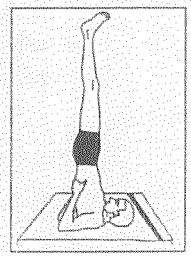
Stage 3

Now fold both legs to the chest. Repeat the same procedure as stage 1. Afterwards relax the whole body with awareness on breath.

**Benefits**

1. This Asana gives an excellent massage to the abdomen. In this pose the abdominal muscles are tensed and simultaneously the internal organs are compressed by the folded legs.
2. This increases the circulation of the blood and stimulates the nerves which connect the organs to the brain or nerve complexes. As such it helps in no small way to relieve various types of abdominal ailments associated with malfunctioning of inefficient organs.
3. This Asana is particularly useful for removing constipation and flatulence. Food moves from the stomach through the intestines during digestion.
4. This Asana also tones up the back muscles and spinal nerves.

**Sarvangasana-(Shoulder Stand Pose)**



The Sanskrit word Sarvangasana is made up of three separate words Sarva, Anga and Asana. The word Sarva Means 'whole', 'all' or 'entire', the word Anga means 'limbs', 'parts', 'organs' or 'members'. Sarvangasana is so called because it is an Asana which influences the whole body and its functions.

**Procedure-** Stage 1: raising the legs.

1. Place a folded blanket on the ground.
2. Lie flat on your back with both legs straight and together. Straighten your arms and place them beside the body, palms downwards.

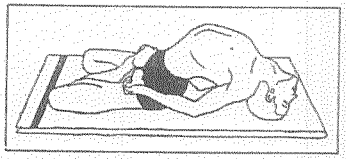
3. For a few seconds completely relax the whole body.
4. During the next movement, raising the body, the breath can be retained inside or outside; that is, you can either breathe in deeply and raise the body or breathe out deeply. It does not matter, but you should hold the breath.
5. Slowly raise your legs by contracting and utilizing the abdominal muscles. The movement should be gradual and with control; it should take at least 10 seconds for the legs to reach the vertical.
6. Keep the legs straight and together. If possible try to raise the legs using only the abdominal muscles for this action will help to strengthen these muscles.
7. If this is impossible, however, you can help to raise your legs by pressing the arms against the ground.
8. At the end of the movement, the buttocks and back should be on the ground with the legs pointing directly upwards.
9. Remain in this position for a short time.

**Benefits**

1. The direct influence on the thyroid gland helps to remove many diseases and generally maintain good health of the entire body.
2. The ageing process is very much associated with the endocrinal system. One can help to maintain youthfulness and rejuvenate an ageing body by regular practice of Sarvangasana.
3. The thyroid gland controls the metabolism of the body. Therefore, by improving the efficiency of the thyroid gland through Sarvangasana one can maintain the correct body weight.
4. Sarvangasana helps to normalize the body weight by balancing the endocrinal system.
5. Sarvangasana integrates all the body systems, improving health and removing disease.
6. Sarvangasana improves the blood supply to the brain.
7. Sarvangasana on the parathyroid glands helps to ensure normal bone growth and regeneration and can prevent premature ossification (hardening) of the bones.
8. Sarvangasana is very useful for asthmatics.
9. Sarvangasana is very useful for treating piles (haemorrhoids) and varicose veins, for it helps to drain accumulated blood from these areas.
10. Regular practice helps to remove various types of digestive ailments, especially where they are caused by blood congestion or general inefficiency of the organs. Diabetics are advised to practise Sarvangasana for it not only influences the pancreas, but also the entire endocrinal system.
11. Sarvangasana tones the reproductive organs and helps to prevent degeneration of the testes, gonads and ovaries as well as the other sexual organs, male and female. It has been found useful in helping to relieve menstrual, menopausal and other general sexual disorders. It helps to alleviate hydrocele, leucorrhea, spermatorrhea, etc.
12. Sarvangasana helps to eliminate and prevent various types of throat and nose ailments, including the common cold.



**Matsyasana-Fish Pose**



वामोरुमूलार्पितदक्षपादं जानोर्बहिर्वेष्टितवामपादम ।
प्रगह्य तिष्टेत्परिवर्तितागः श्रीमत्स्यनाथोदितमासनं स्यात ॥
मत्स्येंद्रं पीठं जठरप्रदिप्तिं प्रचंडरुग्मंडलखंडनास्त्रम ।
अभ्यासतः कुडलिनी प्रबोधं चंद्रस्थिरत्वं च ददति पुंसात ॥ (ह.यो.प्र. 1/28-29)

In Sanskrit the word Matsya means 'fish'. Therefore, this Asana can be translated as 'the fish pose'. At first this may seem a strange name for an Asana that seems to bear no resemblance what so ever to any kind of fish.

**Procedure**

Stage 1: starting position

1. Sit in Padmasana.
2. If you cannot sit in Padmasana please don't try to force your legs. Relax the whole body.

Stage 2: leaning backwards

1. Lean slightly backwards.
2. Place the hands on the floor slightly behind and to the side of the buttocks. Support the weight of the body on the straight arms.
3. Bend one of the arms, allowing the forearm and elbow to rest on the ground; to do this you will have to twist your body to one side.
4. Then slowly bend the other arm so that both elbows rest on the ground.
5. At this stage the trunk and head should be supported above the ground behind the buttocks. Then take the final pose.

Stage 3: final position - alternative A

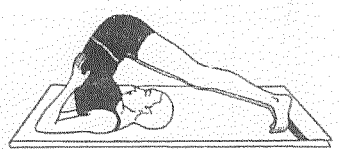
1. Bend your head backwards so that you can see the floor behind your head.
2. Stretch the front of the neck as much as is comfortable.

3. Slowly slide your arms forwards away from your head and lower the top of the head towards the ground. Gently allow the top of the head to support the body weight.

**Benefits**

1. Matsyasana gives an excellent massage of the abdominal organs, thereby helping to alleviate various types of digestive disorders.
2. The ribcage and lungs are given an accentuated stretch which helps to improve the breathing process by allowing the chest to expand to full capacity during respiration. It is therefore a good Asana for those people who suffer from asthma, bronchitis or any other lung ailments.
3. Matsyasana loosens up the whole spine and removes any tendency towards round shoulders. The associated nerve connections and blood supply are rendered more efficient.
4. The nerves in the neck and the thyroid gland are particularly influenced.
5. The pelvic region is also given a good stretch; this Asana is therefore useful for ladies in preventing or removing various forms of sexual malfunctions.
6. The pressure of the legs on the thighs greatly reduces the blood circulation in the legs; the femoral arteries are compressed.
7. The blood flow is diverted to the pelvic organs including the sexual glands (testes and prostate in males and ovaries in females), which helps to revitalize these organs and eliminate various types of associated ailments.
8. It is also a useful Asana for loosening up the legs in preparation for sitting in still postures for meditational practice.

**Halasana-(Plough Pose)**



The Sanskrit word Hala means 'plough'. Halasana is so called because in its final pose it resembles a plough; not the modern mechanized plough but the wooden plough pulled by oxen or bulls that has been used in India since time immemorial and still is. The resemblance is very close. The English name for this Asana is, not surprisingly, 'the plough pose'.

The traditional method of doing Halasana is as follows:

**Procedure**

1. Lie flat on the floor, facing upward.
2. The legs should be straight and together and should remain so throughout the practice.

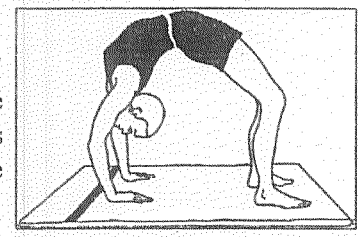


3. The palms can face upward or downward; beginners may place their fists under the buttocks with the knuckles facing upwards.
4. Relax the whole body and prepare for the practice. Breathe in deeply.
5. Then slowly raise the two legs to the vertical position; use the abdominal muscles as much as possible and the arms as little as possible.
6. The aim, eventually, is to use only the abdominal muscles to raise the legs without the slightest help of the arms; this may require a little time and practice.
7. Then fold the legs over the top of the head, keeping them straight as illustrated. As the legs are raised over the head, the buttocks and hips should also be simultaneously raised.
8. Gently lower the feet toward the ground behind the head, but without the slightest strain.
9. If possible touch the toes to the ground behind the head; those who are unable to do this should allow their feet to suspend above the floor.
10. This is the final pose.

**Benefits**

1. Halasana gives many of the same benefits as Sarvangasana. However, the direct influence on the brain is much less, with more emphasis on the back, abdomen and pelvis. It combines the benefits of inverted Asanas with forward bending Asanas.
2. Halasana is almost an upside down form of Paschimottanasana, though there is a distinctive difference between the benefits that they give. Paschimottanasana acts mainly on the lower back and stretch the back; Halasana, on the other hand, acts mainly on the upper back and neck region.
3. These two Asanas supplement each other. Halasana makes the entire spine supple, stretches the muscles, loosens the vertebrae and tones the nerves both inside and outside the spinal column. This leads to better efficiency of all the organs in the body.
4. The thyroid and parathyroid glands are rendered more efficient. The abdominal muscles are strengthened. The abdominal organs are massaged.
5. This helps to alleviate constipation, dyspepsia, diabetes and various other abdominal ailments. It generally decongests and revitalizes the liver, spleen, kidneys, pancreas and adrenal glands.
6. It helps to remove backache, neck ache and headache. Besides these physical benefits, Halasana done with attention can induce states of Pratyahara (sense withdrawal) as a preparation for meditational techniques.

### Chakrasana-(Wheel Pose)



The word Chakra has many meanings 'wheel' 'circle', 'vortex', 'whirlpool', 'spiral' and so on. In the context of Chakrasana, the best English translation is 'wheel pose'. This Asana is so called because of the wheel shape taken by the body in the final pose.

**Procedure**

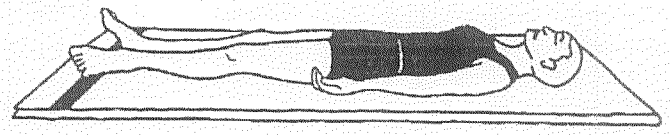
1. Lie flat on your back. Bend the legs and place the heels near the buttocks; the feet should be about half a meter apart.
2. Bend the arms and place the hands on the ground beside the back of the head; the fingers should point towards the shoulders with the palms flat on the floor.
3. This is the starting position. Relax the whole body for a few seconds in preparation for performing the final pose.
4. Breathe in deeply.
5. Then raise the head and trunk off the ground by straightening the legs and arms; the feet and hands should not be moved.
6. Try to arch the back as much as possible to take the final pose. Let the head hang between the two straight arms.
7. The degree of bend in the back can be accentuated by bending or straightening the knees, and allowing the shoulders to move over the arms.
8. Do not try to bend the back more than its flexibility will allow.
9. This is the final pose. Breathe slowly and deeply. Stay in the final pose for as long as is comfortable.
10. Then slowly return to the starting position by slowly lowering the body to the ground.
11. The Asana can be repeated once or twice if you have sufficient energy and time.

**Benefits**

1. Chakrasana also massages the abdominal organs but by stretching the outer muscles, deep breathing in the final pose, accentuates this process.
2. Chakrasana, unlike Dhanurasana, is also an inverted Asana. Therefore, a minute or so in the final pose will flush the brain with a freshly oxygenated supply of blood. This will help to improve the efficiency of the brain cells and in turn, the overall health of the entire body.
3. Chakrasana is an excellent Asana that can help to bring about optimum health of the body



### Shavasana



This Asana is also known as Mrutasana (the dead man's pose).

उत्तानं शववभ्दूमौ शयनं तच्छवासनम । शवासनं श्रांतिहरं चित्तविश्रांतिकारकम ॥ (ह.यो.प्र. 1/34)

**Procedure**

1. Lie flat on your back in the supine position.
2. Place a small pillow or folded blanket behind your head with the corners pulled under the shoulders; this ensures that your neck and shoulder muscles can relax.
3. Don't use a thick pillow for this will tend to cause more tension by arching your neck upwards excessively.
4. Rest the arms in line with and on each side of the body.
5. Leave a little space between the arms and the side of the body.
6. The palms should face upwards and the hands should not be clenched.
7. The legs should be straight and slightly separated.
8. Close your eyes.
9. Try to feel the different parts of your body in contact with the floor. This is most important for it starts to develop your awareness of the different parts of the body.
10. Feel the contact between the floor and the buttocks. If you feel that the muscles of the buttocks are pulled together, release them.
11. Keep your attention on the pressure between the floor and the buttocks for a few seconds until you think that this area of the body is relaxed.
12. Now try to feel the contact between the ground and the right heel for a few seconds.
13. Repeat the same thing with the left heel.
14. Now- feel the contact between the floor and the right arm, right hand, left arm, left hand, middle of the back, each shoulder blade, the back of the head and finally the whole body; spend a few seconds at each point of contact.
15. Next, try to feel that your whole right leg is very heavy and that it is sinking into the floor. If you cannot feel this heaviness, don't worry a little practice is necessary in the beginning.

**Benefits**

1. Basically Shavasana relaxes the whole physiological, psychological system. A relaxed mind allows you to see and relate to the world and the people around you in a more realistic light, carry out your work more smoothly and attain more happiness in life.
2. A tense mind automatically implies a tense body. From this combination result the majority of diseases which inflict mankind.
3. Shavasana, by relaxing the mind-body complex, helps to relieve and prevent disease. Its benefits are inestimable.

**Setubandhasana**

In Sanskrit 'Bridge' means 'Setu', 'Bandha' means 'Lock' and 'Asana' means 'Pose'. The poses look like the shape of the bridge, so this pose is called as bridge poses i.e. Setubandhasana. Basically this pose is effective in relaxing the body and reducing stress. It stretches the chest, spinal cord and neck.

**Procedure-**

1. First lie down as Shavasana or in supine position.
2. Your arms should be on the sides of your thighs.
3. Now, fold your knees and clasp your ankle with your palms.
4. The distance between the feet should be 10 inches.
5. With inhale raise your back in relaxed manner as possible as you can.
6. One can also be on toes by raising the heels. It gives more stretching to the back as well as the neck.
7. Maintain the pose for 30 seconds or more with slow inhaling and exhaling.
8. Bring your back down with deep exhale and have a rest.
9. Repeat this process for 3 to 5 times.

**Benefits**

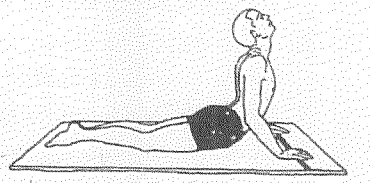
1. Thyroid treatment: Providing appropriate stretch on the back leads to suitable massage to the neck. In fact, it helps to regulate the functions of thyroid gland thereby helpful in releasing thyroxin hormone.
2. Relieves back pain: This asana provides the spine a backward movement and correct stretching, which is helpful in easing back ache and strengthens the back.
3. Good for neck pain: The yoga pose removes strain from the neck.



4. Good for tennis elbow: If one raises one's back by holding his ankle, it exerts effective stretch on the elbow and may be helpful in treatment of tennis elbow.
5. Good for mind and body: The yoga posture provides good health to nerves, which indirectly control the smooth coordination of body and mind.
6. Massage the Colon: It facilitates suitable stretches and massages to the abdominal organs, especially the colon.
7. Good for brain: It has calming effect to the brain thus helpful in reducing stress, depression and anxiety.
8. Enhance digestion: It improves digestion.
9. Osteoporosis: It is also suggested to those who have having the problems of Osteoporosis.
10. Good for asthma: It enlarges the horizon of chest and shoulder while performing. Accordingly, works upon the expansion of the lungs.
11. Menopause problems: It helps to ease out the problems related with menopause.

**Prone Postures**

**Bhujangasana-(cobra Pose)**



Bhujangasana emulates the action of the cobra raising itself just prior to striking at its prey. We have already discussed Ardha Bhujangasana, which is the preparatory pose form astering Bhujangasana. If your back is stiff then you should do Ardhabhujangasana just before doing Bhujangasana. Otherwise Bhujangasana alone is sufficient.

अंगुष्टनाभिपर्यन्तमधोभूमौ विनिन्यसेत । करतलाभ्यां धरां धृत्वा ऊर्ध्वशीर्षः फणीव हि ।
देदाग्निर्वर्द्धते नित्यं सर्वरोगवोनाशनम । जागर्ति भुजगी देवी भुजगासनसाधनात ॥ (घे.स. 2/42-43)

**Procedure**

1. Lie flat on the stomach with the legs straight and the soles of the feet uppermost.
2. Place the palms of the hands flat on the floor below and slightly to one side of the shoulders; the fingers should point forwards and the arms should be bent with the elbows facing backwards.
3. Rest the forehead on the ground.
4. Close the eyes. Relax the whole body, especially the lower back. This is the starting position. Breathe out slowly and deeply.
5. Then as you breathe in raise the body in the way we will describe.

6. Slowly bend your head backwards so that the chin eventually points forwards and the back of the neck is compressed. Feel the stretch of the front part of the neck.
7. Now the arms must be brought into play. Slowly raise the head and shoulders off the ground by progressively straightening the arms.
8. Feel the flexion of the back roll down the spine starting from the neck region and working towards the lower back; try to feel the flexion of each individual vertebra throughout the movement. Remember, it is the arms that execute the movement.
9. Keep the back and legs as relaxed as possible.
10. Try to keep the navel in contact with the ground; if the navel is raised too high then the bend tends to be at the knees and not the back.
11. Continue slowly to arch the back as far as flexibility will allow.
12. In this position the back of your head should point towards your feet. Your arms may or may not be straight it depends on the flexibility of your back.
13. You will feel a pleasantly painful sensation in the lower back; this is a good sign that you are doing the Asana correctly. Hold this final pose for as long as comfortable.
14. On exhalation return to the starting position.

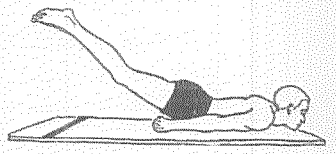
**Benefits**

1. This Asana increases the flexibility of the back and massages the abdominal organs. It gives many other similar benefits. In particular it influences the kidneys and the adrenal glands. The kidneys purify our blood.
2. This helps give our mental and physical constitution more stability.
3. This Asana massages the organs of the abdomen and pelvis such as the stomach, pancreas, liver, gall bladder and sexual and eliminative organs. In particular we recommend it for treating female disorders such as leucorrhoea, dysmenorrhoea and amenorrhoea as it notably tones the ovaries and uterus.
4. Those people who suffer from a slipped disc or sciatica can also benefit from this Asana, but they should be careful.
5. The thyroid gland is also regulated. This has a large part to play in maintaining a healthy body and its optimum condition is essential.
6. Bhujangasana expands the chest, which improves one's breathing habits.

**Shalbhasana-(Locust Pose)**

This Asana is so called because the legs are raised in the final position to imitate the tail of a locust. It is also commonly known as the grasshopper pose for the same reason.





It is an excellent backward bending asana which has a specific influence on the organs, muscles and nerves of the pelvis, abdomen and chest. It is also particularly note worthy for the fact that it is one of the few Asanas that gives a direct massage to the heart.

अध्यास्यः शेते करयुग्मं वक्षेधूमिमवष्टभ्य करयोस्तलाभ्याम ।
पादौ च शून्ये च वितस्ति चोर्ध्वं वदन्ति पीठं शलभं मुनीन्द्राः । (घे.स. 2/39)

**Procedure**

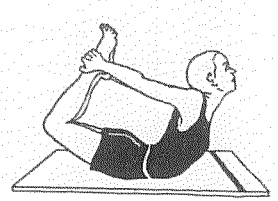
1. Lie flat on the ground, face downwards.
2. Your legs should be straight with the feet together; the soles should point upwards. The arms can be placed either beside the body or under the body; the palms can face downwards, upwards or may be clenched.
3. The hands and arms is left to the discretion of the practitioner through his own personal experience.
4. Keep the chin in contact with the ground throughout the practice.
5. The shoulders should be as near as possible to the floor and remain so throughout the practice.
6. Relax the whole body. Close your eyes. Breathe out deeply.
7. Then inhale deeply, hold your breath and raise both legs, keeping them together and straight.
8. The elevation of the legs is produced by applying pressure on the arms and contracting the lower back muscles.
9. Hold the legs in the raised position while retaining your breath.
10. Hold the final position for as long as you can without straining.
11. Then slowly lower the legs and exhale.

**Benefits**

1. Shalabhasana stimulates the whole autonomic nervous system, particularly the parasympathetic outflow.
2. Shalabhasana does this by stretching the nerves and improving the blood circulation, allowing new oxygenated blood to circulate.
3. The pressure in the abdomen due to the weight of the body is transmitted to the lungs and heart via the diaphragm, improving the functioning of both these vital organs.
4. This Asana has been found useful for relieving sciatica and mild forms of slipped disc.

### Dhanurasana-(Bow Pose)

The Sanskrit word Dhanu means 'a bow'. Therefore, this is called 'the bow pose', because in the final pose the body resembles a bow, the trunk and thighs representing the wooden part of the bow and the lower parts of the legs and the arms representing the bowstring.



प्रसार्य्य पादौ भुवि दण्डरुपौ करौ च पृष्ठे धृतपादयुग्मम ।
कृत्वाधनुस्तुल्यपरिवर्त्तिताङ्गं निगद्यं योगी धनुरासनं तत ॥ (घे.स. 2/18)

**Procedure**

1. Lie flat on the floor, facing downwards.
2. Bend the legs at the knees and bring the heels as close as possible to the back.
3. Reach back with your hands and grasp the ankles of each leg.
4. Hold the feet together so that the big toes are in contact.
5. Place your chin on the ground. Relax your whole body, especially your back. This is the starting position.
6. Breathe out deeply while on the ground. Breathe in deeply.
7. Then tense your leg muscles and try to straighten your legs.
8. This is of course impossible because of the anchoring effect of the arms.
9. The result will be that you will arch your back and lift thighs, chest and head off the ground. The only muscular contraction should be in the legs. The back, the arms and the rest of the body should be relaxed as much as possible.
10. Hold the head back and raise the chin.
11. You should adjust your position so that the soft part of the abdomen (the belly) supports the weight of the entire body on the ground.
12. Hold your breath in the final pose. Stay in the final pose for as long as it is comfortable.
13. Don't strain. Then slowly relax the leg muscles and return to the starting position.

**Benefits**

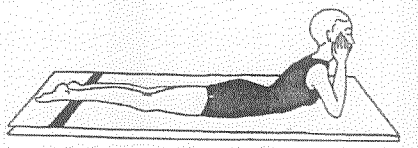
1. Dhanurasana roughly duplicates the benefits of Bhujangasana and Shalabhasana.
2. Improved functioning of the whole body, especially the digestive, eliminative and reproductive organs.
3. Overall improved digestion.
4. It helps to alleviate constipation, dyspepsia, sluggishness of the liver, diabetes and excess fat.



5. Relieves stiffness and the spine is made more supply and healthy.
6. This also helps to alleviate various types of rheumatism.

### Makarasana-(Crocodile Pose)

This Asana is very similar to the sphinx Asana. It is an Asana that many people do naturally. Those who suffer from slipped discs or other spinal disorders, as well as asthma and other lung ailments.



अध्यास्यः शेते हृद्यं निधाय भूमौ च पादौ च प्रसार्यमाणौ ।
शिरश्च धृत्वा करदण्डयुग्नेदेहाग्निविकारं मकारासनं तत ॥ (घे.स. 2/40)

**Procedure**

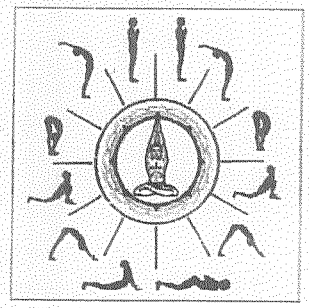
1. Lie flat on the stomach with the head and shoulders raised off the ground.
2. The head is cupped in the palms with the elbows resting on the ground.
3. Relax the whole body and close the eyes.
4. Be aware of the natural and rhythmic breathing pattern.
5. If you like you can also count the breath.

**Benefits**

1. If you suffer from any spinal or lung ailments, we suggest you lie in Makarasana for as long as possible; the longer the better.
2. You can even read a book in this Asana. This position encourages the spine to resume its normal shape and releases compression of the spinal nerves (sciatica).
3. The chest is also expanded allowing an increased amount of air to enter the lungs, which is a great help in alleviating congestion and other ailments of the respiratory system.
4. This Asana can also be used as a simple meditational pose by those persons who find sitting Asanas impossible.

### Suryanamaskara-Procedure and Benefits

The Sanskrit word Surya means 'sun' and the word Namaskara means 'salutation' or 'worship'. Therefore, this practice is known as 'salutation to the sun'. Surya Namaskara is a dynamic exercise. It is neither an Asana nor a part of traditional Yoga. But because it is such a wonderful practice we have incorporated it into the Yoga techniques that we teach.



It can be practised at almost any time of the day and in any place. No special preparations are necessary. If you feel tired during the day, a few rounds of Surya Namaskara will quickly restore the lost vitality, both physically and mentally. If you feel angry or depressed, Surya Namaskara is an excellent antidote; not a panacea, but a great help in removing emotional disturbances. It is a rhythmical, symmetrical exercise which is really a pleasure to perform. When it is perfected, the body almost appears to flow through the different movements without any effort or conscious will. Each part of the body seems to move automatically into the right position at the right time and in the right sequence without any effort.

**Basic features**

Surya Namaskara consists of live essential aspects. All of them must be done to gain the optimum results from the practice. These aspects are as follows:

1. *Physical postures:* there are twelve physical postures which correspond to the signs of the zodiac. During the sun's apparent journey through the heavens it passes through each of these celestial houses in turn. It remains in each zodiac for about thirty days and is said to triumph over each sign as it enters its domain.

Each position in Surya Namaskara corresponds to one of these signs of the zodiac.

2. *Breathing:* the whole movement of Surya Namaskara from start to finish is synchronized with breathing. Each position is associated with inhalation, exhalation or retention of breath. Nothing is forced or unnatural, for the breathing corresponds to the pattern one would normally do in relation to the physical movement. Correct automatic breathing should occur naturally without any prior instructions. However, details of the correct relationship between movement and breath are given to ensure it is done perfectly, for it is air important part of the practice. Without synchronization between the breath and the movement many of the benefits of Surya Namaskara are missed.

3. *Mantras:* associated with each of the twelve positions of Surya Namaskara is a specific Mantra. A mantra is a combination of syllables, sounds or phrases, realized by ancient sages, which have been widely known in India for thousands of years. They are evocative sounds and through their power of vibration have subtle, yet powerful and penetrating effects on the mind and body. While doing Surya Namaskara, a particular mantra is repeated either silently or uttered aloud with each poisor..

When Surya Namaskara is combined with correct breathing and these Bija Mantras (seed sounds), the entire mind and intellect are energized. These Bija Mantra as create a vibration and it is this which creates the energy.

Mantras may or may not have specific meanings. But the vibrations which they create



should reach every fibre of one's being. The Mantras of Surya Namaskara are energized sound. When repeated loudly, clearly and with devotion, these Mantras give the greatest possible benefits to those who utter them, either hastening the curing of an ailment, acquiring stability of mind and self-control, or dissolving tensions caused by modern living.

The full Mantras, one for each movement of the exercise are:

1. Om Hram Mitraya Namah
2. Om Hrim Ravaye Namah
3. Om Hrum Suryaya Namah
4. Om Hraim Bhanave Namah
5. Om Hraum Khagaya Namah
6. Om Hrah Pushne Namah
7. Om Hram Hiranyagarbhaya Namah
8. Om Hrim Marichaye Namah
9. Om Hrum Adityaya Namah
10. Om Hraim Savitre Namah
11. Om Hraum Arkaya Namah
12. *Om Hrah Bhaskaraya Namah*

The meanings of these names of the sun are as follows :

1. *Mitra* - friend
2. *Ravi* - shining
3. *Sun* - beautiful light
4. *Bhanu* - brilliant
5. *Khaga* - who moves in the sky
6. *Pushan* - giver of strength
7. *Hiranyagarbha* - golden centred
8. *Marichi* - lord of the dawn
9. *Aditya* - son of Aditi
10. *Savita* - beneficent
11. *Arka* - energy
12. *Bhaskara* - leading to enlightenment

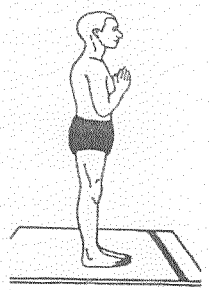
4. *Awareness:* this is an essential element of Surya Namaskara. Without awareness

the many beneficial results are reduced.

5. *Relaxation*- this is not strictly a part of Surya Namaskara. However, it is a necessary supplementary practice that should be done without fail on completing your rounds. Any relaxation technique can be adopted, but the best method is Shavasana.

**Methods**

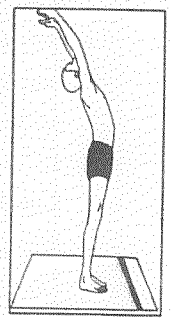
**Position 1 :** Pranamasana (prayer pose)



1. Stand erect with the feet together.
2. Face the sun or the direction of the sun.
3. Place the two palms together in front of the chest in an attitude of prayer, the Namaskara Mudra.
4. Close the eyes and relax the whole body.
5. Be aware of the body for at least half a minute.
6. This will prepare you for the forth coming practice.
7. Try to consciously relax the muscles of the body.

Breathing: Breathe normally with full awareness.

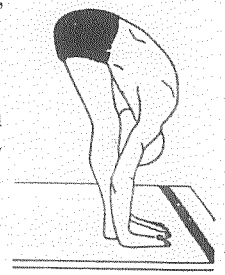
**Position 2:** Hastauithan Asana (raised arms pose)



1. Raise both arms above the head, keeping hands separated by a shoulder's width.
2. At the end of the movement bend the head, arms and upper trunk backwards.
3. The palms should face forwards.
4. The movement should be executed in one smooth motion with awareness.

Breathing: Inhale while raising the arms.

**Position 3:** Padahastasana (hand to foot pose)

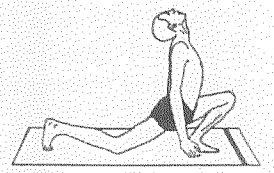


1. Bend forward and place the palms of the hands on the floor, either in front of or on each side of the feet.
2. The movement should be continuous and without any jerking.
3. Keep the legs straight. If possible, try to touch your knees with your forehead or chin; (be careful of your nose for you may cause injury when doing Surya Namaskara quickly).
4. Under no circumstances should undue force be used in order to attain the final position.



Breathing: Exhale as deeply as possible while bending forwards and if possible accentuate the contraction of the abdomen, especially in the final position.

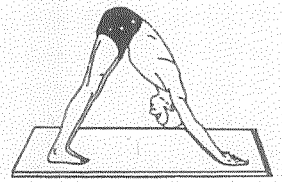
**Position 4 :** Ashwa Sanchalanasana(equestrian pose)



1. Stretch the right leg backwards as far as you can.
2. Simultaneously bend the left leg at the knee, but keeping the left foot in the same position.
3. The palms should remain on the floor and the arms should remain straight.
4. Beginners: If this is too difficult for beginners the palms can be raised off the ground, with only the finger tips in contact with the floor. This helps to increase the arch of the back. In the final position the toes and knee of the extended right leg should be in contact with the ground. Complete the movement by bending the head backwards and arching the spine as much as possible without straining.
5. The movement should be executed smoothly and with awareness.

Breathing : inhale deeply as you move the body.

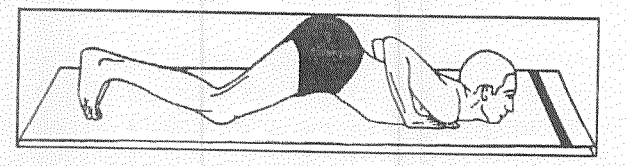
**Position 5 :** Parvatasana (mountain pose)



1. Raise your right knee.
2. Simultaneously lower your head towards the floor and bend the back so that the buttocks move upwards.
3. Stretch the left leg backwards and place the left foot beside the right foot.
4. Then raise the buttocks as high as possible into the air and further lower the head so that it lies between the two arms.
5. The legs should be straightened in the final position.
6. Try to press the heels of both feet towards the ground.
7. Throughout the practice the arms must remain straight, and the hands and right foot should remain in contact with the floor.
8. Though attainment of position five requires the movement of various parts of the body, all the movements should be synchronized to form one harmonious and smooth motion.

Breathing : Exhale deeply as you perform the movement.

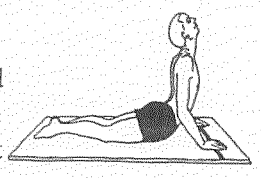
**Position 6 :** Ashtanga Namaskara (worship with eight points)



1. This position is so called because in the final pose eight points of the body are in contact with the ground.
2. Lower the body to the ground, first bending the legs and placing the knees in contact with the floor.
3. Bend the arms and lower the head and trunk towards the ground.
4. Try to brush your forehead along the surface of the floor as you move the head and trunk forwards.
5. At the end of the forward movement of the head and trunk, let the chest brush along the surface of the floor and rest the chin on the ground.
6. Finally raise the abdomen and hips slightly of the ground.
7. In the final position the eight points should be on the ground: the chin, the chest, two palms, two knees and the balls of both feet.
8. The whole movement should be smoothly executed.

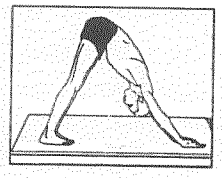
Breathing : Hold the breath outside, i.e. don't breathe in.

**Position 7 :** Bhujangasana (cobra pose)



1. Lower the hips to the ground.
2. Simultaneously straighten the arms so that the head and back arch upwards.
3. In the final position the head and back should be bent backwards as far as is comfortable, but try to keep the abdomen as close as possible to the floor, without straining.
4. The position of the hands and feet should not change throughout the movement.
5. Breathing; Inhale deeply during the movement.

**Position 8 :** Parvatasana (mountain pose)



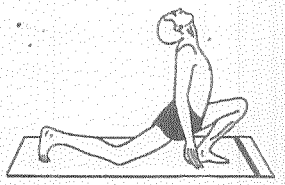
1. This position is a repeat of position 5.
2. From the arched position of Bhujangasana bend the back in the opposite direction so that the buttocks move upwards.



3. Keep the arms and legs straight and don't move the position of the hands and feet.
4. In the final pose the buttocks should be as high as possible, the head should be between the arms and the heels should be gently pressed towards the floor.

Breathing : Exhale while performing the movement.

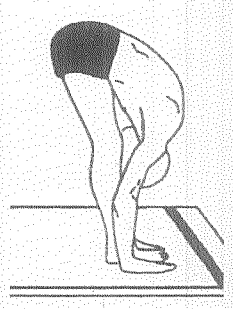
**Position 9 :** Ashwa Sanchalanasana(eques train pose)



1. This position is a repeat of position 4.
2. Bend the left leg and place the left foot between the two hands. Simultaneously raise the head upwards, arch the back downwards and lower the right knee to the floor.
3. The position of the two hands and the right foot must not change.
4. The arms should remain straight throughout.
5. In the final pose, accentuate the arching of them back and bend the head backwards as far as possible.

Breathing : Inhale deeply while assuming the final pose.

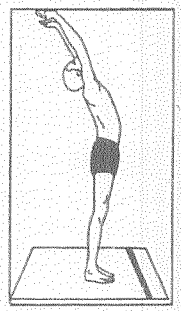
**Position 10 :** Padahastasana (hand to foot pose)



1. This position is the same as position 3.
2. Lower the head towards the ground.
3. Simultaneously raise the buttocks and right knee upwards.
4. Then, when you are able, place the right foot beside the left foot in between the hands.
5. Straighten the legs and try to touch the forehead to the knees.

Breathing : Exhale deeply as you move the head towards the knees.

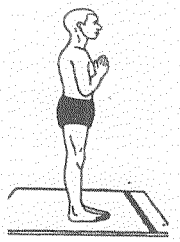
**Position 11:** Hasta Utthanasana (raised arms pose)



1. This position is the same as position 2.
2. Smoothly straighten the whole body.
3. Keep the arms straight and separated by about a shoulder's width.
4. Raise the arms over the head and lean the head, arms and back slightly backwards.
5. To do this the abdomen must be pushed a little forwards.

Breathing : Inhale throughout the movement.

**Position 12 :** Pranamasana (prayer pose)



1. This is the final pose and the same as position 1.
2. Bring the palms together and hold them in front of the chest.
3. Relax the whole body.
4. Breathing : Exhale while assuming the final pose.

Breathing : Breathe normally while remaining in the final position prior to continuing the practice.

**Precautions**

Surya Namaskara is a powerful method of eliminating toxins from the body. However, these toxins should not be eliminated too quickly, for they may manifest in a number of uncomfortable ways, such as huge painful boils. If any such symptoms or sign of fever begins to show, reduce the number of rounds of Surya Namaskara or even stop altogether for a few days. The toxins must be eliminated from the body, but it should be done gradually over a period of weeks or months, utilizing Surya Namaskara, Asanas and Pranayama.

**Benefits**

**Digestive system :** The abdominal organs and stomach are alternately stretched and compressed. This imparts a healthy massage to the internal organs and ensures that they function correctly, or if they don't currently work efficiently, encourages them to do so.

Many diseases of the digestive system can be prevented and removed by the regular practice of Surya Namaskara.

**Eliminative system:** Rapid elimination of waste materials from the body is essential.

Often undigested waste products remain in the intestines and bowels due to constipation, which can result in various other disorders. Surya Namaskara stimulates the peristalsis of the intestines helping to remove any tendency towards constipation.

The kidneys are also important eliminative organs. They filter impurities from the blood and eliminate them from the body in the form of urine.

**Skin** -A high proportion of the body's waste products are eliminated through the skin. This process works particularly well when a person sweats profusely. Often toxins accumulate in the skin, manifesting as boils and pimples. If a good sweat was developed regularly there would be fewer tendencies for this to happen as the toxins would reach the outer surface of the skin and be washed off. Surya Namaskara results in increased



perspiration and there by encourages the elimination of toxins from the body, helping to prevent skin ailments.

**Circulatory system:** Surya Namaskara increases the heart beat and the workings of the whole circulatory system, helping to eliminate waste materials from the body. Areas of sluggish blood are also removed and replaced by purified and oxygenated blood. All the cells of the body receive extra nutrition enabling them to function more efficiently.

This leads to better health and increased vitality. The lymphatic system is also speeded up. This system is most important in protecting the body against infection.

**Respiratory system:** Most people tend to breathe superficially in short and shallow gasps. This starves the body of the oxygen it requires for perfect health. Carbon dioxide also tends to accumulate in the system. Further underutilization of the lung capacity allows a build up of germs which can lead to various illnesses.

Surya Namaskara, when done correctly, accentuates the exchange of air to and from the lungs, opens and expands the intricate alveoli, or air sacs, of the lung tissue and exercises the muscles of the surrounding chest region. The lungs are emptied of impurities and stale air and the body and brain are revitalized by the extra supply of oxygen they receive. One can almost feel the extra supercharge of energy.

**Endocrinal system:** This system plays an important part in determining our well-being and attitude towards life. It consists of a large number of different chemicals (hormones) which interact with each other, reinforcing or counteracting each other. Even the slightest imbalance can cause widespread repercussions in the form of disease. A well-known example is diabetes. There are many other illnesses which are a direct result of hormonal imbalance. The hormones are the officers of the body, the brain is the commander and the parts of the body are the soldiers. It is the hormones that mobilize and coordinate the different functions of the body. Rate of growth, sexual functions, excitability and so on are all controlled by hormones.

Surya Namaskara harmonizes this system helping to remove any irregularities by directly massaging the relevant glands and improving their blood flow. Imbalance of the endocrinal system is often caused by mental tension. Surya Namaskara can help to remove or reduce this deeper cause of hormonal malfunction, especially if it is supplemented by other Yoga practices.

**Nervous system:** The multitudes of nerve connections throughout the body are gently stretched, massaged and stimulated while doing Surya Namaskara. It is these nerves that connect the different parts and organs of the body with the brain. The nerves are the intermediaries. Even if an organ is in perfect condition it can only function as well

as the nerves will allow. If the nerves are unhealthy then the functioning of the associated organs must suffers. If the pipe connecting the water tank to the tap is blocked, then the tap cannot work properly, even though it might be perfectly new. It is the same with the bodies nervous system. The nerve fibres determine how well the organs and muscles of the body function.

**Muscles and skeleton:** Surya Namaskara exercises all the main muscles and joints in the body. The muscles are contracted and extended and any impure, stagnant blood is redirected back to the lungs and kidneys for purification. It is an excellent method of loosening up the body for Asana practice.

# CHAPTER 17 Pranayama

The word Pranayama is a combination of "Prana" and "Ayama". Prana means breath and Ayama means to extent. Pranayama is an exact science. It is the fourth Anga or limb of Ashtanga Yoga.

तस्मिन सति श्वास पश्वासयोर्गति विच्छेदः प्राणायामः । (प.यो.सू. 2/49)

Regulation of breath or the control of Prana is the stoppage of inhalation and exhalation, which follows after securing that steadiness of posture or seat, Asana. Prana is the vital energy required for sustaining the dynamic operation and coordination of each organ within a body. The continuous flow of Prana in the Nadis, or subtle nerves in the body, is important for a disease-free body. Pranayama is control and smooth flow of Prana through Yoga exercises. Pranayama or Prana-control can be achieved by the modification of breathing patterns. Pranayama exercise is done through proper regulation of inhaling, holding the breath and exhaling. While Pranayama can be practiced alone, it can be integrated with several of the Asanas (postures) for improved benefits.

After the mastery over the Asana, controlling the inspiration and expiration is known as Pranayama. One should consume wholesome diet while doing Pranayama. Pranayama helps to establish control over mind and thus helps in the mastery of the other Angas of Yoga.

चले वाते चलं चित्तं निश्चले निश्चलं भवेत । योगी स्थाणुत्वमान्योति ततो वायुः निरोधयेत ॥
(ह.यो.प्र. 2/2)

When Pranavayu is moving, even the mind will be under stable. When Pranavayu attains stability, even the mind becomes stable. When both Vayu and mind become stable, then only Yogi can attain Sthanutva. So one should control the Vayu through Pranayama process.

**Pranayama (According to the Gita)**

अपाने जुहवति प्राणं प्राणेऽपनं तथापरे । प्राणापानगति रुद्ध्वा प्राणायामपरायणाः ॥ (गीता 4.29)

Others offer Prana (outgoing breath) in Apana (incomingbreath) and Apana in Prana, restraining the passage of Prana and Apana, absorbed in Pranayama.

Pranayama is a precious Yajna (sacrifice). Some practise the kind of Pranayama called Puraka (filling in). Some practise the kind of Pranayama called Rechaka

(emptying). Some are engaged in the practice of Pranayama called Kumbhaka, by impeding the outward passage of air, through the nostrils and the mouth, and by impeding the inward passage of the air, in the opposite direction.

**Pranayama (According To Sri Sankaracharya)**

"Pranayama is the control of all life-forces by realising naught but Brahman in all things as the mind, etc.

बाह्याभ्यन्तरस्तम्भवृत्तिर्देशकालसंख्याभिः परिदृष्टो दीर्घसूक्ष्मः ।
बाह्याभ्यन्तरविशयाक्षेपी चतुर्थः ॥ (प.यो.सू. 2/51-52)

Generally there are four stages in Pranayama.

1. Bahya Vritti/ Rechaka- Exhalation
2. Abhyantara/ Puraka – Inhalation
3. Stambha Vritti/ Kumbhaka – Holding of the breath
4. Caturthaka- There is also a fourth stage called caturthaka which is beyond inhalation and exhalation.

प्राणायामस्त्रिधा प्रोक्ता रेचेपूरककुम्भकैः । सहितः केवलश्चेति कुम्भको द्विविधो मतः ॥
(ह.यो.प्र. 2/71)

According to Hathayoga Pradipika, Pranayama is of three types

1. Rechaka/Exhalation-
2. Puraka/Inhalation
3. Kumbhaka/ Retention

**Benefits of Pranayama**

Doing Pranayama does not mean only taking the air in the body (inhalation) and throwing it out (exhalation) but along with oxygen, we also take in our body the vital energy. This vital energy permutes the entire universe and what we inhale and exhale is a fragment of it.

The control of regulation of Prana is called Pranayama. All function of our body are directly or indirectly related to Prana without, Prana there would be no life. It is Prana which is the cause of life and death. Pranayama has the capacity of freeing the mind from untruthfulness, ignorance and all other painful and unpleasant experience of the body and mind. When mind becomes clean it becomes easy for the yogi concentrate on the desired object and it becomes possible for him to progress further in the direction of Dharan, Dhyana and Samadhi.

Pranayama influence the subtle and the physical bodies in a greater measure than Yogasana do and that too in a perceptible manner. Physically Pranayama appear to be



a systematic exercise of respiration, which makes the lungs stronger, improves blood circulation, and makes the man healthier for long life.

प्राणायामेन युक्तेन सर्वरोगक्षयो भवेत । अयुक्ताभ्यासयोगेन सर्वरोगसमुभ्दवः ॥ (ह.यो.प्र. 2/16)

By proper practice of Pranayama all diseases are eradicated. Through improper practice all diseases can arise.

यावद्धायुः स्थितो देहे तावज्जीवनमुच्यते । मतणं तस्य निष्कंतिस्ततो वायुं निरोद्जयेत ॥ (ह.यो.प्र. 2)

As long as the Vayu (Prana) remains in the body, there is life. Death occurs when the Vayu leaves the body, therefore, retain the Vayu.

युक्तं युक्तं त्यजेद्वायुं युक्तं युक्तं च पूरयेत । युक्तं युक्तं च बध्नीयादेवं सिद्धिमवाप्नुयात ॥
(ह.यो.प्र. 2/18)

One should inhale, exhale and retain in a regulated manner so that perfection is attained. Physiologically teaches us that the Prana we breathe in fill our lungs, spreads in the entire body, providing it with essential food and oxygen. Not only that the veins coolest the gross elements from the body, take them to the heart and then to the lungs which throws the useless material like carbon dioxide out of the body through the act of exhalation. If this action of the respiratory system is done regularly and efficiently, lungs become stronger and blood becomes pure. By regular practicing Pranayama a man to lead a healthy and long life.

Mental disturbance like anxiety, fear, anger, disappointment, lust for sex and other mental problem can calm down by regular practice of Pranayama. Pranayama practices improves the function of brain cells with the result that memory and the faculty of discrimination and observation improves, making it easy for the Yogi to perform concentrate and meditation.

Patanjali explain in Sutra a man who regularly performs Pranayama is required to take lesser number of breaths and therefore lives longer. e.g. Tortoise whose rate of respiration per minute five times lives for about 400 year. Pranayama keeps the body fit and healthy. It reduces excessive fat. One can live a long life through Pranayama. Pranayama improves the power of memory and eliminates mental disorders.

Pranayama tones up the stomach, the liver, the bladder, the small and the large intestines and the digestive system, purifies tubular channels and removes sluggishness from the body, and kindles gastric fire; the body becomes healthy and the inner voice begins to be heard. Constant practice of Pranayama strengthens the nervous system. The mind becomes calm and capable of concentration, and rouses spiritual power. Most importantly negative thinking comes to an end. The person practicing Pranayama is always full of positive thoughts.

आदौ स्थानं तथा कालं मिताहारं तथापरम । नाडीशुद्धि ततः पश्चात प्राणायामं च साधयेत ॥
दूरदेशे तथारण्ये राजधान्यां जनान्तिके । योगारम्भं न कुर्वीत कृतश्चेत सिद्धिहा भवेत ॥ (घे.स. 5,4)

Four things are necessary in practicing Pranayama. A good place, suitable time, moderate food and purifications of the Nadis. The practice of Yoga should not be attempted in a far off home, nor in a forest, nor in a capital city, nor in the midst of a crowd, if one does so, he loses success.

सम्यग्गोमयलिप्तं च कुटिरन्तत्रनिर्मितं । एवं स्थानेषु गुप्तेषु प्राणायाम समभ्यसेत ॥ (घे.स. 5/7)

Place should be completely plastered over with cow dung. In hut thus built and situated in such a hidden place, let him practice Pranayama.

**Duration of Pranayama**

हेमन्ते शिशिरे ग्रीष्मे वर्षायां च ऋतौ तथा । योगारम्भं न कुर्वात कृते योगो हि रोगदः ॥ (घे.स. 5/8)

The practice of Yoga should not be commenced in these four seasons out of six- Hemanta, Sisira, Grishma and Varsha. If one begins in these seasons, one will contact diseases.

वसन्ते वाऽपि शरदि योगारम्भ समाचरेत । तथा योगो भवेत सिद्धो विनायासेन क़थ्यते ॥
(घे.स. 5/8,9)

The practice of Yoga should be commenced either in Vasanta and Sarada. For in these seasons success is attained without much trouble.

प्रातर्मध्यं दिने साय अर्धरात्रे च कुभकान । शनैरशीतिर्यतं चतुर्वारं समभ्यसेत ॥ (ह.यो.प्र. 2/11)

Pranayama or Kumbhaka can be performed four times in a day. i. e. mornings, mid afternoon, evening and mid night are the time ideal for practice of Pranayama. One should gradually practice Pranayama for one time 80 and per day and night together it is 320.

**Pranayama Tividha Lakshana**

कनीयसि भवत स्वेद कम्पो भवति मध्यमे । उत्तमे स्थानमाप्नोति ततो वायु निबन्धयेत ॥
(ह.यो.प्र. 2/12)

a. Kanishtha Pranayama - This is the beginning stage of Pranayama, in this there will be sweda.
b. Madhyama Pranayama - Middle stages Pranayama in this there will Kampa.
c. Uttama Pranayama - The last stage of Pranayama, Yogi will attain steadiness and Vayu reaches Bramharandhra which is the best seat. But this is very difficult task.

Kanishtha (Tamas), Madhyama (Rajas) Pranayama is Vikasarahita, Uttama Pranayama is Nirvikara and Satvika. It is useful in achieving Yoga Siddhi.



In general the ratio of Puraka, Kumbhaka and Rechaka is 1:4: 2
Kanishtha Pranayama - Avara Pranayama - 12 matras -12sec: 48 sec: 24 sec.
Madhyama Pranayama-16 matras - 16sec: 64 sec: 32 sec.
Uttama Pranayama - 20 matras- 20 sec: 80 sec: 40 sec.

**Pranayama Yukta Laxana**

प्राणायामादि युक्तेन सर्वरोगक्षयो भवेत । (ह.यो.प्र. 2/16)

If Pranayama is practiced in a proper way it is capable of curing all diseases.

प्राणायामं ततः कुर्यान्नित्यं सात्विकाया धिया । यथा सुषुन्माडीस्था मलाः शुद्धि प्रयान्ति च ॥
(ह.यो.प्र. 2/6)

One should practice Pranayama regularly with Satvika mind, so that the morbid matter present in the Sushumna Nadi gets purified and the flow of Prana through it becomes regulated.

**Pranayama Ayukta Laxana**

अयुक्ताभ्यासयोगेन सर्व रोग करो भवेत ॥ (ह.यो.प्र. 2/16)

Improperly practice Pranayama leads to the onset of all kinds of diseases.

यथा सिंहो गजो व्याघ्रो भवेदृश्यः शनैः शनै । तथैव सेवितो वायुरन्यथा हन्ति साधकम ॥
(ह.यो.प्र. 2/15)

The Simha, Gaja and Vyaghra can be gradually brought under control, similarly the Prana Vayu can be controlled gradually, otherwise it destroys practitioner.

हिक्का श्वासश्च कासश्च शिरः कर्णाक्षि वेदनः । भवन्ति विविदा रोगाः पवनस्य प्रकोपतः ॥
(ह.यो.प्र. 2/17)

Due to aggravation of Vata the diseases like Hikka, Swasa, Kasa, Shiravedhana and Akshi Vedana are produced.

**Malashodhaka Pranayama**

मलाकुलासु नाडिषु मारुतो नैव मध्यगः । कथं स्यादुन्मनीभावः कार्यसिद्धिः कथं भवेत ।
शुद्धिमेति यदा सर्व नाडीचक्रं मलाकुलम । तदैव जायते योगो प्राणसंग्रहणे क्षमः ॥ (ह.यो.प्र. 2/4-5)

Sitting in Padmasana posture the Yogi should fill in the air through the left nostril (close right nostril )and keeping it confined according to one's ability it should be expelled slowly through the Surya (right nostril).

Then, drawing in the air through the right nostril, slowly, the belly should be filled and after performing Kumbhaka as before. It should be expelled slowly through the left nostril.

Inhaling thus through the one, through which it was expelled and having restrained at their till possible it should be exhaled through the other, slowly not forcibly. By practicing alternatively, the whole of the collection of the Nadis become clean. i.e. free from impurities after three months and over.

**Pranayama Abhyasa Kala Ahara**

अभ्यास काले प्रथमे शस्तं क्षीराज्यभोजनम । ततोऽभ्यासे दृढिभूमे ना तादृडनियमग्रह ॥ (ह.यो.प्र. 2/14)

शाल्यन्नं यवपिष्ठ वा गोधूमपिष्टकं तथा । मुद्गं माषचणकादि शुभ्रं च तुषवर्जितम ॥
पटोलं पनसं मानं कक्कोलं च शुकाशकम । द्राढिकां कर्कटीं रम्भां डुम्बरीं कण्टकण्टकम ॥
आरम्भां भालरम्भां रम्भादण्डं च मूलकम । वार्ताकी मूलकं ऋद्धिं योगी भक्षणमाचरेत ॥
बालशाकं कालशाकं तथा पटोलपत्रकम । पञ्चशाकं प्रशंसीयाव्दास्तूकं हिलमोचिकाम ॥
शुद्धं सुमधुरं स्निग्ध उदराद्धंविवर्जितम । भुज्यते सुरसं प्रीत्या मिताहारमिमं विदुः ॥
अन्नेन पूरयेदर्ध तोयेन तु तृतीयकम । उदरस्यं तुरीयांशं संरक्षेद्वायुचातणे ॥ (घे.स. 5/17-22)

During the first stage practice of Pranayama on should take food consisting of milk and Ghrita. When the practice becomes accomplished no such restriction is necessary, normal Yogabhyasa Ahara can be taken. The food consumed should be Satvika in nature.

A Yogi should eat rice, barley, or wheat bread. He may eat Mudga, Masha, Chanaka etc. these should be clean, white and free from chaff. A Yogi may eat Patola, Panasa, Manakachu, Kakkola, Jujube, bondue nut, cucumber, plantain, fig, unripe plantain, plantain stem and Roots, medicinal roots and fruits etc.

He may eat green, fresh vegetables, black vegetables, the leaves of Potola, Vastuka-Shaka, Himalocika Shaka. These are the five Shakas praised as fit food for Yogis.

Half the stomach should be filled with food, one quarter with water and one quarter should be kept empty for practicing Pranayama.

**Varja Ahara during Pranayama**

कटवम्लं लवणं तिक्तं भृष्टं च दधि तक्रकग । शाकोत्कटं तथा मद्यं तालं च पनसं तथा ॥
शाकोत्कटं तथा मद्यं तालं च पनसं तथा । कुलत्थं मसूरं पाण्डुं कूष्माण्डं शाकदण्डकम ।
तुम्बीकोलकपित्थं च कण्टबिल्वं पलाशकम । कदम्बं जम्बीरं बिम्बं लकुचं लशुनं विषम ॥
कामरङ्गं पियालं च हिंगुशाल्मलीकेमुकम ॥ (घे.सू. 5/23)

In the beginning of Yoga practice one should avoid Katu, Amla, Lavan, Tikta, Brushta (roasted things), Dadhi, Takra, Shaka, Madya, Tala and over ripened Panasa(jack fruit).

Kulattha and Masura, Pandu fruit, pumpkins and vegetable stems, gourds, berries,



Kathabel, Kantabilva and Palasha. So also Kalama, Jambira, Bimba, Lashuna, Kamaranga, Hinga, Salmali etc.

**Nadi Suddhi Pranayama**

बद्धपद्मासनो योगी प्राणं चन्द्रेण पूरयेत । धारयित्वा यथाशक्ति भूयः सूर्यण रेचयेत ॥
प्राणं सूर्येण चाकूष्य पूरयेदुदरं शनैः । विधिवत्कुंभकं कृत्वा पुनश्चन्द्रेण रेचयेत ॥ (ह.यो.प्र.)

The Sanskrit word Nadi means 'psychic passage' or 'specific pathway' through which Prana flows throughout the body. The word Shodhana means 'purification'. Thus this is a practice where by the pranic pathways are purified and decongested. This allows the Prana to flow freely throughout the body, bringing the physical body into the best possible health and calming the mind. It is an excellent preparation for meditational techniques.

**Method**

1. Sit in Padmasana, Siddhasana, Vajrasana or Sukhasana with the spine erect.
2. Perform Jalandhara Bandha and keep the hands in Jnana Mudra with left hand.
3. Bend the right hand at elbow and perform Nasagra Mudra i.e. bend the index finger and middle finger , brings the ring finger and little finger near the thumb.
4. Touch the right nostril with the thumb and left nostril with the thumb and left nostril with the ring finger and little finger.
5. Close the left nostril and inhale deeply through right nostril and fill the lungs completely with the air.
6. Perform Mulabandha and with hold the breathe i.e. Kumbhaka.
7. Exhales through the left nostril completely, while right nostril is closed then again perform Kumbhaka with Mulabandha.
8. Then inhale deeply through left nostril by closing the right nostril.
9. Perform Kumbhaka in Mulabandha.
10. Exhale deeply through right nostril, while left nostril is closed. This is one cycle.
11. Repeat the cycles for 5 to 10 minutes.

**Benefits**

1. Nadi Shodhana is an excellent preparatory technique for more advanced forms of Pranayama and an excellent prelude to meditational or relaxation techniques.
2. It induces calmness of mind by regulating the flow of Prana in the body. It helps to remove congestion or blockage of the Nadis and thereby allows the free flow of Prana.

3. The whole body is nourished with an extra supply of oxygen and the carbon dioxide is more efficiently eliminated. This purifies the whole blood system and increases the overall health of the body, including its power to resist disease.
4. Deep, slow breathing encourages the removal of stagnant air from the lungs.

**Nadi Shuddhi Lakshana**

यदा तु नाडीशुद्धिः स्यात्तथा चिन्हानि बाह्यतः । कायस्य कृशता कान्ति स्तदा जायेत निश्चितम ॥
यथेष्ट धारण वायोरनलस्य प्रदीपनम । नादाभिव्यक्तिरारोग्यं जायते नाडी शोधनम ॥

(ह.यो.प्र. 2/19-20)

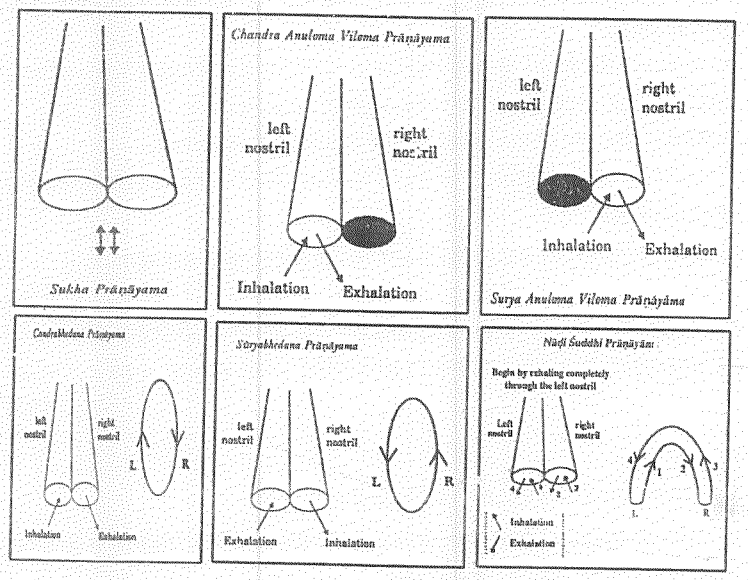
Purification of channels of the body produces following internal and external features. They are lightness of body, glowing color of body, and feeling of certain of success. Increases Agni to withholding of Vayu, awakening of divine sound, body becomes healthy.

यावद वायुः स्थितो देहे तावज्जीवनमुच्यते । मरणं तस्य निष्क्रान्तिन्तिस्ततो वायुं निरोधयेत ॥

(ह.यो.प्र. 2/3-4)

The person is said to be alive till the Prana Vayu is present in the body. As soon as the Prana Vayu goes out, he is said be dead. So one should learn to control the longevity of life.

**Anuloma-Viloma Pranayama**






1. Both nostrils- Sukha Pranayama
2. Single nostril-
   a. Candranuloma Viloma
   b. Suryanuloma Viloma
3. Alternate nostrils-
   a. Candra Bhedana
   b. Surya Bhedana
   c. Nadi Shodhana



Both Nostrils - Breathing in and out goes on through both nostrils. This is Sukha Pranayama also called Dirgha Shvasana. This is the simplest of the Pranayama

Single Nostril - In this breathing is done either through the left or the right. These are called Candranuloma Viloma or Suryanuloma Viloma, respectively.

Alternate Nostrils - In this series three combination of inhalation exhalation can be seen

a. Inhale through left and exhale through right- Chandra Bhedana
b. Inhale through right and exhale through left- Surya Bhedana
c. Inhale through left, exhale through right and inhale through right and exhale through left- Nadi Suddhi.

To close left and right nose alternately make a Mudra (hand pose) with right hand. Keep only thumb, little and ring fingers extended and keep index and middle fingers flexed.

1. Inhale via right and breath-out via left nose. Second time inhale via left and breath-out via right nose. During early learning phase try to do 10 to 15 breaths in one session, and come down to normal breathing in-between. Try to maintain the rate of breathing about 8 to 10 per minute. Determine to do regularly 3 to 4 such sessions daily. You will observe its benefits within a week. In Yoga two important Nadies, Ida (Surya–Nadi) and Pingla (Chandra–Nadi) are described. Ida runs in right nose and Pingla runs in left nose.
2. Inhale via right and breath-out via left nostril every time. This will be Surya Pranayama. Do such 30 breathings in one session. Take rest. This will become one session of a Surya Pranayama. It is claimed that Surya Pranayama done in one session, and such 4 sessions done in a day, reduces body weight by 1 lb/month without any diet changes. If combined with proper food and calories control it helps to reduce obesity.
3. The reverse of Surya Pranayama is Chandra Pranayama.

4. Inhale via left and breath-out via right nostril. Do this way every time. This will be Chandra Pranayama. Do such 30 Chandra Pranayama in one session. If such 4 sessions are done in one day, it helps to increase body weight by 1lb in month. Chandra Pranayama helps to gain weight by increasing appetite. In case you forget one session and then do it before going to bed.

**Benefits**

1. This Pranayama helps in Asthma cases and Recurrent Sinus problems.
2. Helps in Arthritis by producing joint fluids and regenerating cartilages in early cases of Osteo-Arthritis.
3. Helps in varicose veins of legs and blockage of Brain and Coronary arteries.

## Kumbhakabheda-Suryabhedana, Ujjayi, Sheetali, Sitkari, Bhastrika, Bhramari, Murcha, Plavini

सुर्य भेदनम उज्जायी सीत्कारी शीतली तथा ।
भास्त्रिका भ्रामरी मुर्च्छा प्लावनीत्यष्ट कुम्भकाः ॥ (ह.यो.प्र. 2/44)

Pranayama is eight types 1. Surya Bhedana, 2. Ujjayi, 3. Sitkari, 4. Sheetali, 5. Bhastrika, 6. Bhramari, 7. Murccha and 8. Plavani.

सहितः सुर्यभेदश्च उज्जायी शीतली तथा । भस्त्रिका भ्रामरी मुर्च्छा केवली चाष्टकुम्भिकाः ॥
(घे.स. 5/46)

The Kumbhaka are eight types, Sahita, Surya bheda, Ujjayi, Sitali, Bhastrika, Bhramari, Murcha and Kevali.

**Sahita Pranayam**

सहितो द्विविधः प्रोक्तः सगर्भश्चनिगर्भकः । सगर्भो बीजमुच्चार्य निगर्भो बीजवर्जितः ॥ (घे.स. 5/47)

The Sahita Kumbhaka is two types Sagrabha and Nigarbha. The Kumbhaka performed by the repetition of Bija mantra is Sagarbha, which done without such reputations is Nigrabha.

**1. Surya Bhedana Pranayama - (Gh.Sa. 5/58-59)**

आसने सुखदे योगी बद्धवा चैवानकं ततः । दक्षनाड्या समाकृष्य बहिः स्थं पवनं शनैः ॥
(ह.यो.प्र. 2/48)
आकेशादाननखाग्राच्च निरोधावदि कुंभयेत । ततः शनैः सव्यनाड्या रेचयेत्पवनं शनैः ॥
(ह.यो.प्र. 2/49)

Sit in comfortable Asana, the Yogi inhale through the right nostril slowly and exhale through left nostril.



**Procedure**

1. Sit on Padmasana or Siddhasana. Close the eyes. Keep the left nostril closed with your right ring and little fingers.
2. Slowly inhale without making any sound as long as you can do it comfortably through the right nostril. Then close the right nostril with your right thumb and retain the breath firmly pressing the chin against the chest (Jalandhara Bandha).
3. Hold on the breath till perspiration oozes from the tips of the nails and roots of the hairs (hair follicles). This point cannot be reached attach very outside. You will have to increase the period of Kumbhaka gradually. This is the limit of the sphere of practice of Surya Bheda Kumbhaka.
4. Then exhale very slowly without making any sound through the left nostril by closing the right nostril with the thumb. Repeat OM mentally with Bhava and meaning during inhalation, retention and exhalation. Exhale after purifying the skull by forcing the breath up.
5. This Pranayama should again and again be performed.

**Benefits**

कपालशोधनं वातदोषघ्नं कृमिदोषहृत । पुनः पुनरिदं कार्यं सूर्यभेदनमुत्तमम ॥ (ह.यो.प्र. 2/50)
कुम्भक; सूर्यभेदस्तु जरामृत्युविनाशकः । बोधयेत कुंडलीं शक्ति देहानलं विवर्धयेत ॥ (घे.स. 5/68)

1. It purifies the brain and destroys the intestinal worms and diseases arising from excess of wind (Vayu).
2. This removes the four kinds of evils caused by Vayu and cures Vata or rheumatism.
3. It cures rhinitis, cephalalgia and various sorts of neuralgia.
4. The worms that are found in the frontal sinuses are removed.
5. It destroys decay and death, awakens Kundalini Shakti and increases the bodily fire.

**2. Ujjayi Pranayama**

मुखं संयम्य नाडीभ्यामाकृष्य पवनं शनैः । यता लगति कंठात्तु हृद्यावधि सस्वनम ॥
(ह.यो.प्र. 2/51)
पूर्ववत्कुं भयेत्प्राणं रेचयेदिडया ततः । श्लेष्मदोषहरं कंठे देहानलविवर्धनम ॥ (ह.यो.प्र. 2/52)
नासाभ्यां वायुमाकृष्य मुखमध्ये च धारयेत । हृदगलाभ्यां समाकृष्य वायुं वक्त्रे च धारयेत ॥
(घे.स. 5/69)

**Procedure**

1. Sit in Padmasana or Siddhasana. Close the mouth.
2. Inhale slowly through both the nostrils in a smooth, uniform manner till the breath fills the space from the throat to the heart.

3. Retain the breath as long as you can do it comfortably and then exhale slowly through the left nostril by closing the right nostril with your right thumb.
4. Expand the chest when you inhale. During inhalation a peculiar sound is produced owing to the partial closing of glottis. The sound produced during inhalation should be of a mild and uniform pitch. It should be continuous also.
5. This Kumbhaka may be practised even when walking or standing. Instead of exhaling through the left nostril, you can exhale slowly through both nostrils.

**Benefits**

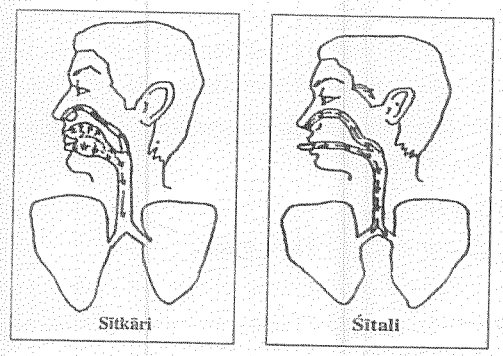
नाडी जलोदराधातुगत दोष विनाशनम । गच्छता तिष्ठता कार्यमुज्जाय्याख्यं तु कुंभकम ।

(ह.यो.प्र. 2/53)

उज्जायीकुम्भकं कृत्वा सर्वकार्यणि साधयेत न भयेत कफरोगश्च क्रूरवायुजीर्णकम ॥
आमवातः क्षयः कासोज्वर प्लिहा न विद्यते । जरामृत्यु विनाशाय चोज्जायीं साधयेन्नरः ॥

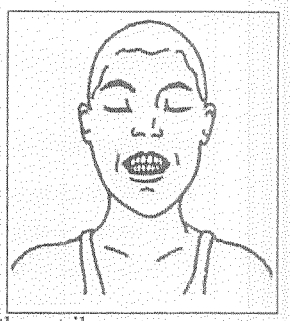
(घे.स. 5/72)

1. This removes the heat in the head.
2. The practitioner becomes very beautiful.
3. The gastric fire is increased.
4. It removes all the evils arising in the body and the Dhatus and cures Jalodara (dropsy of the belly or ascites).
5. It removes phlegm in the throat, Asthma, consumption and all sorts of pulmonary diseases are cured. All diseases that arise from deficient inhalation of oxygen, and diseases of the heart are cured.
6. The practitioner is never attacked by diseases of phlegm, nerves, dyspepsia, dysentery, enlarged spleen, consumption, cough or fever. Perform Ujjayi to destroy decay and death.






**3. Sitkari Pranayama**



सीत्कां कुर्यात्तथा वकत्रे घ्राणेनैव विजृंभिकाम ।
एवमभ्यासयोगेन कामदेवो द्वितीयकः ॥
योगिनीचक्र सामान्यः सृष्टिसंहारकारकः । (ह.यो.प्र. 2/54-55)

1. Fold the tongue so that the tip of the tongue might touch the upper palate and draw the air through the mouth with a hissing sound C C C C (or Si, Si, Si, Si).
2. Then retain the breath as long as you can without the feeling of suffocation and then exhale slowly through both nostrils.
3. You can keep the two rows of teeth in contact and then inhale the air through the mouth as before.

**Benefits**

न क्षुधा त तृषा निद्रा नैवालस्यं प्रजायते ॥

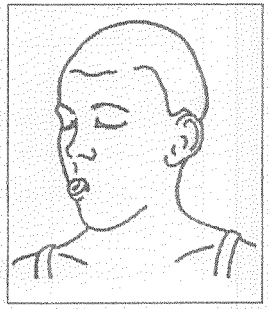
भवेत्सत्वं च देहस्य सर्वोपद्रवबर्जितः । अनेन विधिना सत्यं योगीद्रो भूमिमंडले ॥ (ह.यो.प्र. 2/56)

1. The practice enhances the beauty of the practitioner and vigour of his body.
2. It removes hunger, thirst, indolence and sleep.
3. His strength will be just like that of Indra. He becomes the Lord of Yogins. He is able to do and undo things. He becomes an independent monarch.
4. He becomes invincible. No injury will affect him. When you are thirsty, practise this. You will be relieved of thirst immediately.

**4. Shitali Pranayama (Ghe. Sa. 5/73)**

जिह्वा वायुमाकृष्य पूर्ववत्कुंभसाधनम । शनकैर्घ्राणरंध्राभ्यां रेचेयेत्यवनं सुधीः ॥ (ह.यो.प्र. 2/57)
जिह्वा वायुमाकृष्य उदरे पूरयेच्छनैः । क्षणं च कुम्भक कृत्वा नासाभ्यां रेचयेत पुनः ॥ (घे.स. 5/73)

**Procedure**



1. Protrude the tongue a little away from the lips.
2. Fold the tongue like a tube.
3. Draw in the air through the mouth with the hissing sound Si.
4. Retain the breath as long as you can hold on with comfort.
5. Then exhale slowly through both nostrils.
6. Practise this daily again and again in the morning from 15 to 30 times.
7. You can do this either on Padmasana, Siddhasana, Vajrasana or even when you stand or walk.

**Benefits**

गुल्मप्लिहादिकान रोगान ज्वरं पित्तं क्षुधां तृषाम । विषाणि शीतलीनाम कुंभकेयं निहंति ॥
(ह.यो.प्र. 2/58)

सर्वदा साधयेद्योगी शीतलीकुम्भकं शुभम । अजीर्णं कफपित्तञ्च नैव तस्य प्रजायते ॥ (घे.स. 5/74)

1. This Pranayama purifies the blood.
2. It quenches thirst and appeases hunger.
3. It cools the system.
4. It destroys Gulma (chronic dyspepsia), Pleeha, inflammation of various chronic diseases, fever, consumption, indigestion, bilious disorders, phlegm, the bad effects of poison, snake-bite, etc.
5. If you feel thirsty, practise this Pranayama. You will be at once relieved of thirst.
6. He who practises this Pranayama regularly will not be affected by the bite of serpents and scorpions. Sitali Kumbhaka is an imitation of the respiration of a serpent.
7. He becomes a proof against all sorts of inflammations and fever.

**5. Bhastrika Pranayama**

In Sanskrit Bhastrika means 'bellows'. Rapid succession of forcible expulsion is a characteristic feature of Bhastrika. Just as a blacksmith blows his bellows rapidly, so also you should move your breath rapidly.

ऊर्वोरुपरि संस्थाप्य शुभे पादतले उभे । पद्मासनं भवेदेतत्सर्वपाप प्रणाशनम ॥ (ह.यो.प्र. 2/59)
सम्यक पद्मासनं बध्वा समग्रीवोदरं सुधीः । मुखं संयम्य यत्नेन घ्राणं घ्राणेन रेचेयेत ॥ (ह.यो.प्र. 2/60)
पुनर्विरेचेयेत्तद्वत्पूरयेच्च पुनः पुनः । यथैव लोहकारेण भस्त्रा वेगेन चाल्यते ॥ (ह.यो.प्र. 2/62)
भस्त्रै व लिहकाराणां यथाक्रमेण संभ्रमेत । तथा वायुं च नासाभ्यामुभाभ्यां चालयेच्छनैः ॥
(घे.स. 5/75)

**Procedure**

1. Sit on Padmasana. Keep the body, neck and head erect. Close the mouth. Next, inhale and exhale quickly ten times like the bellows of the blacksmith. Constantly dilate and contract.
2. When you practise this Pranayama a hissing sound is produced. The practitioner should start with rapid expulsions of breath following one another in rapid succession.
3. When the required number of expulsions, say ten for a round, is finished, the final expulsion is followed by a deepest possible inhalation.
4. The breath is suspended as long as it could be done with comfort.



5. Then deepest possible exhalation is done very slowly. The end of this deep exhalation completes one round of Bhastrika.
6. Rest a while after one round is over by taking a few normal breaths. This will give you relief and make you fit for starting the second round.
7. Do three rounds daily in the morning. You can do another three rounds in the evening also. Busy people who find it difficult to do three rounds of Bhastrika can do one round at least. This also will keep them quite fit.

Bhastrika is a powerful exercise. A combination of Kapalabhati and Ujjayi makes up Bhastrika. Practise Kapalabhati and Ujjayi to start with. Then you will find it very easy to do Bhastrika.

**Benefits**

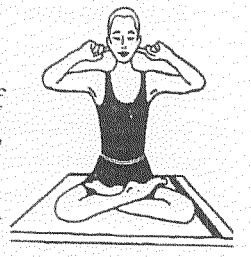
न च रोगो न च क्लेश आरोग्यं च दिने दिने । (घे.स. 5/77)
विधिवत्कुंभक कत्वा रेचयेदिदयानिलम । वातपित्तश्लेष्महरं शरिरग्निविवर्धनम ॥ (ह.यो.प्र. 2/65)

1. Bhastrika relieves inflammation of the throat, increases gastric fire, destroys phlegm, removes diseases of the nose and chest and eradicates asthma, consumption, etc.
2. It gives good appetite. It breaks the three Granthis or knots viz. Brahma Granthi, Vishnu Granthi and Rudra Granthi.
3. It destroys phlegm which is the bolt or obstacle to the door at the mouth of Brahma Nadi (Sushumna). It enables one to know the Kundalini.
4. It removes all diseases which arise from excess of wind, bile and phlegm.
5. It gives warmth to the body. When you have no sufficient warm clothing in a cool region to protect yourself from cold, practise this Pranayama and you will get sufficient warmth in the body quickly.
6. It purifies the Nadis considerably. It is the most beneficial of all Kumbhakas. Bhastrika Kumbhaka should be specially practised as it enables the Prana to break through the three Granthis or knots that are firmly located in the Sushumna.
7. It awakens the Kundalini quickly. The practitioner will never suffer from any disease. He will always be healthy.

**6. Bhramari Pranayama**

वेगादशेषं पूरकं भृंगनादं भृंगीनादं रेचेकं मंदमंदम ।
योगीद्राणामेवमभ्यासयोगाच्चित्ते जाता काचिदानंदलिला ॥ (ह.यो.प्र. 2/68)
अर्धरात्रे गते योगी जन्तूनां शब्दवर्जिते । कर्णौ पिधाय हस्ताभ्यां कुर्यात पूरककुम्भकम । (घे.स. 5/78)

**Procedure**



1. Sit on Padmasana or Siddhasana.
2. Inhale rapidly through both nostrils making sound of Bhramara, the bee, and exhale rapidly through both nostrils, making the humming sound.
3. You can carry the process till the body is bathed in perspiration.
4. In the end inhale through both nostrils, retain the breath as long as you can do it comfortably and then exhale slowly through both nostrils.
5. The joy which the practitioner gets in making the Kumbhaka is unlimited and indescribable.

**Benefits**

1. In the beginning, heat of the body is increased as the circulation of blood is quickened.
2. In the end the body-heat is decreased by perspiration. By success in this Bhramari Kumbhaka the Yogic student gets success in Samadhi.

### 7. Murchha Pranayama

पूरकांते गाढतरं बध्वाजालंधरंशनैः । रेचयेन्मूर्छनाख्येयं मनोमूर्छा सुखप्रदा ॥ (ह.यो.प्र. 2/69)
सुखेन कुम्भकं कृत्वा मनस्य ध्रु वारेन्तरम । संत्यज्य विषयान सर्वान मनोमूर्च्छा सुखप्रदा ॥
आत्मनि मनसो योगादानन्दो जायते ध्रुवम ॥ (घे.स. 5/83)

**Procedure**

1. Sit in your Asana and inhale.
2. Retain the breath.
3. Do Jalandhara Bandha by pressing the chin against the chest.
4. Retain the breath till you expect fainting and then exhale slowly.

**Benefits**

This is Murchha Kumbhaka as it makes the mind senseless and gives happiness. But this is not suitable for many.

### 8. Plavini Pranayama

अंतः प्रवर्तितोदारमारुतापूरितोदरः । पयस्यगाधेऽपिसुखात्प्लवते पद्मपत्रवत ॥ (ह.यो.प्र. 2/70)

**Procedure**

1. Practice of this Pranayama demands skill on the part of the student.



2. He who practises this Plavini can do Jalastambha (solidification of water) and float on water for any length of time. Mr. 'S' a Yogi can float on water for twelve hours at a stretch. He who practises this Plavini Kumbhaka can live on air and dispense with food for some days.
3. The Yogi actually drinks air like water slowly and sends it to the stomach. The stomach gets bloated a bit.
4. If you tap the stomach when it is filled with air, you will get a peculiar tympanic (air) sound. Gradual practice is necessary.
5. The help of one who is well versed in this Pranayama is also necessary. The Yogi can expel all the air from the stomach by gradual belching.

CHAPTER 18

# Shatkarma

These are six cleaning practices advised by great Yogis to purify the internal body from impurities similar to Panchakarma as described in Ayurveda. Gheranda Muni explains that the Jeeva moves from one body to another body like a Ghatiyantra that moves up and down by the bullocks. The bodies are produces as per their previous bodies' Karma. Thus when a person wants to get Yogik knowledge he should make his body strong.

आमकुम्भमिवाम्भस्थो जीर्यमाणः सदा घटः । योगानलेन सन्दह्य घतशुद्धिम् समाचरेत् ॥ (घे.स. 1/8)

The body is like unbaked earthen pot is filled with water; it soon dissolves and is decayed. On the other hand, if pot is properly baked, the water stays in it and the pot is also safe. In the same manner the body of human body of a human being deteriorates day by day. To make it strong and pure, one should bake it hard in the fire of physical training, i.e. regular practice of Yoga.

सप्तसाधन–

शोधनम् दृढता चैव स्थैर्यम् धैर्यञ्च लाघवम् । प्रत्यक्षञ्च निर्लिप्तञ्च घटस्य सप्तसाधनम् ॥ (घे.स. 1/9)

Seven exercises to train and strengthen the body. These are purifying, strengthening, steadying, calming, lightness, perception and isolation.

मेदः श्लेष्माधिकः पूर्वं षटकर्माणि सम्मचरेत । अन्यस्तु नाचरेत्तानि दोषाणां समभावतः ॥
(ह.यो.प्र. 2/21)

Person having excess of Shleshma and Medas should practice Shatkarma otherwise it is not necessary as Doshas are in equilibrium.

षटकर्मणा शोधनञ्च आसनेन भवेअद्रूढम । मुद्रया स्थिरता चैव प्रत्याहारेण धीरता ॥
प्राणायामाल्लाघवञ्च ध्यानात्प्रत्यक्षमात्मनि । समाधिना निर्लिप्तञ्च न संशयः ॥ (घे.स. 1/10-11)

1. The purification is acquired by the regular performance of six practices (Shata Karma) to be mentioned.
2. Asana or posture gives Driddhata or strength.
3. Mudra gives Sthirata or steadiness
4. Pratyahara gives Dhairyata or calmness.
5. Pranayama gives lightness or Laghima





6. Dhyana gives perception
7. Samadhi gives isolation (Nirliptata), which is verily the freedom.

The Shodhana is done by six karmas. Hatha Yoga Pradipika explains Six Karmas are the cleansing procedures done before Pranayama this helps to remove the Meda and Kapha in the two Nadis; Ida and Pingala Nadi and thus allows free passage of Prana Vata through Sushumna Nadi.

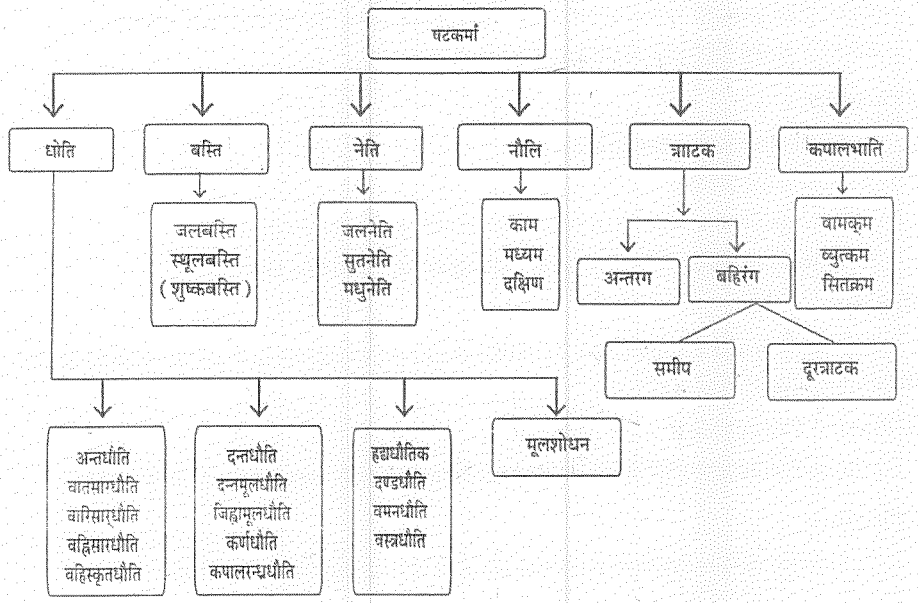
मलाकुलासु नाडीषु मारुतो नैव मद्ध्यगः । कथम् स्यादुन्मनीभावः कार्यसिद्धिः कथम् भवेत् ॥
(ह.यो.प्र. 2/4)

When the Naadis are full of impurities,the breath does not go into the middle Nadi Sushumna.

शुद्धिमेति यदा सर्वम् नादिचक्र महाकुलम् । तदैव जायते योगी प्राणसम्ग्रहणे क्षमः ॥ (ह.यो.प्र. 2/5)

When all the Nadis is full of impurities, is cleaned, then the Yogi becomes able to control the Prana and perform Pranayama.

षटकर्माः
धौतिर्बस्तिस्तथा नेतिर्लौलिकी त्राटकं तथा । कपालभतिश्चेतानि षट्कर्माणि समाचरेत् । (घे.स. 1/12)
धौतिर्बस्तिस्तथा नेति त्राटकं नौलिकं तथा । कपालभातिश्चेतानि षट्कर्माणि प्रचक्षते । (ह.यो.प्र. 2/22)
कर्मषट्कमिदं गोप्यं घटशोधनकारकं विचत्रगुणसन्धादि पूज्यते योगिपुनावैः ॥ (ह.यो.प्र. 2/22)



The Six procedures are :

1. Dhouthi
2. Basti
3. Neti
4. Louliki/Nouli
5. Trataka
6. Kapalabhati

**1. Dhouti**

There are 4 types of Dhouti :

अन्तधौति दन्तधौति र्हध्दौतिमूलशोधनम । धौति चतुर्विधा कृत्वा घटं कुर्वन्तु निर्मलम ॥ (घे.स. 1/3)

The Dhouti of four kinds help in clearing the impurities of the body. They are Antardhouti, Dantadhouti, Hrudyadhouti and Mulashodhana.

1. अन्तर्धौति - It is subdivided into 4 types

वातसारं वारिसारं वन्हिसारं बहिष्कृतम । घटस्य निर्म्मलार्थाय अन्तदौतिश्चतुविधा ॥ (घे.स. 1/14)

1. वातसार धौति 2. वारिसार् धौति 3. वह्निसार धौति 4. बहिष्कृत धौति ।

2. दन्तधौति–

1. दन्तमूल धौति 2. जिह्वामूल धौति 3. कर्प्रान्ध्र धौति 4. कपालरन्ध्र धौति

3. ह्रुत्धौति–

1. दण्ट धौति 2. वमन धौति 3. वस्त्र धौति

4. मूल शोधन

वातसारधौति–

काकचन्चुवदास्येन पिबेद्वायुं शनैः शनैः । चालयेदुदरं पश्चाद्वर्त्मना रेचयेच्छनैः ॥ (घे.स. 1/15)

Shape both lips like the beak of a crow and inhale air slowly. After filling the stomach fully with air, this should be moved slowly and execrated through the lower passage.

**Benefits**

वातसारं परं गोप्यं देहनिर्म्मलकारणम । सर्वरोगक्षयकरं देहानलविवर्द्धकम् ॥ (घे.स. 1/16)

It is a secrete process, which cleans body, destroys all diseases and improves digestive fire.

वारिसारधौति–

आकण्ठं पूरयेत्वारि वक्त्रेण च पिबेच्छनैः । चालयेदुदरेणैव चोदगद्रेचयेदधः । (घे.स. 1/17)



Water is filled in the mouth up to throat and this is drunk slowly. This moves to the stomach and should be expelled through rectum.

**Benefits**

वारिसारं परं गोप्यं देहनिर्म्मलकारकम् । साधयेतत्प्रयत्नेन देवदेहं प्रपद्यते ॥

One who practices Varisara cleans the body. By practicing it carefully, one gets shining body.

वह्निसारधौति–

नाभिग्रन्थिं मेरुपुष्टे शतवारञ्च कारयेत् । अग्निसारमेषा धौतियोगिनां योगसिद्धिदा ॥ (घे.स. 1/19)

Press the naval region or intestines towards the spine for hundred times. This Agnisara process gives success in the practice of Yoga.

**Benefits**

उदरामयजंत्यक्त्वा जठराग्निं विवर्धयेत । एषा धौतिः परा गोप्या देवानामपि दुर्लभा ॥ (घे.स. 1/20)

It cures all the diseases of abdomen and enhances Agni.

बहिष्कृतधौति–

काकीमुद्रां साधयित्वा पूरयेदुदरं मारुत । धारयेदर्द्ध यामन्तु चालयेदर्धवर्त्मना ॥ (घे.स. 1/22)
एषा धौतिः परा गोप्या न प्रकाश्या कदाचन । नाभिमग्नो जले स्थित्वा शक्तिनाडीं विसर्जयेत् ॥
कराभ्यां क्षालयेन्नाडीं यावन्मलविसर्जनम् । तावत्प्रक्षाल्य नाडीञ्च उदरे वेशयेत् पुनः ॥
इदं प्रक्षालनं गोप्यं देवानामपि दुर्लभम् ॥ (घे.स. 1/23)

Make the mouth like crows beak, fill the stomach with air. Retain this for one and half hour and then force it down towards the intestine. Then stand in the naval deep water, draw out Shaktinadi i.e. intestines, wash it with hand and draw it inside again, this not possible till one can with hold his breath for one hour.

**Benefits**

केवलं धौतिमात्रेण देवदेहो भवेद्ध्रुवम् । (घे.स. 1/24)

By the practice of this Dhouti only one attains the body like that of Gods.

यामार्धं धारणां शक्तिं यावन्न साधयेन्नरः । बहिष्कृतं महद्धौतिस्तावच्चैव न जायते । (घे.स. 1/25)

A Yogi should not practice this great Dhouti as long as he does not achieve the capacity to retain breath in his stomach for one and half hours.

चतुरंगुलविस्तारं हस्तपण्चदशायतम । गुरुपदिष्टमर्गेन सिक्तं वस्त्रं सनैर्ग्रसेत ॥

पुनः प्रत्याहरेश्चैतदुदितं धौतिकर्म तत ॥ (ह.यो.प्र. 2/24)

Take a clean cloth of 4 fingers broad and fifteen spans long and slowly swallow it according to the instructions of Guru.

दन्तधौति-दन्तमूलं जिह्वामूलं रन्ध्रञ्च कर्णयुग्मयोः । कपालरन्ध्रं पञ्चैते दन्तधौतिं विधीयते ।
(घे.स. 1/26)

Five types of Danta Dhouti.

1. Danta Mula
2. Jivha Mula
3. Karna Randhra Right
4. Karna Randhra Left
5. Kapalarandhra

दन्तमूलधौति–

खादिरेण रसेनाथ मृत्तिकया च शुद्धया । मार्जयेद्दन्तमूलञ्च यावत्किल्दिषमहरेत ॥ (घे.स. 1/27)

One should rub teeth with Khadira Choorna or pure earth till the dental impurities are removed.

Benefits- preserve the teeth longer.

जिह्वामूलधौति–

अथातः सम्प्रवक्ष्यामि जिह्वाशोधनकारणम् । जरामरणरोगादीन्नाशयेद्दीर्घलम्बिका ॥
तर्जनीमध्यमानामा अन्गुलित्रययोगतः । वेशयेदगलमध्ये तु मार्जयेल्लम्बिका मूलम ॥
शनैः शनैः मार्जयित्वा कफदोषं निवारयेत ॥ (घे.स. 1/29-30)

Index finger, middle finger and ring finger are joined together and used to clean the root of the tongue. Tongue should be rubbed with better pulled out little worth metal instrument every day. So that tongue gets elongated gradually.

कर्णरन्ध्रधौति–

तर्जन्यनामिकायोगान्मार्जयेत् कर्णरन्ध्रयोः । नित्यमभ्यासयोगेन नादान्तरं प्रकाशयेत् ॥ (घे.स. 1/33)

Clean the ear every day with the help of index and ring finger. By practicing this one can hear mystic sounds.

कपालरन्ध्रधौति–

वृद्धाङ गुष्ठेन दक्षेण मार्जयेभ्दालरन्ध्रकं । एवमभ्यासयोगेन कफदोषं निवारयेत् ॥ (घे.स. 1/34)

Depression in the fore head near the nasal bridge is pressed with thumb of right hand. By the practice of this Kapha Roga gets subsided.

If one practices daily after getting up from sleep, after meals, evening, he will be endowed with extra ordinary vision.



हृत्धौति–It is of three types, Danda Dhouti, Vamana Dhouti and Vastra Dhouti

हृुत्धौतिं त्रिविधांकुर्याद्दण्डवमनवाससा । ( घे.स. 1/36 )

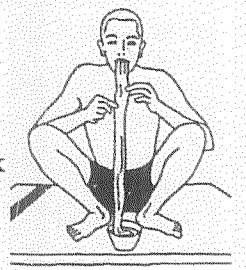
दण्डधौति–रम्भादण्डं हरिद्दडं वेत्रदण्डं तथैव च । हन्मध्ये चालयित्वा तु पुनः प्रत्याहरेच्छनैः ॥
(घे.स. 1/37)

Take the stalk of Banana, turmeric or cane. Put it into the oesophagus slowly and with draw it out slowly.

कफपित्तं तथा क्लेदं रेचयेदूर्ध्ववर्त्मना । दण्डधौतिविधानेन हृुद्रोगं नाशयेदध्रुवम् । (घे.स. 1/38)

**Benefits**

By this process Kapha, Pitta, Kleda are expelled out and cure all kinds of heart diseases surly.



वामनधौति–

भोजनान्ते पिबेत्वारि चाकण्ठपूरितं सुधीः ।
ऊर्ध्वं दृष्टिं क्षणं कृत्वा तज्जलं वमयेत्पुनः ॥ (घे.स. 1/39)

After meals one should drink water up to the throat, then look upwards for a while and vomit it out.

नित्यमभ्यासयोगेन कफपित्तं निवारयेत ॥ (घे.स. 1/39)

**Benefits**

Practice of this every day cures diseases of Pitta and Kapha.

वस्त्र धौति–

चतुरन्गुलविस्तारं सूक्ष्मवस्त्रं शनैर्ग्रसेत् । पुनःप्रत्याहरेतत्प्रोच्यते धौतिकर्मकम ॥ (घे.स. 1/40)

Thin cloth of four finger width is slowly swallowed and drawn out slowly after wards. This process in Vastra Dhouti.

गुल्मज्वरप्लीहाकुष्ठंकफपित्तं विनश्यति । आरोग्यं बलपुष्टिश्च भवेत्तस्य दिने दिने ॥ (घे.स. 1/41)

It cures abdominal diseases, Gulma, Jwara, Pleeha, Kushtha and diseases of Kapha and Pita. It Practiced regularly he will be endowed with health, strength and nourishments.

मूलशोधन–

अपानक्रूरता तावद्यावन्मूलं न शोधयेत । तस्मात्सर्वप्रयत्नेन मूलशोधनमाचरेत् ॥
पित्तमूलस्य दण्डेन मध्यमान्गुलि नापि वा । यत्नेन क्षालयेद्गुह्यं वारिणा च पुनः पुनः ॥ (घे.स. 1/43)

By the stalk of turmeric or middle finger, the rectum should be cleaned well with water again and again.

**Benefits**

वारयेत्त्कोष्ठकाठिन्यमामजीर्ण निवारयेत् । कारणं कान्तिपुष्टयोश्च वह्निमण्डलम् दिपनम ॥ (घे.स. 1/44)

Cures the constipation and indigestion, enhances lustre, nourishment and digestive fire.

2. बस्ति–

जलबस्तिः शुष्कबस्ति र्बस्तिः स्यादद्विविधा स्मृता । जलबस्तिं जले कुर्याच्छुष्कबस्तिं सदा क्षितौ ॥ (घे.स. 1/45)

नाभिदन्धजले पायौ न्यस्तनालोत्कटासनः । आधाराकुंचनं कुर्यात्क्षालनं बस्तिकर्म तत ॥ (ह.यो.प्र. 2/26)

Basti is two types. One is Jala Basti and Shushka Basti.

जलबस्ति–

नाभिदध्नजले पायु न्यस्तवानुत्कटासनः । आकुन्चनम् प्रसारञ्च जलबस्ति समाचरेत ॥ (घे.स. 1/46)

One should stand in the navel level water, assume Utkatasana position, contract and relax the muscles of anal sphincter. This is Jalabasti.

**Benefits**

प्रमेहञ्च उदावर्त क्रूरवायुं निवारयेत । भवेत्स्वच्छन्ददेहश्च कामदेव समोभवेत ॥ (घे.स. 1/47)

It cures urinary disorder (Prameha), Udavarta (disoreder of Vayu) and constipation. Body becomes beautiful like that of Kamadeva.

शुष्कबस्ति–

बस्तिं पश्चिमोत्तानेन चालयित्वा शनैरधः । अश्विनीमुद्रया पायुमाकुञ्चयेत् प्रसारयेत् ॥ (घे.स. 1/48)

One should assume the pasture of Pashchimottasana, then perform Ashwini Mudra by contrasting and relaxing anal sphincter.

**Benefits**

एवमभ्यसयोगेन कोष्ठदोषो न विद्यते । विवर्धयेत् जठरग्निमामवातम् विनाशयेत् ॥ (घे.स. 1/49)

गुल्मप्लीहोदरं चापि वातपिताकफोभ्दवाः । बस्ति कर्म प्रबावेन क्षीयंते सकलामयाः ॥ (ह.यो.प्र. 2/27)

Practice of this cures constipation, Gulma, Pliha Roga, enhance Agni and cures Amavata.

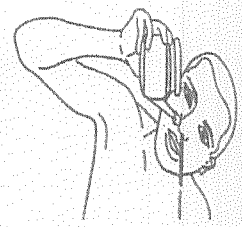
3. नेति–

There are 6 types of Neti. Jala Neti, Dugdha Neti, Vyukrama Nati, Sitakarma Neti, Suta Neti, Madhu Neti.

Out of these 6 types Jala Neti and Sutra neti are in practice.



Jala Neti – cleansing with water



Apparatus- Neti Pot. It is made up of rubber and plastic material having long beak like projection which can be easily placed in nasal passage. This pot contains about 120 ml. Of liquid up to its level marked.

**Procedure**

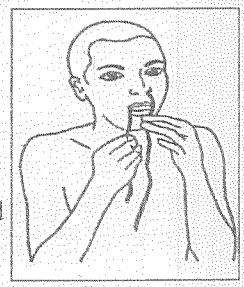
- Add a teaspoonful of table salt to pot containing about 500 ml luke warm water.
- Fill the Neti pot its level mark with the water.
- Insert the nozzle of the pot into the right nostril.
- Keep the mouth open to allow free breathing the mouth.
- Tilt the head slightly towards left, so that water from the pot enters the right nostril and easily flows out through the left one by gravity. Allow the flow till the pot is empty.
- Repeat the procedure again.
- Repeat the same procedure twice through the left nostril also.
- Carryout active exhalation alternately through both nostrils so tha there is absolutely no fraction of water.

**Benefits**

Beneficial for eyes, helpful in Kapha Roga

Madhu Neti is practiced by adding 3-4 drops of honey in place of salt.

**Sutra Neti**



वितस्तिमां सूक्ष्मसूत्रं नासानाले प्रवेशयेत् ।
मुखान्निर्गमयेत् पश्चात प्रोच्यते नेतिकर्मकम् ॥ (घे.स. 1/50)
सूत्रं वितस्ति सुस्निग्धं नासानाले प्रवेशयेत् ।
मुखन्निर्गम येच्चैषा नेतिः सिद्धै र्निगद्यते ॥ (ह.यो.प्र. 2/29)

Take a thin thread of 32 Angula insert it through one nostril and take out through mouth, this is Neti Karma.

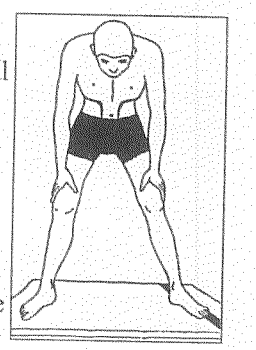
**Benefits**

साधनान्नेतिकार्यस्य खेचरीसिद्धिमाप्नुयात् । कफदोषा विनश्यन्ति ल्व्यदृष्टिः प्रजायते ॥ (घे.स. 1/51)

कपालसोधनी चैव दिव्यदृष्टिप्रदायिनी । जत्रूर्ध्वजातरोगौधं नेतिराशु निहन्ति च ॥ (ह.यो.प्र. 2/30)

By practicing Neti Kriya one can obtain Khechari Mudra. It destroys Kapha Dosha and gives clear vision.

4. लौकिकी/नीली–



Nouli is Yogic abdominal process for cleansing of abdominal Viscera.

Nouli is 3 types—

1. Uddiyana Bandha
2. Agnisara Kriya
3. Nouli Proper.

Nouli proper is in practice generally. Nouli proper can be done in three stages

1. Vama Nouli
2. Madhyama Nouli
3. Dakshina Nouli

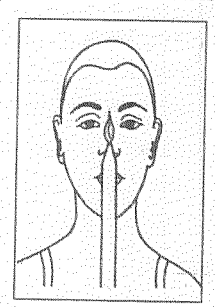
अमन्दवेगमुत्तुन्दन्चभ्रामयेदुभपार्स्वयोः । सर्वरोगान्निहन्दीह देहानलविवर्धकम् ॥ (घे.स. 1/52)
अमन्दवर्तवेगेन तु द सव्यापसव्यतः । नतांसो भ्रमयेदेषा नौलिः सिद्धैः प्रचक्षते ॥ (ह.यो.प्र. 2/33)

One should move the stomach and intestines from one side to other side. This process is called as Nouli or Loukiki.

मदाग्निसंदीपनपाचनादि संधापिका नंदकरी सदैव । अवेष दोषामयशोषणी च हठक्रियामौलिरियं च नौलिः । (ह.यो.प्र. 2/34)

Benefits- Cures all Variety of diseases and increases body fire. It dies of all the Doshas completely. Digestion is improved, constipation is relieved, and abdominal fat is reduced.

5. त्राटक–



निमेषोन्मेषकं त्यक्त्वा सूक्ष्मलक्ष्यं निरीक्षयेत ।
यावदश्रुन पतति त्राटकं प्रोच्यते बुधैः ॥ (घे.स. 1/53)
निरीक्षेन्निश्चलदृशा सूक्ष्मलक्ष्यं समाहितः ।
अश्रु संपात पर्यन्त माचार्यैस्त्राटकं स्मृतम् ॥ (ह.यो.प्र. 2/31)

One should continue look at some small object till eyes tear. This is called Trataka.

एवमभ्यसयोगेन शाम्भवी जायते ध्रुवम् । नेत्ररोगा विनश्यन्ति दिव्यदृष्टिः प्रजायते ॥ (घे.स. 1/54)
मोचनं नेत्ररोगाणां तन्त्रादीनां कपाटकम् । यत्नतन्त्राटकं गोप्यं यथा हाटकपेटकम् ॥ (ह.यो.प 2/32)

By practicing this technique, one can attain Shambhavi Siddhi very fast. It destroys all eye diseases and gives good vision.



**Procedure**

1. Sit in any meditative posture
2. Place the burning candle with flame at the same height as the eyes at a distance of about one meter.
3. Start gazing at the flame without blinking of the eyes.
4. Learn to ignore the irritation and watering of the eye
5. With the practice, gaze becomes steady makes the mind single pointed relaxation of the eye is important otherwise strain of the eyes muscles may cause headache.
6. Progress slowly starting with 10 seconds and increasing the duration by 10 second per week.
7. At the end wash the eyes thoroughly with clean water.

**Benefits**

1. Best mental concatenation power is achieved.
2. Will power is strengthened.
3. Prolonged practice of Trataka helps in attaining.
4. Tear glands activated.
5. Eye sight is improved.

6. कपालभाति–

In Kaphalabhati, the exhalation sounds like that of the bellow of the black smith. Hence the particular name Kapalabhati is given to this cleansing process.

वातक्रमेणव्युत्क्रमेण शीत्क्रमेण विशेषतः । भालभार्ति त्रिधा कुर्यात् कफदोषं निवारयेत् ॥ (घे.स. 1/55)

Kapalabhati is of three types, namely Vamakrama, Vyutkrama and Sheetakrama. They destroy Kapha Dosha.

भस्त्रवल्लोहकारस्य रेचपूरौ ससभ्रमो । कपालभाति र्विख्याता कफदोष विशोषणः ॥ (ह.यो.प्र. 2/35)

As the black smith blows his bellow in the same way one should inhale and exhale very fast. This is Kapalabhati and it dries of Kapha Dosha.

वातक्रम–

ईडया पूरयेद्वायु रेचयेत् पिन्गला पुनः । पिन्गलया पूरयित्वा पुनश्चन्द्रेण रेचयेत् ॥ (घे.स. 1/66)
पूरकं रेचकं कृत्वा वेगेन न तु चालयेत । एवमभ्यासयोगेन कफदोषं निवारयेत् ॥ (घे.स. 1/66)

Inhale through the left nostril and exhale through right nostril then inhale through right nostril and exhale through left nostril.

**Benefits**

The inspiration and expiration should be without force which destroys Kapha.

व्युत्क्रम–

नासाभ्यां जलमाकृष्य पुनर्वक्त्रेण रेचयेत् । पायं पायं व्युत्क्रमेण श्लेष्मदोषम्निवारयेत् ॥ (घे.स. 1/58)

Draw water through both nostrils and expel through mouth slowly. This process is Vyutkrama Kapalabhati. This destroys Kapha Dosha.

शीत्क्रम–

शीत्कृत्य पीत्वा वक्त्रेण नासानालौर्विरेचयेत । एवमभ्यासयोगेन कामदेव समो भवेत् ॥ (घे.स. 1/59)

Drink water through mouth and expel it through nostrils to get a beautiful body like that of Kamadeva.

**Benefits of Shatkarma**

न जायते वार्द्धक्यं च जरा नैव प्रजायते । भवेत्स्वच्छन्ददेहश्च कफदोषं निवारयेत् ॥ (घे.स. 1/69)

षट्कर्म निर्गतस्थौल्य कफदोषमलाधिकः । प्राणायामं ततः कुर्यादनायासेन सिद्ध्यति ॥ (ह.यो.प्र. 2/36)

This prevents old age and diseases. The body becomes healthy elastic and free from Kapha disorders.

# CHAPTER 19 Bandhas and Mudras

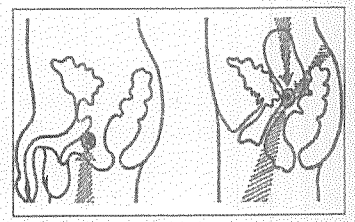
**Bandhas**

There are three classic Bandhas; Mula, Uddiyana, and Jalandhara Bandha. When practiced together they are called Tri-Bandha. Jalandhara Bandha, Uddiyana Bandha and Moolabandha are situated respectively, in the throat, abdomen and perineum. They are practiced together or individually at specific times during Kriya, Asana, Pranayama, Mudra, visualization, and meditation practice.

The word Bandha, may be defined in several ways 'binding, tying a bond, tie, chain, fetter, to catch, hold captive, arrest, imprison, fix, fasten, hold back, restrain, stop, shut, close, redirect, check, obstruct, clot and lock.'

It denotes positions which close the body apertures and where the fingers are held, together with special hand features.

**Moola Bandha**



पार्ष्णिभागेन सम्पीड्य योनिगाकुंचयेदगुदम ।
अपानमूर्ध्वमाकृष्य मूलबन्धोऽभिधीयते ॥ (ह.यो.प्र. 2/60)
अधोगतिमपानं वा ऊर्ध्वगं कुरुते बलात ।
आकुचनेन तं प्राहुर्मूलबधं हि योगिनः ॥ (ह.यो.प्र. 3/61)

The Sanskrit word moola means 'root' and the word Bandha means 'lock'. Here the word moola means various things, it refers to the Mooladhara chakra, the seat of the Kundalini and it also refers to the root of the trunk of the body, the perineum. In English, Moolabandha can be translated by the cumbersome name 'the perineum contraction lock'.

**Place of contraction**

The area to be contracted is the physical trigger point of the Mooladhara chakra. This has a slightly different location in men and women.

For males: in the perineum, between the anus and the sexual organ.

For females: at the cervix, where the vagina and the uterus meet.

Moolabandha is often done incorrectly by contraction of the anus. Try to find the exact location that we have described and apply the contraction at that point during

Moolabandha.Sitting position- The best Asanas for Moolabandha are Siddhasana for men and Siddha yoni asana for women. While sitting in either of these Asanas, one heel applies firm pressure in the region of the Mooladhara chakra, which improves the physical contraction.The three main Hatha yoga treatises – Hatha Yoga Pradipika, Siva Samhita and the Gheranda Samhita – all praise Moolabandha and describe it as drawing up on the anus.

This is only a general description of the practice however. With refinement over time a student will get the real feeling of Moolabandha and be able to isolate and lift only certain parts of the pelvic floor.

**Mula Bandha practice**

1. Lie on your back on the floor, bend your knees and bring the soles of your feet to rest on the floor either side of your hips. Breathe slowly and deeply and feel the air inflate your abdomen when you inhale and the navel fall towards the floor as the abdomen descends as you exhale.
2. Take a long inhale and a long exhale and relax your butt cheeks and feel the contact between your body and the ground.
3. Take another long inhale and exhale as deeply as you can. At the end of the exhale hold your breath for a split second and contract your pelvic floor muscles. Imagine you are urinating and you want to stop mid-flow. You should feel your genitals and your anus move up into your body. Inhale. You should feel that the deep abdominal muscles between the top of your genital and below your navel contract and move in and up slightly.
4. Inhale deeply and slowly, feeling that, due to the contraction of the abdominals, the breath now moves into the rib cage. You should feel that the intercostals muscles between each rib stretch and expand and that the ribs move outwards and upwards.
5. Exhale from the ribs as deeply and slowly as possible. Both the inhale and the exhale should be controlled and smooth. Learning to control the movement of the breath is one of the biggest challenges in yoga generally and is especially important when performing the Ashtanga asana series.
6. When the exhale finishes pause, contract the pelvic floor again, and inhale and exhale slowly, trying to keep the contraction all of the time. Repeat step 6 five times.
7. After five long inhales and exhales holding the Bandha, exhale, release the pelvic floor and inhale and exhale with no Bandha feeling the abdomen expand and contract.
8. After the exhale, pause, contract the pelvic floor and try to keep the contraction for five breaths, tightening it after each exhale.



9. Release and breathe normally. Feel the difference in the quality of the breath and in how your body moves as you inhale and exhale.

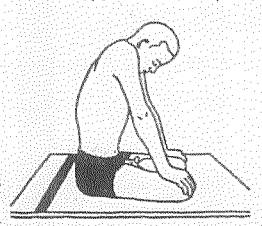
**Benefits**

Strengthens the pelvic floor, relieves hemorrhoids and congestion in the pelvic area. Calms the autonomic nervous system, calms and relaxes the mind. On the spiritual level, Moolabandha activates and purifies the Mooladhara Chakra. It awakens dormant consciousness and the Kundalini Shakti.

**Jalandhara Bandha - Chin Lock**

कंठमाकुच्य हृद्धे स्थापयेच्छिबुकं दृढम । बन्धो जालधारख्योऽयं जरमृत्युविनाशकः ॥
बन्धोति हि शिराजालमधोगामि नभोजलम । ततो जालंधरो बन्धं कंठदुःखोघनाशनः ॥

(ह.यो.प्र. 3/69,70)

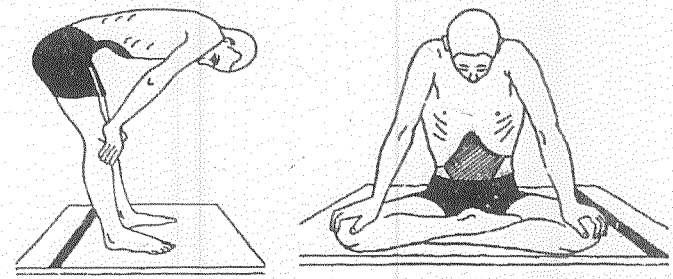


Starting Position: Meditation Pose
Concentration: on the Vishuddhi Chakra
Breath: inhale deeply and hold the breath
Repetitions: 3–5 rounds

**Practice:** Inhale deeply and hold the breath. Place the hands on the knees, lift the shoulders and tilt the body forward slightly, keeping the back straight. Press the chin firmly against the chest or between the collarbones so that the windpipe and oesophagus are firmly closed. Concentrate on the Vishuddhi Chakra and hold the breath for as long as comfortable. Raise the head and with a long exhalation return to the starting position. Breathing normally remains in this position for some time.

**Benefits:** This exercise awakens the inner energy centers, especially the Vishuddhi Chakra. Improves the ability to retain the breath for a long period of time and develops the ability to concentrate. Beneficial for throat diseases and regulates thyroid function.

**Uddiyana Bandha**



बद्धो येन सुषुम्नायां प्राणस्तूड्डीयते यतः । तस्मादुड्डीयनाख्योऽयं योगिभिः समुदाहतः ॥
उड्डीनं कुरुते यस्मादविश्रातं महाखगः । उड्डीयानं तदेव स्यात्तत्र बंधोऽभिधीयते ॥
उदरे पश्चिमं तानं नाभ्रुरुर्ध्व च कारयेत । उड्डीयानो ह्यसौ बंधो मृत्युमातंगकेसरी ॥ (ह.यो.प्र. 3/54-56)

Starting Position: Meditation Pose or Standing
Concentration: on the Manipura Chakra
Breath: completely exhale and hold the breath out
Repetitions: 3–5 rounds

**Practice**: Completely exhale and hold the breath out. Place the hands on the knees, raise the shoulders and tilt the body forward slightly, keeping the back straight. (To practice this Bandha standing, separate the legs a little and bend the knees slightly.) Concentrate on the Manipura Chakra, pull the abdominal muscles in and up into the abdominal cavity as far as possible. Hold the position as long as comfortable. Release the muscular tension and return to the starting position with a deep inhalation. Breathing normally remains for some time in this position.

**Benefits:** Activates the Manipura Chakra and solar plexus. Stimulates intestinal activity and helps relieve constipation. Stimulates the pancreas and is helpful for diabetes. Strengthens the immune system. Balances the mind, soothes irritability and anger and dispels a depressive mood.

## Mudra

Mudra is a term with many meanings. It is used to signify a gesture, a mystic position of the hands, a seal, or even a symbol. There are eye positions, body postures, and breathing techniques that are called Mudras. These symbolic finger, eye, and body postures can vividly depict certain states or processes of consciousness. Practicing the different types of Mudras for health is considered good as it provides physical, mental, as well as spiritual benefits. Mudras, also known as hand yoga, typically involves placing the hands and fingers in certain positions as described in the Vedas.

तस्मादत्सर्वप्रयत्नेन प्रबोधयितुमीश्वरीम । ब्रह्मव्दारमुखे सुप्तां मुद्रभ्यासं समाचरेत ॥ (ह.यो.प्र. 3/5)

Therefore the goddess sleeping at the entrance of Brahma's door should be constantly aroused with all effort, by performing Mudra thoroughly.

महामुद्रा महाबन्धो महावेधश्च खेचरी । उड्डीयानं मूलबन्धश्च बन्धो जालन्धराभिधः ॥
करणी विपरीताख्या वाज्रोली रिक्तचालनम । इदं हि मुद्रादशकं जरामरण नाशनम ॥ (ह.यो.प्र. 3/6)

Mudra and Bandha's have been mentioned in Yoga for the attainment of eight Ashraya along with Asthanga Yoga. Mahamudra, Mahabandha, Mahavedha, Khechari, Uddiyanam, Mulabandha, Jalandhara, Vipatita Karani, Vajroli, Shaktichalana aree ten important Mudra.



According to Gheranda Samhita- 25 Mudras

Mahamudra, Nabhobandha, Khecari, Uddiyanam, Mulabandha, Jalandhara, Mahabandha, viparita Karani, Yogi, Vajroli, Shakti Chalana, Tadagi, Manduki, Sambhavi, Panchadha, Ashwini, Pashini, Kaki, Matangi, Bhujagani, Mahavedha.

### Five groups of yoga Mudras

The yoga Mudras can be categorised into approximately five groups which are described as follows:

**1. Hasta,** hand Mudras: The hand Mudras presented in this book are meditative Mudras. They redirect the Prana being emitted by the hands back into the body. Mudras which join the thumb and index finger engage the motor cortex at a very subtle level, generating a loop of energy which moves from the brain down the hand and then back again.

Conscious awareness of this process rapidly leads to internalisation. Techniques included in this category:

1. Jnana Mudra
2. Chin Mudra
3. Yoni Mudra
4. Bhairava Mudra
5. Hridaya Mudra.

**2. Mana,** head Mudras: These practices form an integral part of Kundalini yoga and many are meditation techniques in their own right. They utilise the eyes, ears, nose, tongue and lips. Techniques included in this category:

1. Shambhavi Mudra
2. Nasikagra drishti
3. Khechari Mudra
4. Kaki Mudra
5. Bhujangini Mudra
6. Bhoochari Mudra
7. Akashi Mudra
8. Shanmukhi Mudra
9. Unmani Mudra.

**3. Kaya,** postural Mudras: These practices utilise physical postures combined with breathing and concentration. Techniques included in this category:

1. Prana Mudra

2. Vipareeta karani Mudra
3. Yoga Mudra
4. Pashinee Mudra
5. Manduki Mudra
6. Tadagi Mudra.

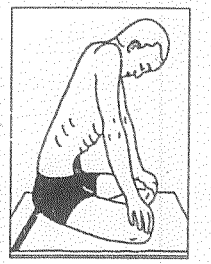
**4. Bandha,** lock Mudras: These practices combine Mudra and Bandha. They charge the system with Prana and prepare it for Kundalini awakening. Techniques included in this category:

1. Maha Mudra
2. Maha Bheda Mudra
3. Maha Vedha Mudra.

**5. Adhara,** perineal Mudras: These techniques redirect Prana from the lower centres to the brain. Mudras concerned with sublimating sexual energy are in this group. Techniques included in this category:

1. Ashwini Mudra
2. Vajroli/Sahajoli Mudra.

**Maha Bandha-The Great Bandha**



Maha Bandha is categorized as a Mudra or yogic gesture in both the classical texts Hatha Yoga Pradipika and the Gheranda Samhita.

Starting Position: Meditation Pose

Concentration: on the Mooladhara, Manipura and Vishuddhi Chakras.

Breath: exhale completely and hold the breath.

Repetitions: 3–5 rounds

**Practice :** Inhale deeply and exhale fully through the mouth. Hold the breath out. Place the hands on the knees, raise the shoulders and tilt the upper body forward slightly, keeping the back straight. Perform Jalandhara Bandha and concentrate on the Vishuddhi Chakra. Perform Uddiyana Bandha and concentrate on the Manipura Chakra. Finally, come into Mulabandha and concentrate on the Muladhara Chakra. Remain in this position, with all three Bandhas maintained, for as long as the breath can easily be held. Release the Bandhas in the same sequence as they were applied. Inhale deeply and return to the starting position. Breathing normally remains for some time in this position.

Benefits: Beneficial for the health of the whole body, especially the autonomic nervous system, internal organs, muscles and nerves. Has a positive influence upon the mind. It removes stomach disorders.



**Different Types of Yoga Mudras**

The different types of Yoga Mudra aid a person to achieve better health and mental condition through proper and regular practice. Yoga Mudra is a gesture, often done with hands, to symbolise a closing up or a seal. Yogic Mudras are weapons to use the energy in a better manner in a specific direction. Yoga Mudra has a tremendous effect on posture and thought process. It is an easy process of exhaling and inhaling and can be done sitting in Easy Pose or Sukasana, which is a comfortable cross legged sitting posture.

**Kechari Mudra-(The Tongue Lock)**

Kechari Mudra is considered the king among Mudras. In Sanskrit, the word 'Kha' indicates Brahman or the supreme reality and 'Chara' means to move. Kechari Mudra helps the practitioner to move in the blissful infinite consciousness of Brahman. Kechari is an advanced practice that enables the yogi to reach higher states of consciousness. Kechari Mudra is mentioned in Gheranda Samhita, Hatha Yoga Pradipika and various other yogic and tantric texts.

Kechari Mudra is a yoga practice where the tongue is rolled up to touch the soft palate. This is an advanced practice and the yogi is said to overcome thirst, hunger, decay and death by this practice.

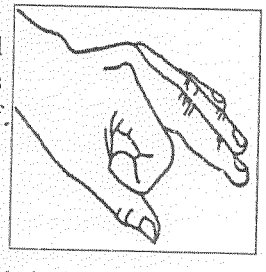
**Method**

1. Sit in a comfortable position. Close the mouth and roll the tongue up to touch the upper palate. See how far back it can go. Initially it may touch the hard palate. Some may be able to touch the soft palate with the first try itself. Keep the tongue there for as long as comfortable. Initially one may be able to keep it for less than a minute.
2. The above process should be continued and one will be able to hold the tongue on the palate for a prolonged duration.
3. With practice, the tongue will be able to go further back. Some day it will touch the uvula at the back of the throat. With further practice, the tongue will be able to negotiate the uvula and go behind it.
4. Next the tongue enters the nasal cavity. One should be able to hold it there for at least few minutes. One can breathe normally during this process. As you progress, the breathing rate will go down to 5 – 8 breaths per minute or even lower.
5. Once inside the nasal cavity, the tongue can stimulate certain nerve centers that are connected to the brain. It is said that constant churning of the tongue produces a liquid that emanates from the roof of the cavity.

**Benefits of Kechari Mudra (The Tongue Lock)**

1. Gheranda Samhita says that by performing Kechari Mudra, the yogi overcomes fainting, laziness, thirst and hunger.
2. The yogi doesn't suffer from disease, decay and death. The immune system becomes very strong. The body becomes divine.
3. In the Gheranda Samhita as well as in the Hatha Yoga Pradipika, it is said that such a yogi becomes immune to poison and snake bites.
4. Kechari Mudra helps the practitioner to attain Samadhi or the super-conscious state.
5. The secretions when consumed give great benefits to the body.
6. Kechari Mudra is also used by yogis to do astral travelling. The Mudra helps the yogi to detach the astral body from the physical body and travel in the astral planes.

**Jnana Mudra (Psychic Gesture of Knowledge)**



The Sanskrit word Jnana means 'intuitive knowledge' and the word Mudra, for the purpose of this discussion, means 'attitude'; thus this hand position is known as the 'attitude of intuitive knowledge'.

**Technique**

1. Sit in any meditative asana.
2. Fold the index fingers of both hands so that the tips touch the inside root of their corresponding thumbs.
3. Straighten the other 3 fingers and separate them slightly.
4. Place the hands on the knees, with the palms down wards.
5. The 3 unbent fingers and the thumb of each hand should point downwards towards the floor in front of the knees.
6. Relax your arms and hands.

**Specialty**

As it is a Mudra of knowledge, it enhances the knowledge. The tip of thumb has centers of pituitary and endocrine glands. When we press these centers by index finger the two glands work actively.

**Time duration**

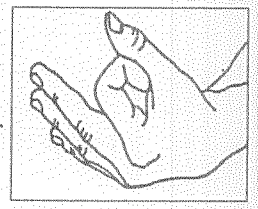
There is no particular time duration for this Mudra. You can practice by sitting, standing or lying on bed whenever and wherever you have time.



**Benefits**

Increases memory power and sharpens the brain. Enhances concentration and prevents Insomnia. If we practice it regularly, it will cure all psychological. Disorders like Mental, Hysteria, Anger and Depression.

**Chin Mudra (Psychic Gesture of Consciousness)**



The Sanskrit word chin means 'consciousness'; therefore this hand position can be translated as the 'attitude of consciousness'.

Method-

This Mudra is very similar to Jnana Mudra. Again the tip of the index finger can be either placed at the root of the thumb or so that the tip of the index finger is in contact with the tip of the thumb. The difference lies in the arrangement of the hands on the knees. During Chin Mudra the hands are placed so that the palms face upwards with the backs of the hands resting on the knees. The unbent fingers should also point forwards away from the body. The symbolic meaning is the same as Jnana Mudra.

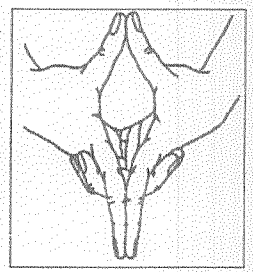
**Chinmaya Mudra (Gesture of Manifested Consciousness)**

The Sanskrit word Chinmaya means 'manifested consciousness'; in other words, the phenomenal world around us that has arisen from the underlying consciousness.

**Technique**

1. Hold the fingers in the same way as depicted for Jnana Mudra.
2. Fold the 3 straightened fingers so that the tips touch or point towards the palm. The position of the thumb and index finger remains the same, whether the tips are in contact or if the tip of the index finger presses the root of the thumb. Both are correct.
3. Place the hands on the knees, palms upwards or downwards.

**Yoni Mudra (Attitude of The Womb or Source)**



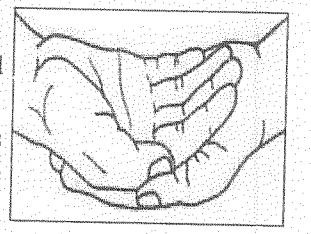
1. Assume a comfortable meditation posture with the head and spine straight.
2. Place the palms of the hands together with the fingers and thumbs straight and pointing away from the body. Keeping the pads of the index fingers together, turn the little, ring and middle fingers inwards so that the backs of the fingers are touching.
3. Inter lock the little, ring and middle fingers.

4. Bring the thumbs towards the body and join the pads of the fingers together to form the base of a yoni or womb shape.

**Benefits**

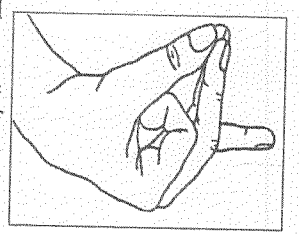
1. The interlocking of the fingers in this practice creates a complete cross connection of energies from the right hand into the left and vice versa. As well as balancing the energies in the body, it helps balance the activities of the right and left hemispheres of the brain.
2. Placing the tips of the index fingers and thumbs together further intensifies the flow of Prana.
3. This Mudra makes the body and mind more stable in meditation and develops greater concentration, awareness and internal physical relaxation.

**Bhairava Mudra (Fierce or Terrifying Attitude)**



1. Assume a comfortable meditation posture with the head and spine straight.
2. Place the right hand on top of the left, so that the palms of both hands are facing up. Both hands then rest in the lap.
3. Close the eyes and relax the whole body, keeping it motionless.
4. Bhairava is the fierce or terrifying form of Lord Shiva, the aspect responsible for the dissolution of the universe. The two hands represent Ida and Pingala Nadis, and the union of the individual with the supreme consciousness. Bhairava Mudra is used in Prana Mudra. It may also be used during Pranayama and meditation practice.

**Hridaya Mudra (Heart Gesture)**



1. Sit in any comfortable meditation asana with the head and spine straight.
2. Place the tips of the index fingers at the root of the thumbs, as in chin and Jnana Mudras, and join the tips of the middle and ring fingers to the tips of the thumbs so they are placed side by side. The little finger remains straight.
3. Place the hands on the knees with the palms facing upward.
4. Close the eyes and relax the whole body, keeping it motionless.

**Duration:** This practice may be performed for up to 30 minutes.

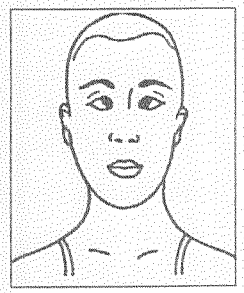


**Benefits**

This Mudra diverts the flow of Prana from the hands to the heart area, improving the vitality of the physical heart. The middle and ring fingers relate directly to Nadis connected with the heart, while the thumb closes the Pranic circuit and acts as an energiser, diverting the flow of Prana from the hands to these Nadis.

Hridaya Mudra helps to release pent-up emotion and unburden the heart.

**Shambhavi Mudra (Eyebrow Centre Gazing)**



1. Sit in any comfortable meditation asana.
2. Keep the head and spine upright and straight, and place the hands on the knees in either chin or Jnana Mudra.
3. Close the eyes and relax the whole body.
4. Relax all the muscles of the face, including the forehead, the eyes and behind the eyes.
5. Slowly open the eyes and look ahead at a fixed point, keeping the head and the whole body absolutely still.
6. Next, look upward and inward, focusing the eyes at the eyebrow centre.
7. The head should not move.
8. When performed correctly the two curved eyebrows will form a V-shaped image at the root of the nose. This point is the location of the eyebrow centre.

**Duration:** Start with 5 rounds and gradually increase to 10 over a period of months.

**Contra-indications:** People suffering from glaucoma, diabetic retinopathy or those who have just had cataract surgery, lens implant or other eye operations, should not perform Shambhavi without expert guidance.

**Benefits**

1. Physically, Shambhavi Mudra strengthens the eye muscles and releases accumulated tension in this area.
2. Mentally, it calms the mind, removing emotional stress and anger.
3. It develops concentration, mental stability and the state of thoughtlessness.
4. Regular practice of Shambhavi Mudra retards degeneration of the pineal gland and is therefore recommended for children from the age of eight onwards to balance their emotional development.

**Nasikagra Dristi-Mudra (Nose Tip Gazing Gesture)**

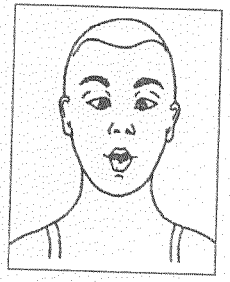
In Sanskrit, Nasika means the nose and Agra means the end or tip, Drishti means the sight.

Method- Sit in comfortable meditative pose with spine erect. Keep the gaze straight and breathe normally. Relax the shoulder and place the palms on knees. Slowly move your eyes and try to look at the tip of the nose. Keep the gaze there for few seconds to start with. Hold the breath to get more concentration. Release the eyes when you feel pain or discomfort.

**Benefits**

It helps to develop concentration and used as part of any meditation techniques. It helps to strengthen the eye muscles. It can activate the Mooladhara Chakra.

**Kaki Mudra (The Crow's Beak)**



1. Sit in any comfortable meditation asana with the head and spine straight and the hands resting on the knees in either chin or Jnana Mudra.
2. Close the eyes and relax the whole body for a few minutes.
3. Open the eyes and perform Nasikagra Drishti by focusing both eyes on the nose tip.
4. Try not to blink the eyes throughout this practice.
5. Purse the lips forming a break through which air may be inhaled.
6. The tongue should be relaxed. Breathe in slowly and deeply through the pursed lips. At the end of inhalation close the lips and exhale slowly through the nose.
7. Repeat the process for 3 to 5 minutes.

**Benefits:**

1. Kaki Mudra cools the body and mind and soothes mental tensions, alleviating disorders such as high blood pressure.
2. In addition to the benefits of Nasikagra Drishti, the act of pursing the lips in this practice, together with the contact of the indrawn air with the membranes of the mouth, stimulates digestive secretions aiding the digestive process generally. It also purifies the blood.

**Bhujangini Mudra (Cobra Respiration)**

1. Sit in any comfortable meditation asana.
2. Close the eyes and relax the whole body, especially the abdomen.
3. Push the chin forward and up a little.
4. Try to suck in air through the mouth and draw it into the stomach, not the lungs, in a series of gulps as though drinking water.



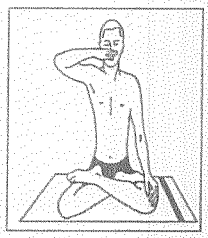
5. Expand the stomach as much as possible.
6. Hold the air inside for as long as comfortable, then expel it by belching.

**Duration:** 3 to 5 times is sufficient for general purposes; for specific ailments it may be repeated more often.

**Benefits**

1. Bhujangini Mudra rejuvenates the oesophagus walls and the glands that secrete the digestive juices.
2. It tones the whole stomach, removes stagnant wind and helps alleviate abdominal disorders.
3. Retaining air in the stomach enables the practitioner to float in water for any length of time.

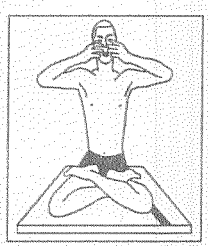
**Bhoochari Mudra (Gazing into Nothingness)**



1. Sit in any comfortable meditation asana with the head and spine straight and the left hand in chin or Jnana Mudra.
2. Close the eyes and relax the whole body.
3. Open the eyes and raise the right hand in front of the face.
4. The elbow should point to the side of the body.
5. Hold the hand horizontally, palm down with all the fingers together.
6. The side of the thumb should be in contact with the top of the upper lip. Focus the eyes on the tip of the little finger and gaze at it intently for a minute or so without blinking or flickering the eyes.
7. Try to maintain continuous awareness of the fingertip.
8. After a minute remove the hand but continue to gaze into nothingness at the place where the little finger was in front of the face. Try not to blink.

**Benefits:** Same as for Nasikagra Drishti and Shambhavi Mudra. Bhoochari Mudra develops the power of concentration and memory. It tranquillises and introverts the mind and is particularly beneficial for people who express a lot of anger.

**Shanmukhi Mudra (Closing the Seven Gates)**



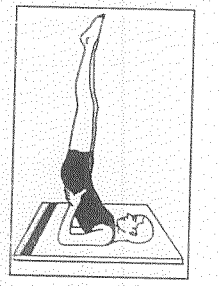
1. Sit in Siddha/Siddha yoni asana, if possible. Otherwise take comfortable meditation asana and place a small cushion beneath the perineum to provide pressure in this area.
2. Hold the head and spine straight. Close the eyes and place the hands on the knees.

3. Relax the whole body.
4. Raise the arms in front of the face with the elbows pointing sideways.
5. Close the ears with the thumbs, the eyes with the index fingers, the nostrils with the middle fingers, and the mouth by placing the ring and little fingers above and below the lips.
6. Release the pressure of the middle fingers and open the nostrils. Inhale slowly and deeply, using full yogic breathing. At the end of inhalation close the nostrils with the middle fingers.
7. Retain the breath inside for as long as is comfortable.
8. Try to hear any manifestation of sound in the region of Bindu, Ajna or Anahata chakras. There may be many sounds or none at all; just listen. After some time, release the pressure of the middle fingers and slowly breathe out.
9. This is one round.

**Benefits**

Physically, the energy and heat from the hands and fingers stimulate and relax the nerves and muscles of the face. Physically, this practice helps in the treatment of eye, nose and throat infections and to alleviate vertigo. Mentally, it balances the internal and external awareness. Spiritually, it induces the state of Pratyahara or sense withdrawal.

**Viparеeta Karani Mudra (Inverted Psychic Attitude)**



1. Assume the inverted posture of Viparеeta Karani Asana.
2. Keeping the legs straight and together, tilt them slightly over the head so that the eyes look straight up at the feet.
3. Close the eyes and relax the whole body. Fix the awareness at Manipura chakra in the spine, directly behind the navel. This is the starting position.
4. Inhale slowly and deeply with Ujjayi Pranayama. Feel the breath and consciousness moving from Manipura to Vishuddhi chakra situated in the spine, behind the throat pit. While exhaling, maintain the awareness at Vishuddhi.
5. At the end of exhalation, immediately bring the awareness back to Manipura and repeat the same process.
6. Continue for as long as the asana can be comfortably maintained.

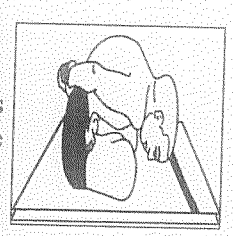
**Duration:** Practise 5 to 7 rounds or until discomfort arises.

**Benefits**

1. This practice gives all the benefits of Viparеeta Karani asana. It balances hypoactive thyroid and acts as a preventative for cough, cold, sore throat and bronchial disorders.
2. It stimulates the appetite and digestion, and helps relieve constipation.
3. Regular practice prevents atherosclerosis by restoring vascular tone and elasticity. It relieves prolapsed, haemorrhoids, varicose veins and hernia, all of which are exacerbated by the downward pull of gravity.
4. Circulation to the brain is enhanced, especially to the cerebral cortex and pituitary and pineal glands. Cerebral insufficiency and senile dementias are counteracted and mental alertness increased.



**Yoga Mudra (Attitude of Psychic Union)**



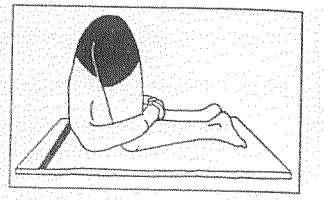
1. Sit in Padmasana. Take hold of one wrist behind the back.
2. Close the eyes and relax the whole body. Bring the awareness to Mooladhara Chakra (slight Moolabandha may also be performed.)
3. Inhale slowly and feel the breath gradually rising from Mooladhara to Ajna chakra. Retain the breath for a few seconds and concentrate on Ajna chakra.
4. Exhale slowly while bending forward, synchronising the movement with the breath so that the forehead just touches the floor as the air is fully expelled from the lungs.
5. Final position is Yogamudrasana. Simultaneously, feel the breath gradually move downward from Ajna to Mooladhara chakra.
6. Retain the breath outside for a few seconds while concentrating on Mooladhara chakra.
7. Inhale, raise the trunk to the vertical position and be aware of the breath moving upward from Mooladhara to Ajna chakra.
8. All these movements should be performed in a harmonious, smooth and synchronised manner.
9. Remaining in the upright position, hold the breath for a few seconds while concentrating on Ajna Chakra.
10. Exhale slowly, moving the awareness back down the spine with the breath to Mooladhara Chakra.
11. This is one round.

**Benefits**

This practice gives all the benefits of Yogamudrasana. In addition it is an excellent

preparatory practice for meditation. The pressure along the abdomen and chest created by the legs and heels calms the adrenal system, engendering a sense of relaxation. It relieves anger and tension, inducing tranquillity, and develops awareness and control of psychic energy.

**Pashinee Mudra (Folded Psychic Attitude)**

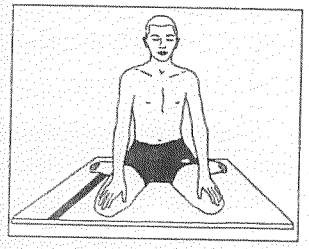


1. Assume Halasana. Separate the feet by about half a metre.
2. Bend the knees and bring the thighs towards the chest until the knees touch the ears, shoulders and floor. Wrap the arms tightly around the back of the legs.
3. Relax the whole body in this position and close the eyes.
4. Breathe slowly and deeply. Maintain the position for as long as is comfortable.
5. Slowly release the arms and come back into Halasana.
6. Lower the legs and relax in Shavasana.

**Benefits**

Pashinee Mudra brings balance and tranquillity to the nervous system and induces Pratyahara, sense withdrawal. It stretches the spine and the back muscles and stimulates all the spinal nerves in and around the spine. It massages all the abdominal organs.

**Manduki Mudra (Gesture of The Frog)**



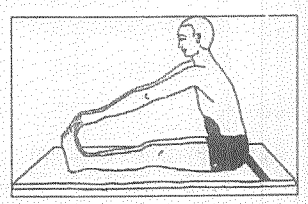
1. Sit in Bhadrasana with the toes pointing outward (Vajrasana Group of Asanas).
2. If it is not comfortable to sit with the toes pointing outward, sit in Bhadrasana with the toes pointing inwards.
3. The buttocks should rest on the floor. If this is still too difficult, place a folded blanket underneath the buttocks to apply firm pressure to the perineum, stimulating the region of Mooladhara chakra.
4. Place the hands on the knees, hold the spine and head straight. Close the eves and relax the whole body. This is Manduki asana.
5. After some time, open the eyes and perform Nasikagra Drishti If the eyes become tired relax them for a minute or so.
6. Continue the practice for 5 minutes until the mind and senses become introverted.

**Benefits:** The nose is related with Mooladhara Chakra through the sense of smell.



This practice affects the brain centres related to man's most deep rooted instincts and drives. It calms the disturbances and fluctuations of the mind and balances Ida and Pingala Nadis. Perfection of this practice leads directly to meditation.

**Tadagi Mudra (Barrelled Abdomen Technique)**

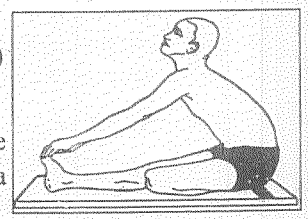


1. Sit with the legs stretched out in front of the body and the feet slightly apart. The legs should remain straight throughout the practice.
2. Place the hands on the knees, keeping the head and spine straight.
3. Close the eyes and relax the whole body, especially the abdominal area.
4. Lean forward and grasp the big toes with the thumbs, index and second fingers, keeping the head facing forward.
5. Inhale slowly and deeply, expanding the abdominal muscles to their fullest extent.
6. Retain the breath inside for a comfortable length of time without straining the lungs in any way.
7. Exhale slowly and deeply while relaxing the abdomen. Maintain the hold on the the toes.
8. Repeat the breathing up to 10 times. Then release the toes and return to the starting position.
9. This is 1 round.

**Benefits**

1. Tadagi Mudra relieves any tension stored in the diaphragm and pelvic floor tones the abdominal organs and stimulates blood circulation to these areas.
2. It improves the digestion and helps to alleviate diseases of this region.
3. The nerve plexuses in the visceral area are stimulated and toned.
4. Bending forward and extending the stomach stretches the diaphragm and pelvic floor, and creates pressure throughout the trunk of the body. This stimulates Manipura chakra, the centre of energy distribution, and raises the level of Prana generally.

**Maha Mudra**



**Base position :** Utthanpadasana (stretched teg pose)

1. Sit with the legs outstretched.
2. Bend the left knee and press the left heel firmly into the perineum or vulva, the location point of Mooladhara Chakra. The right leg remains outstretched.

3. Place both hands on the right knee. Adjust the position so that it is comfortable.
4. Bend forward just enough to be able to clasp the right big toe with both hands. Hold the position for a comfortable duration. Return to the upright position with both hands resting on the right knee.
5. This is one round.

**Benefits**

1. By the practice of Maha Mudra the combined benefits of Shambhavi Mudra, Moola Bandha and Kumbhaka are gained.
2. Digestion and assimilation are stimulated and abdominal disorders are removed.
3. Maha Mudra stimulates the energy circuit linking Mooladhara with Ajna Chakra. The whole system is charged with Prana which intensifies awareness and induces spontaneous meditation. Mental depression is rapidly eliminated by this practice as energy blockages are removed.

**Prithvi Mudra-Mudra of Earth**

Method: Tip of the ring finger touches the tip of the thumb, with the other three fingers stretched out.

Specialty: It reduces all physical weaknesses.

Time Duration: It has no particular time duration. You can practice it any time you want.

Benefits : It helps to increase the weight for weak people. It improves the complexion of skin and makes the skin to glow. It makes the body active by keeping it healthy.

**Varuna Mudra-Mudra of Water**

Method : Tip of little finger touches the tip of thumb, with the other three fingers stretched out.

Specialty : It balances the water content and prevents all diseases which come due to lack of water.

Time Duration : It has no specific time duration and one can practice it according to their time.

Benefits: It retains clarity in blood by balancing water content in the body. Prevents the pains of Gastroenteritis and Muscle Shrink

**Vayu Mudra-Mudra of Air**

Method: Keep the index finger on the base of the thumb and press with the thumb keeping the other three fingers straight.



Specialty: It prevents all the diseases that occur due to the imbalance of the air.

Time Duration: The practice of this Mudra for 45 minutes reduces the severity of the disease in 12 to 24 hours. For better results practice it for two months.

Benefits: It cures Rheumatism, Arthritis, Gout, Parkinson's disease and paralysis without any medicine. It is useful for Cervical Spondylitis, paralysis to face and catching of nerve in neck. It corrects the disorder of gas in the stomach.

**Shunya Mudra - Mudra of Emptiness**

Method: Keep the middle finger at the mount of Venus and press it with thumb.

Specialty: It reduces the dullness in our body.

Time Duration: One can practice it for 40 to 60 minutes daily until to be cured from the disease.

Benefits: It relieves an earache within 4 or 5 minutes. It is useful for the deaf and mentally challenged, but not for inborn ones.

**Surya Mudra - Mudra of The Sun**

Method: Bend the ring finger and press it with thumb.

Specialty: It sharpens the center in thyroid gland.

Time Duration: Practice it daily twice for 5 to 15 minutes.

Benefits: It reduces cholesterol in body and helps in reducing weight. It reduces anxiety. It corrects indigestion problems.

**Prana Mudra - Mudra of Life**

Method: Bend ring finger and little finger and touch the tip of thumb with their tips keeping the remaining two fingers stretched.

Specialty: As it is the Mudra of life, it improves the power of life. Weak people become strong. It reduces the clamps in blood vessels. If we practice it regularly, we will become active.

Time Duration: No specific time duration. One can practice it any time.

Benefits: It improves immunity. Improves the power of eyes and reduces eye related diseases. It removes the vitamin deficiency and fatigue

**Apana Mudra - Mudra of Digestion**

Method : The tips of middle finger and ring finger touch the tip of the thumb while the other two fingers are stretched out.

Specialty : It plays an important role in our health as it regulates the excretory system.

Time Duration : Practice it daily for 45 minutes, but practice for longer time yields more benefits.

Benefits : It regulates diabetes. It cures constipation and piles. It helps excreting the normal waste regularly.

**Apana Vayu Mudra - Mudra of the Heart**

Method : The tips of the middle finger and ring finger touch the tip of the thumb, while the index finger touches the base of thumb and little finger stretched out.

Specialty : It benefits the heart. It works like injection in the reduction of heart attack. It is as powerful as sorbitate tablet. It reduces the gas content in body.

Time Duration : Practice it as many times as you can. Heart patients and BP patients can practice it for 15 minutes daily twice for better results.

Benefits : It strengthens the heart and regularizes palpitation. It regulates excretory system. It redeems gastric trouble.]

**Linga Mudra - Mudra of Heat and Energy**

Method : Interlock the fingers of both the hands and keep the thumb of the left hand vertically straight and encircle it with the thumb and the index finger of the right hand.

Specialty : It generates heat in our body. Take milk, ghee, more water and fruit juices in addition to practice of this Mudra for much benefits.

Time Duration : Practice it any time you want. But don't practice it a lot as it produces heat in the body. It can cause sweating even in winter if you practice it longer.

Benefits : It stops production of phlegm and gives power to lungs. It cures severe cold and bronchial infection. It invigorates the body.

# CHAPTER 20 Ida-Pingala-Sushumna Nadis and Shad Chakras

Ida, Pingala and Sushumna are considered as Trinadi. I.e. three important channel through which the Kundlini Yoga the serpent power flows. In Shiva Samjita and Goraksha Samhita explains about 72,000 and 3.50, 000 Nadis.

**Ida Nadi-** It is known as Chandra. It is related to left nostril

Nature- cold

Color- blue

Related letter- A

A channel of energy orientating from left nostril then moving up to the crown of head and then traversing down to the base of the spine also called Chandra Nadi.

**Pingala Nadi -** It is known as Surya Nadi. It is related to Right Nostril.

Nature- Hot

Color- Red

Related latter- U

It activates left cerebral hemisphere. A channel of energy originating from right nostril then moving or traversing to the center of head and then travels down to the base of spine.

**Sushumna Nadi-** A particular artery of human body said to lie between Ida and Pingala. It starts from the Muladhara Chakra and extends up to Bramharandhra located in the centre of head. The Brahma Nadi being situated within the inner most sheath of Sushumna

Nature- normal

Color- yellow

Related letter- M

It having names Triveni and Bruhata Nadi, Bramharandhra, Mahapatha, Sambhavi, Madhyamarga etc.

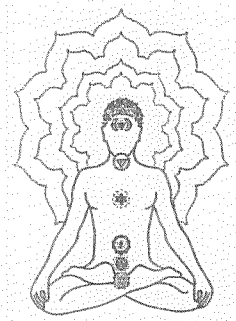
Goraksha Samhita explain main 10 Nadis.

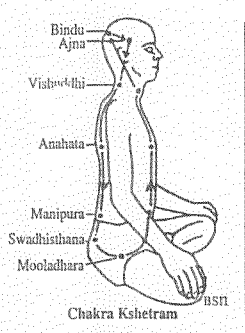
1. Ida - Left nostril
2. Pingala - Right nostril
3. Sushumna - Middle
4. Avalambusha - Mukha

5. Gandhari - left eye
6. Hastajiva - Right Eye
7. Yashasvini - left ear
8. Pushya - right ear
9. Kuhu - Lingadesha
10. Shakhini - Mula sthana(rectum)

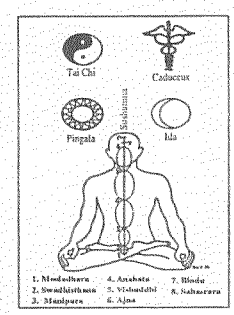
Shiva Samhita explains main 14 Nadi above 10 and Varuna, Vishodhari, Sarasvati, Payasvini Nadi.

**Shata Chakra**





Chakra Kshetram




The chakras are Pranic centres within the human framework. In each person, there are myriad of chakras. However, only a few principal ones are utilized in yogic practice. These few are the ones which span the full spectrum of man's being from the gross to the subtle.

These main chakras are:

1. Mooladhara
2. Swadhisthana
3. Manipura
4. Anahata
5. Vishuddhi
6. Ajna
7. Sahasrara

Though we have included Sahasrara in this list, it is not really a chakra; it transcends the mall and includes all of the chakras and Sahasrara together because they are the basic centres common to many mind awakening systems throughout the world, including yoga. Together with another focal point called the Bindu they are the fundamental centres used in Kriyayoga techniques.

The word Chakra literally means 'wheel' or 'circle'. A better translation in the context of yoga is 'vortex' or 'whirlpool'. The chakras are vortices or whirlpools of Pranic energy at specific areas in the body which control the circulation of Prana permeating the entire human structure. They are beyond the realms of normal perception. Chakra is also widely known as Padma- 'lotus'.



In yoga and, in fact, in most Indian systems, the chakras are symbolized by lotus flowers.

Other systems use different symbols; for example, the Rosicrucian's symbolize the chakras by roses. The choice is arbitrary, but for the purposes of Kriya yoga we will use lotus flowers. Each of the main chakras is represented by a lotus with a specific colour and number of petals as follows:

1. Mooladhara - four-petal deep red lotus
2. Swadhisthana - six-petal vermilion lotus
3. Manipura - ten-petal bright yellow lotus
4. Anahata - twelve-petal blue lotus
5. Vishuddhi - sixteen-petal violet lotus
6. Ajna - two-petalled silver-blue lotus
7. Sahasrara - thousand-petal lotus of all colours.

**Attributes of the chakras**

Although the meaning of each chakra can never be explained in words, especially the higher chakras, there are general attributes associated with each one. These don't represent the experience of the chakras, only the expression and feelings of a person at any particular chakra level.

The following are very basic attributes that we associate with the main chakras.

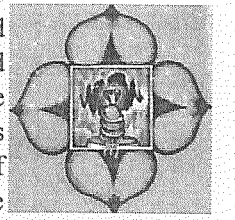
1. Mooladhara. This is the centre where one is almost totally concerned with obtaining personal security. That is, one's main motive in life is directed towards obtaining food, a place to live and so forth. It is the centre where the individual fights the world, which is regarded as being totally alien.
2. Swadhisthana. This centre is associated with the predominant motive of seeking personal pleasures and sensations through food, drink, sex, etc.
3. Manipura. This is the centre of self-assertion. One attempts to dominate situations and other people. One seeks to manipulate the world according to personal wishes. This is expressed in the predominant motive of gaining wealth, respect, etc.
4. Anahata. This is the centre where one begins to love and understand people for what they are, regardless of faults, idiosyncrasies, etc. One begins to accept other people.
5. Vishuddhi. This is the centre where one begins to understand and experience the world as a place of harmony and perfection. It is the centre where Shiva consumes the poison and the nectar, meaning that all experiences, good or bad are seen as part of an

integrated whole, all of which help to remove one's personal problems and conditioning and thereby raise the level of consciousness. The world becomes a veritable Garden of Eden.

6. Ajna. This is the centre where one becomes an actor on the stage of the world, seeing everything as almost a dream. All actions, thoughts and objects, including one's own body and mind, are observed from the centre of one's being. This is the witnessing centre. The chakras can also be divided into three approximate classes as follows:

1. Mooladhara and Swadhisthana, the two lower chakras, are predominantly negative or Tamasic in nature. That is, one's actions tend to be Adharmic, disharmonious and not in accordance with one's individual nature.
2. Manipura and Anahata, the two middle chakras, are a mixture of both negative and positive qualities. This is the level where rajas predominate; where actions and thoughts are a combination of dharma and Adharma.
3. Vishuddhi and Ajna, the two higher chakras, are predominantly positive (satwika). One tends to follow dharma, where one's actions and thoughts are in accordance with one's individual nature.

**Mooladhara Chakra**



The Sanskrit word Moola means 'root' or 'base'; the word Adhara means 'substratum' or support'. Therefore, the word Mooladhara means 'the basic substratum'; this chakra is the fundamental root or framework of individual human existence. It is the platform from which each person can express himself or herself as an individualized centre of being. It is the springboard to more elevated levels of understanding. This centre is also widely known as the Adhara Chakra - 'the support centre'.

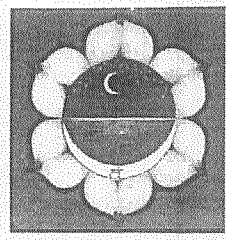
| | | |
|---|---|---|
| **Location** | : | Perineum |
| **Colour** | : | Red, Yellow |
| **Spokes** | : | 4 |
| **Mantra** | : | LAM |
| **Element** | : | Prithivi (Earth) |
| **Ruling Deities** | : | Brahma, Dakini |
| **Activity** | : | Smell, Excretion |

**Description**

Resting place of Kundalini Shakti, which coils around Svayambhu Lingam in the middle of Traipura Trikona, or Mahayoni. Connected to Apana Vayu and Kandarpa vayu. Frequently (though not always) assigned as the seat of Kanda.



**Svadhisthana Chakra**



The Sanskrit word Swa means 'one's own' and Adhisthana means 'dwelling place', 'residence'. Therefore, swa+adhisthana = Swadhisthana, which means 'one's own abode'. This chakra is regarded as being the substratum, the basis of individual human existence. This is explainable when one knows that this chakra is generally associated with the unconscious mind with its store house of mental impressions - Samskaras.

Individual being takes root in the unconscious mind. The many instinctive drives that are felt at the level of Swadhisthana chakra bubble up from the depths of the unconscious mind.

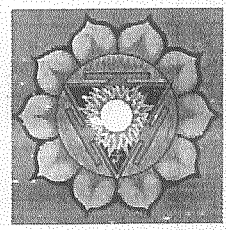
Swadhisthana is indeed the basis, the abode from which most people express themselves in the world. It is their basis for living life. It is also said that Swadhisthana chakra was once the seat of the Kundalini, but that there was a fall, a further fall, and Kundalini descended to the Mooladhara chakra.

| | | |
|---|---|---|
| **Location** | : | Clitoris, Base of Penis |
| **Colour** | : | Vermilion, white |
| **Spokes** | : | 6 |
| **Mantra** | : | VAM |
| **Element** | : | Apas (Water) |
| **Ruling Deities** | : | Vishnu, Rakini |
| **Activity** | : | Taste, Urination |

**Description**

Seat of the passions and unconscious desires. Development here brings mastery over base instinct, one becomes an object of adoration and love, fearless, and achieves fluent and compelling communication skills. Connected to Vyana Vayu.

**Manipura Chakra**



The Sanskrit word Mani means 'gem' or 'jewel'; the word Pura means 'city'. Therefore, the word Manipura can be translated directly as 'the city of gems'. It is so called because of the intensity of the Pranic energy at this centre. In the Gautamiya Tantra it says: "The Manipura chakra is so called because it is lustrous like a

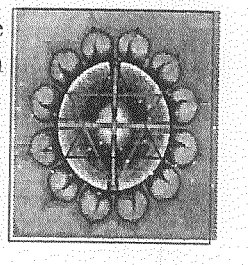
sparkling jewel." (ch. 34) It is often compared to the dazzling power of the sun, which continually radiates energy to the planets.

| | | |
|---|---|---|
| **Location** | : | Navel |
| **Colour** | : | Dark grey, red, blue (also gold) |
| **Spokes** | : | 10 |
| **Mantra** | : | RAM |
| **Element** | : | Tejas (Fire) |
| **Ruling Deities** | : | Rudra, Lakini |
| **Activity** | : | Vision, Walking |

**Description**

Considered the seat of all fires: digestion, willpower, solar resonance, etc. Contains the power of creation and destruction. Shining, powerful, forceful. Mastery brings freedom from disease, alchemical ability, clairvoyance, and lasting happiness. Related to Samana vayu.

**Anahata Chakra**



The Anahata chakra is the fourth chakra, coming after the Mooladhara, Swadhisthana and Manipura chakras. It is located in the heart region of the spine.

The word Anahata means 'unstuck' or 'unbeaten'. Therefore, the Anahata chakra is the centre of unbeaten sound. That is, the cosmic sound (Shabda Brahman) is heard at this centre . . . a sound that does not arise as a result of two objects hitting each other as do other sounds. The sound that is heard is uncaused.

This chakra is also widely called the Hridaya chakra, heart centre, because of its location.

| | | |
|---|---|---|
| **Location** | : | Chest |
| **Colour** | : | Deep red, gold, smoke |
| **Spokes** | : | 12 |
| **Mantra** | : | YAM |
| **Element** | : | Prana (Air) |
| **Ruling Deities** | : | Ishvara, Kakini |
| **Activity** | : | Touch, Moving Arms |

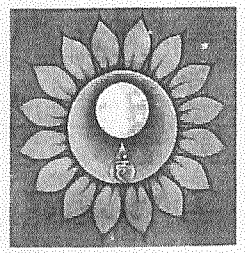
**Description**

Considered to be the seat of the individual soul (for details, see Secondary Chakras).



Governs qualities of wisdom, nobility, and control of the senses. Mastery of this center makes one endearing to the opposite sex, brings inspired speech, and the ability to enter another's body. Also, full knowledge of past, present, and future, and powers of levitation are available from contemplating on this center. Related to Prana Vayu.

**Vishuddha Chakra**



Vishuddhi

The first two are generally associated with the attributes of Tamas. The third and fourth chakras are associated with the qualities of rajas. In this topic we will introduce the first of the Sattwic chakras, the Vishuddhi chakra. The word Sattwa means purity, understanding, peace and other qualities that lead to and are an expression of both inner harmony and harmonious interactions with other people and the outside world in general.

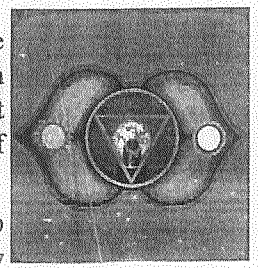
Vishuddhi chakra is located in the throat region and comes immediately above the Anahata chakra in the ascending order of the chakras.

| | | |
|---|---|---|
| **Location** | : | Throat |
| **Colour** | : | Smoky purple, Blue, White |
| **Spokes** | : | 16 |
| **Mantra** | : | HAM |
| **Element** | : | Akasha (Void) |
| **Ruling Deities** | : | Sadashiva, Shakini |
| **Activity** | : | Hearing, Speech |

**Description**

Centre of pristine purity and the first "gateway" to significant spiritual realiza-tion. Contains the foundational energy for manifestation – Akasha – as the background unifying essence of the lower four elements of earth, water, fire, and air. Mastery brings about enduring peacefulness and sagacious wisdom. Related to Udana Vayu and Soma.

**Ajna Chakra**



Ajna

The Ajna chakra is the sixth and last of the chakras that we will discuss. It represents the highest of the psychic centres in man. Above this level are Bindu and Sahasrara, which are not chakras or psychic centres - they really come into the realm of the ineffable.

The Sanskrit word Ajna means 'command'. This chakra is so called because it represents the level of awareness and harmony

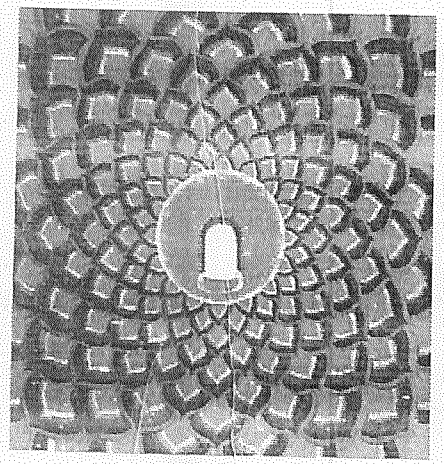
where it is possible for direct mind to mind communication between two people. It is the stage of sensitivity where individual minds can meet. It is the centre through which the guru communicates with his disciples and gives them commands. It is the link or bridge between the guru and disciple; therefore, this chakra is often called the guru chakra. It is the gateway to the inner temple of subtle initiation. The most common name is the third eye - the psychic eye that is located midway between the two physical eyes. This is the eye that looks inwards instead of outwards.

| | | |
|---|---|---|
| **Location** | : | Forehead (alt: between eyebrows) |
| **Colour** | : | White |
| **Spokes** | : | 2 |
| **Mantra** | : | OM |
| **Element** | : | Manas (Mind) |
| **Ruling Deities** | : | Paramashiva, Hakini |
| **Activity** | : | Consciousness |

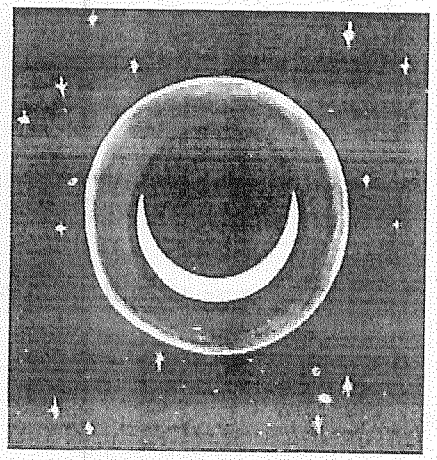
**Description**

Control centre for all mental activity, including regulation of sense faculties (Indriyas). Unification point of Ida, Pingala, and Sushumna Nadis. Seat of polarity archetypes – masc./fem., Shiva/Shakti, etc. Mastery of this centre eradicates karma, and gains all the powers of the lower five chakras.

**Sahasrara Chakra**



Sahasrara



Bindu



The literal meaning of the word Sahasrara is one thousand'. For this reason, it is said to be a lotus with one thousand petals.

| | | |
|---|---|---|
| **Location** | : | Above head, facing down |
| **Color** | : | White |
| **Spokes** | : | 1,000 |

**Description**

Seat of Atman. Center of enlightenment – not technically a chakra as it is completely transcendent and unrelated to the standard makeup of the lower six centers. Abode of pure, unqualified existence, liberation from suffering, total unification.

# CHAPTER 21 Pratyahara

Pratyahara is as one of the eight limbs (Ashtanga Yoga). Pratyahara enhances the power of concentration of senses. Pratyahara is drawing in of the senses by giving up their own objects and settled in the original state of mind.

स्वविषयासम्प्रयोगे चित्तस्वरूपानुकार इवेन्द्रियाणां प्रत्याहारः । (प.यो.सू. 2/54)

विषयेभ्यः इन्द्रियार्थेभ्यो मनोनिरोधः प्रत्याहारः । (मण्डल उपनिषद 1/1-7)

प्रत्याहारः स विज्ञेयोऽभ्यासनीयो मुहुर्मुहुः । (ब्रह्मणोपनिषद)

Withdrawal of the senses from all wordily desires and temptations and keeping them fixed in the pure nature of Citta or mind is called Pratyahara.

Pratyahara is a bridge between the Bahiranga and Antranga phases of Ashtanga yoga.

**Control of the Senses (Indriya-Pratyahara)**

Indriya-Pratyahara, or control of the senses, is the most important form of Pratyahara, although this is not something that we like to hear about in our mass media-oriented culture. Most of us suffer from sensory overload, the result of constant bombardment from television, radio, computers, newspapers, magazines, books etc.

**Control of the Prana (Prana-Pratyahara)**

Control of the senses requires the development and control of Prana because the senses follow Prana (our vital energy). Unless our Prana is strong we will not have the power to control the senses. If our Prana is scattered or disturbed, our senses will also be scattered and disturbed.

Pranayama is a preparation for Pratyahara. Prana is gathered in Pranayama and withdrawn in Pratyahara. Yogic texts describe methods of withdrawing Prana from different parts of the body, starting with the toes and ending wherever we wish to fix our attention-the top of the head, the third eye, the heart or one of the other chakras.

**Control of Action (Karma-Pratyahara)**

We cannot control the sense organs without also controlling the motor organs. In fact the motor organs involve us directly in the external world. The impulses coming in through the senses get expressed through the motor organs and this drives us to further sensory involvement. Because desire is endless, happiness consists not in getting what we want, but in no longer needing anything from the external world.



**Withdrawal of the Mind (Mano-Pratyahara)**

The yogis tell us that mind is the sixth sense organ and that it is responsible for coordinating all the other sense organs. We take in sensory impressions only where we place our mind's attention. In a way we are always practicing Pratyahara. The mind's attention is limited and we give attention to one sensory impression by withdrawing the mind from other impressions. Wherever we place our attention, we naturally overlook other things.

According to the Yoga Sutras "When the senses do not conform with their own objects but imitate the nature of the mind, that is Pratyahara."

**Pratyahara and the Other Limbs of Yoga**

Pratyahara is related to all the limbs of yoga. All of the other limbs-from asana to Samadhi-contain aspects of Pratyahara. For example, in the sitting poses, which are the most important aspect of asana, both the sensory and motor organs are controlled. Pranayama contains an element of Pratyahara as we draw our attention inward through the breath. Yama and Niyama contain various principles and practices, like non-violence and contentment that help us control the senses. In other words, Pratyahara provides the foundation for the higher practices of yoga and is the basis for meditation. It follows Pranayama (or control of Prana) and, by linking Prana with the mind, takes it out of the sphere of the body.

Pratyahara is also linked with Dharana. In Pratyahara we withdraw our attention from Ordinary distractions. In Dharana we consciously focus that attention on a particular object, such as a mantra. Pratyahara is the negative and Dharana the positive aspect of the same basic function.

## Dharana

Dharana or concentration is the fixing the mind on one place. Dharana is the fixing of the mind on something external or internal. The mind can be fixed externally on the picture of Lord Hari, Lord Krishna or Lord Rama or on any other object or point. Internally it can be fixed on any Chakra or any part of the body or on any abstract idea. Having controlled the Prana through Pranayama and the Indriyas through Pratyahara, you should try to fix the mind on something. In Dharana you will have only one Vritti or wave in the mind-lake.

देशबन्ध चित्तस्य धारणा । (प.यो.सू. 3/1)

Dharana is the confining [fixing] of the mind within a point or area".

मनः संकल्पकं ध्यात्वा संक्षिप्यात्मनि बुद्धिमान धारयित्वा तथात्मानं धारणम् परिकिर्तिता ॥

(अमृतनादोपनिषत)

"A Yogi should always avoid fear, anger, laziness, too much sleep or waking and too much food and fasting. If the above rule he well and strictly practiced each day, spiritual wisdom will arise of itself in three months without doubt. In four months, he sees the Devatas; in five months, he knows (or becomes) Brahmanishtha; and in six months, he attains Kaivalya at will. There is no doubt." Amritananda-Upanishad.

"Having made Atman as the lower Arani (sacrificial wood) and the Pranava as the upper

Arani, one should see the God in secret through the practice of churning which is Dhyana (meditation)." Dhyanabindu-Upanishad.

Before you begin the practice of concentration, you will do well to know something about the subconscious mind and its functions. In the Vedanta philosophy the subconscious mind is called Chitta. When the Chitta is confined and fixed to a certain point or object, this is called concentration. A great deal of your sub consciousness is but bundles of submerged experiences which can be brought to the surface of the conscious mind by means of concentration.

You must evince good interest in the practice of concentration. Then only your whole attention will be directed towards the object upon which you wish to concentrate. There can be really no concentration without a remarkable degree of interest and attention shown by the practitioner.

Attention is steady application of the mind. It is focussing of consciousness on some chosen object. Through attention you can develop your mental faculties and capacities. Where there is attention, there is also concentration. Attention should be cultivated gradually. It is not a special process. It is the whole mental process in one of its aspects.

Perception always involves attention. To perceive is to attend. Through attention you get a clear and distinct knowledge of objects. The entire energy is focussed on the object towards which attention is directed. Full and complete information is gained. During attention all the dissipated rays of the mind are collected. There is effort or struggle in attention. Through attention a deeper impression of anything is made in the mind. If you have good attention, you can attend to the matter in hand exclusively. An attentive man has very good memory.

There are again two other kinds of attention viz, voluntary attention and involuntary attention. When the attention is directed towards some external object by an effort, of the will, it is called voluntary attention. When you have an express volition to attend to this or that, it is called involuntary attention. The man understands why he perceives. Some deliberate intention, incentive, goal or purpose is definitely involved. Voluntary



attention needs effort, will, determination and some mental training. This is cultivated by practice and perseverance. The benefits derived by the practice of attention are incalculable. Involuntary attention is quite common. This does not demand any practice. There is no effort of the will. The attention is induced by the beauty and attractive nature of the object. Individuals perceive without knowing why and without observed instruction. Young children possess this power of involuntary attention to a greater degree than grown-up people.

Napoleon, Gladstone, Arjuna and Jnanadeva had all wonderful powers of attention. They could fix their minds on any object. All scientists and occultists possess attention to a remarkable degree. They cultivate it by patience, regular and systematic practice. A judge and a surgeon can get positive success in their respective professions only if they are endowed with the power of attention to a high degree.

## Dhyana

Dhyana is a term used for the seventh Anga (limb or level) in the eight-step Yoga practice of Sage Patanjali. According Nabhikkshu "when after achieving Dharana on some point, one's mind has succeeded for a sufficient time in holding itself before itself under the form of the object of meditation, without any interruption caused by the intrusion of any other function, one attains Dhyana". This state is penultimate to Samadhi or "absorption." Unfortunately, the word Dhyana is usually translated as meditation, implying a state of abiding calm. Earlier to practicing Dhyana, the relevant steps of Yoga, namely, Yama, Niyama, Asana, Pranayama, Pratyahara, and Dharana should be practiced. Meditation is a generic word stretching from sitting quietly to deep inward focus as practiced in many traditions.

तत्र प्रत्ययैकतानता ध्यानं । (प.यो.सू. 3/2)

Unbroken continuation of that mental ability is meditation.

उमार्धदेहं वरदं सर्वकारणकारणम । आकाशधारणात्तस्य खेचरत्वं भवेदध्रुवम ॥ 101॥
यत्रकुत्र स्थितो वापि सुखमत्यन्तमश्नुते । एवं च धारणाः पञ्च कुर्यादयोगी विचक्षण ॥102॥
ततो दृढशरिरः स्यान्मृत्युस्तस्य न विद्यते । ब्राह्मणः प्रलयेनापि न सीदति महामतिः ॥103॥

(योगतत्वो उपनिषद)

By practicing Dharana in the region of Akasha, he obtains certainly the power of levitating in the Akasha (ether). Wherever he stays, he enjoys supreme bliss. The proficient in Yoga should practice these five Dhahran's. Then his body becomes strong and he does not know death. That great-minded man does not die even during the deluge of Brahma.

समभ्यसेत्तथा ध्यानं घटिकाषष्टिमेव च । वायुं निरुध्यं चाकाशे देवतामिष्टदामिति ॥104॥
सगुणं ध्यानमेतत्स्यादणिमादिगुणप्रदम । निर्गुणध्यानयुक्तस्य समाधिश्च ततो भवेत ॥105॥

(योगतत्वो उपनिषद)

Then he should practice Dharana for a period of six Ghatikas (2 hours, 24 minutes). Restraining the breath in (the region of) Akasha and contemplating on the deity who grants his wishes – this is said to be Saguna Dhyana capable of giving (the Siddhis) Anima, etc. One who is engaged in Nirguna Dhyana attains the stage of Samadhi. Meditation on Lord Krishna, Lord Siva, Lord Rama or Lord Jesus is Saguna meditation. Meditation on Om, Soham, Sivoham, Aham Brahma Asmi and Tat Tvam Asi is Nirguna meditation.

The best and the most congenial time for the practice of meditation is unquestionably the Brahmamuhurta i.e., from 4 to 6 a.m. That is the time when the mind is quite refreshed after an agreeable slumber, when the mind is calm and comparatively pure.

Meditation techniques include specific postures, focused attention, or an open attitude toward distractions. People use them to increase calmness and relaxation, improve psychological balance, cope with illness, or enhance overall health and well-being. Meditation is based on a mental process to calm and reduce psycho-physiologic load on a person due to reasons cited above. The consequence of such a practice is lowered metabolism that goes by the well-known phrase, relaxation response

ध्यान भेदा–

स्थूलं ज्योतिस्तथा सूक्ष्मं ध्यानस्य त्रिविध विदुः । स्थूलं मूर्तिमयं प्रोक्तं ज्योतिस्तेजोमयं तथा ॥
सूक्ष्मं बिदुमयं ब्रह्म कुण्डलीपरदेवता । (घे.स. 6/1)

The Dhyana is of three types, Sthula, Jyoti and Sukshma. When a particular figure, such as one's Guru is contemplated, it is Sthula. When Brahma is contemplated as mass a light it is called Jyotisa. When Brahma as a Bindu or point and Kundali force are contemplated, it is Sukshma.

Dhyana is practiced to break old Samskara; it is based on total Vairagya or complete detachment. All attachment to body and mind should be transcended and only the motive to reach reality should light the path to liberation. Another significant difference between awareness practices and Dhyana is this: in the former, we seem to transcend the mind and seem lifeless, whereas in Dhyana, we are totally aware of our state.

## Samadhi

The fruit of meditation is Samadhi. Samadhi is super conscious state, wherein the Yogi gets super intuitional or super sensual knowledge and super sensual bliss. Samadhi is the



eighth step of the Yogic ladder. Intuition, revelation, inspiration and ecstasy are all synonymous terms.

दिनदवादशकेनैव समाधि समवाप्नुयात । वायुं निरुध्यं मेधावी जीवन्मुक्तो भवत्ययम ॥106॥
समाधिः समतावस्था जीवात्मपरमात्मनोः । यदि स्वदेहमुत्स्रष्टं मिच्छा चेदुत्सृजेत्स्वयम ॥107॥
परब्रह्मणि लीयेत न तस्योत्क्रान्तिरिष्यते । अथ नो चेत्समुत्स्रष्टुं स्वशरिरं प्रियं यदि ॥108॥

(योगतत्वो उपनिषद)

Within twelve days at least, he attains the stage of Samadhi. Restraining his breath, the wise one becomes an emancipated person.

तदेवार्थमात्रनिर्भासंस्वरुपशून्यमिव समाधिः । (यो.सू. 3/3)

Samadhi is that state in which the Jivatman (lower self) and the Paramatman (higher Self) are difference less (or of equal state). If he desires to lay aside his body, he can do so. He will become absorbed in Parabrahman and does not require Utkranti (going out or up). But if he does not so desire and if his body is dear to him, he lives in all the worlds possessing the Siddhis of Anima, etc. Sometimes he becomes a Deva and lives honored in Svarga; or he becomes a man or a Yaksha through his will. He can also take the form of a lion, tiger, elephant, or horse through his own will.

Yajnavalkya, the greatest Yogi says: "By Pranayama impurities of the body are destroyed; by Dharana or concentration impurities of the mind. By Pratyahara the impurities of attachment and by Samadhi everything that hides the Soul is removed."

शाम्भवा चैव खेचर्या भ्रामर्या योनिमुद्रया । ध्यानं नादं रसानन्दं लयसिद्धिश्चतुर्विधा ॥
पञ्चधा भक्ति योगेन मनोमूर्च्छा च षडविधा । षडविधोऽयं राजयोगः प्रत्येकवधारयेत ॥

(घे.स. 7/5-6)

The Samadhi is four folds- Dhyana Samadhi, Nada Samadhi, Rasananda Samadhi and Laya Samadhi respectively accomplished by Shambhavi Mudra, Khechari Mudra, Bramari Mudra and Yoni Mudra. The Bhakti Yoga Samadhi is Fifth, and Raja-Yoga Samadhi, attained through Mano-Murccha Kumbhaka is the Sixth form of Samadhi.

### Dhyana Yoga Samadhi

शाम्भवीं मुद्रिकां कृत्वा आत्मप्रत्यक्षमानयेत । बिन्दुब्रह्ममयं दृष्ट्वा मनस्तत्र नियोजयेत ॥ (घे.स. 7/7)

Performing the Sambhavi Mudra perceive the Atman. Having seen once the Brahman in a Bindu, fix the mind in that point.

### Nada Yoga Samadhi

साधनात खेचरिमुद्रा रसनोर्ध्वगता यदा । तदा समाधिसिद्धिः स्याद्धित्वा साधारणक्रियाम ॥

(घे.स. 7/9)

Turn the tongue upwards, closing the wind passages by performing the Kechari Mudra; by so doing Samadhi will be induced; there is no necessity of performing anything else.

**Rasananda Yoga Samadhi**

अनिलं मन्दविगेन भ्रामरीकुम्भकं चरेत । मन्दं मन्दं रेचयेद्वायुं भृङ्गनादं ततो भवेत ॥
अन्तःस्थः भ्रामरीनादं श्रुत्वा तत्र मनो नयेत । समाधिर्जायते तत्र आनन्दः सोऽहमित्यतः ॥

(घे.स. 7/10-11)

Let him perform the Bhramari Kumbhaka, drawing in the air slowly; expel the air slowly and slowly, with a buzzing sound like that of bettle. Let him carry the manas and place it in the centre of this sound of Humming beetle. By so doing, there will be Samadhi and by this, knowledge of so 'ham' arises and a great happiness takes place.

**Layasidhi Yoga Samadhi**

योनिमुद्रां समासाद्य स्वयं शक्तिमयो भवेत । सुशृंगाररसेनवै विहरेत परमात्मानि ।
आनन्दमयः सम्भूत्वा ऐक्यं ब्रह्माणि सम्भवेत । अहं ब्रह्मेति चाव्दैतं समाधिस्तेन जायते ॥

(घे.स. 7/12-13)

Perform the Yoni Mudra, and let him imagine that he is Sakti and Paramatman is Purusa; and that both have been united in one. By this he becomes full of bliss, and realises Aham Brahma. This conduces to Advaita Samadhi.

**Bhakti Yoga Samadhi**

स्वकीयहृद्ये ध्यायेदिष्टदेवस्वरुपकम । चिन्तयेद भक्तियोगेन परमाहादपूर्वकम ॥
आनन्दाश्रुपलकेन दशाभावः प्रजायते । समाधिः सम्भवेत्तेन सम्भवेच्च मनोन्मनी ॥ (घे.स. 7/14-15)

Let him contemplate within his heart his special diety; let him be full of ecstasy by such contemplation, let him shed tears of happiness, and by so doing he will become entranced. This leads to Samadhi and Maninmani.

**Rajayoga Samadhi**

मनोमूर्च्छा समासाद्य मन आत्मनि योजयेत । पर्रत्मनः समायोगात समाधिम् समवाप्नुयात ॥

(घे.स. 7/16)

Performing Manomurccha Kumbhaka unite the Manas with the Atman. By this union is obtained Raja-Yoga Samadhi.

Samadhi is of two kinds viz., Savikalpa Samadhi and Nirvikalpa Samadhi.

**Savikalpa Samadhi** - Savikalpa is a lower Samadhi. In the Savikalpa Samadhi the Samskaras or latent impressions are not fried in to. There is support for the mind. There is still the triad of subtle type viz., the seer, sight and seen, or the knower, knowledge and knowable. So Savikalpa Samadhi cannot give full satisfaction, full freedom, full bliss and knowledge. Ramadas, Tulasidas, Kabir,Tukaram, Mira, Gouranga, Hafiz, Madhva and Ramanuja had the experience of cosmic consciousness (Savikalpa Samadhi).



**Nirvikalpa Samadhi** - In Nirvikalpa Samadhi all Samskaras are burnt in toto. There is no support for the mind. The mind has merged into the all-pervading Spirit. There is no triad of seer, sight and seen, and so forth. Nirvikalpa Samadhi gives full satisfaction, full freedom, full bliss and full knowledge. Sankara, Dattatreya, Vamadeva, Jada Bharata, Madalasa and Yajnavalkya had all the experience of super cosmic consciousness (Nirvikalpa Samadhi).

There is also another classification viz., Jada Samadhi and Chaitanya Samadhi. In Jada Samadhi there is no awareness. It is more or less like deep sleep. The Yogi does not return with intuitional knowledge.

Jada Samadhi cannot give liberation or Mukti. It is more like an acrobatic feat. The Samadhi that we often hear of persons entering into, in public places is nothing but Jada Samadhi. In the other variety of Samadhi viz., Chaitanya Samadhi, there is "perfect awareness." The Yogi has intuitional knowledge.

According to Muktiopanishad of Sukla Yajurveda, Through the force of the practice of Dhyana, the current of the modification of Manas devoid of Self that is of Brehmic nature is said to be Sarmprajnata Samadhi, while the mind with the utter quiescence of modifications that confers upon one supreme bliss is said to be Asamprajnata-Samadhi that is dear unto Yogins. This [state] that is devoid of light, Manas and Buddhi, and that is of the nature of Chit (consciousness merely) is styled by the Munis Atadvyavrtti Samadhi (a Samadhi that does not care or require the aid of author). It is Plenum above, below and in the middle, and is of the nature of Shiva (auspiciousness). This noumenal (or occult) Samadhi is itself Vidhi-Mukha (sanctioned by books or Brahma).

एवं मिथः समाधिः स्यात सर्वसंकल्पवर्जितः । स्वदेहे पुत्रदारादिबान्धवेषु धन्नदिषु ।
सर्वेषु निर्ममो भूत्वा समाधि समवाप्नुयात ॥ (घे.स. 7/21)

Samadhi obtained, free from all desires. Free from attachments to his own body, to son, wife, friends, kinsmen, or riches; beings free from all, let him obtain fully the Samadhi.

CHAPTER 22

# Description of Yoga in Ayurveda

Ayurveda and Yoga have been connected for thousands of years ago because of the ancient system that is concerned in the healing of the mind and body. Yoga and Ayurveda are the unique sciences of antiquity. Both are developed and practiced in similar circumstances with similar objectives in the same land. Ayurveda a comprehensive science of the life was developed to ensure Arogya, which is the mean to achieving the four Purushartha namely Dharma, Artha, Kama, Moksha. The both science aim to achievement of salvation or Moksha.

धर्मार्थ काममोक्षाणां आरोग्यं मूलमुत्तमम । (च.सू. 1/15)

Health is the main root through which, one can achieve salvation or Moksha.

जन्मौषधिमण्त्रतपः समाधिजाः सिद्धयः । (यो.सू. 4/1)

Yoga and Ayurveda are allied disciplines; both have advocated Aoushadhi, Matra, Japa, Samadhi etc. as the means of achieving their objectives. Beside spiritual paths Yoga also teaches the uses of drugs for Chitta Shuddhi.

योगे मोक्षे च सर्वसां वेदनानामवर्तनम । मोक्षे निवृत्तिनिः शेषा योगोमोक्षप्रवर्तकः ॥ (च.शा. 1/37)

Charaka Samhita, one of the foremost Ayurvedic classics deals with highest category of Yoga. It describes very vividly. The concept of Prajna and the feature of a Yogartha Purusha i.e. Sthita Prajna almost in a similar manner as the concept of Ritambara Prajna described in Yoga Sutras of Patajanli and that of Yogastha Purusha in Bhagavad Gita.

Acharya Charaka has been given detailed account of Bahiranga practice like Yama, Niyama etc. in the context of Sadavritta and Acahara Rasayana (Cha. Chi 1/3). He also specific described the state of higher achievement of Yoga practice including the ultimate realization i.e. Satyabhuddhi and the achievement of Siddhi. The concept of Satya propounded by Charaka which appears to be a more vividly defied and comprehensive entity than Ritambara Prajna is completely incorporated in Charaka Acharya concept of Satyabuddhi.

आवेशश्चेतसं ज्ञानमर्थानां छन्दतः क्रिय । दृष्टिः श्रोत्र स्मृतिः कान्ति इष्टतश्चाप्यदर्शनम । (च.शा. 1/141)

These are very similar to Siddhi described by Patanjali in Yogasutara. Thses can be achieved by the following the path of Yoga. Thus Ayurveda conceives the purest form of yoga and considers, it primarily as the means of Tatva Jnana, liberation and mental Pease.





कर्मजास्तेष्वहेतुकाः । नश्यन्ति त्वक्रियाभिस्ते क्रियाभिः कर्मसंक्षये । (सु.उ. 40/103)

टिकाकार डल्हण–क्रियाभिः प्रायश्चितजपहोमोपहारादिरुपाभिः ।

तेषु कर्मजादिषु त्रिषु कर्मजा अहेतुका दोषागन्तुहेत्तुरहिताः ।

The Karmaja Roga are not curable through medicine these can be cured by Prayashcita, Japa, Tapa, Homa and Upachara etc. by reducing Karmaja of part of life.

तर्पासि तीव्राणि तथैव दानं व्रतानि धर्मो नियमाश्च सत्यम ।

गुणास्तथाऽष्टावपि तेषु नित्वा व्यस्ताः समस्ताश्च यथाप्रभावम । (सु.उ. 60/21)

Tapa, Triveni, Dana, Vrata, Dharma, Niyama, Satya and religious practices as well as the Ashta Aishawarya are either wholly or partially in the Graha according to the degree of their respective power.

तेषां शान्त्यर्थमन्विच्छन वैद्यस्तु सुसमाहितः । जयै सनियमैहोमैरारभेत चिकित्सातुम ॥ (सु.उ. 60/30)

These Graha's may be cured by only Shoucha, Snana, Bramhacharya and chanting Gayatri Mantra.

प्राणायामोव्देजनत्रासनानि सुचीतोदैः संभ्रमश्चात्र शर्तः ॥ (सु.उ. 30/16)

Hiccup should be treated through the practice of Pranayama. In Kshudra and Annaja Hikka, Pranayama is advices.

निशाचरेभ्यो रक्ष्यस्तु नित्यमेव क्षतातुरः । रक्षाविधानैरुद्धिष्टैयमैः सनियमैस्तथा ॥ (सु.चि. 1/133)

Protective rites should be performed for the safety of the wounded patient from the influences of malignant star and spirits with the major and minor duties i.e. Yama and Niyama enjoined to be practiced on his behalf.

..... यमनियमाभ्यामात्मानं संयोज्यवाग्यतोऽभ्यन्तरः । (सु.उ. 30/10)

At the time of use of Soma one should then wash and rinse his mouth with water in the manner of Acahmana. The having controlled his mind and speech with the vows of Yama and Tiyama he should stay in the protected inner chamber surrounded by his friends.

हिसांस्तेयान्यथाकाम पैशुन्यं परुशानृते । सम्भिन्नालापं व्यापादमभिध्यां दृग्विपर्ययम ॥

पापं कमेति दशधा कायवाकमानसैस्त्यजेत । (अ.ह.सू. 2/21-22)

Vagbhatacharya explained in Dinacharya Himsa, Asteya, Anyathakama, Paishunyam, Parushanrute, Sambhinnaalapam, Vyapada, Abhidhya, Drugviparyaya, Papakarma. These Dasha Papakarma should not be borne the body, mind and speech.

Food of all especially of kings should be observed strictly because Yoga and Kshema is by the king. Dharma, Artha, Karma and Moksha are connected with Yoga and Kshema (A. H. S.).

Those who know the subject without the means advocated Tapa or unmethodically performing Yoga may die sure (A.H.S.).

व्यजेदाक्ममनाशाश्च प्राणायामं च कारयेत । पृष्ठपार्श्वोदरं मृजात करैरुष्णैरधोमुखम । (अ.ह.क. 5/13)

Vagbhatacharya explain at the time of treating Murcha one should wet the face with cold water up to removal of back side use fan then, Pranayama then rubbing of back side and abdomen should be performed. When by any means neck is pressed and eyes going inside the use Vamana, Kshavathu and Pranayama should be performed.

## Moksha and Muktatmalakshana and Upaya

Moksha also called Vimoksha, Vimukti and Mukti, means emancipation, liberation or release. The deeper meaning of Moksha in Hinduism simply means liberation of the Atman soul from the cycle of birth and death forever. The moment human beings reached the stage of enlightenment (Kaivalya Jnana), one finally gained Moksha (salvation) in that lifetime.

योगे मोक्षे च सर्वासां वेदनामवर्तनम । मोक्षो निवृत्तिर्निःशेषा योगो मोक्षप्रवर्तकः ॥ (च.शा. 1/137)

Recurrence of all sensation is checked through Yoga and Moksha. The absolute eradication of sensation is attained through Moksha. The Yoga is a means to attain Moksha.

आत्मेन्द्रियमनोर्थानां सन्निकर्षात प्रवर्तते । सुखदुःखमनारम्भादात्मस्थे मनसि स्थिरे ॥
निवर्तते तदुभयं वशित्वं चोपजायते । सशरिरस्य योगज्ञास्तं योगमृषयो विदुः ॥ (च.शा. 1/138-139)

Happiness and Miseries are felt due the contact of the soul, the sense organs, mind and the objects of senses. Both these types of sensations disappear when the mind is concentrated and contained in the soul and the super-natural power in the mind and body re attained. This state is known as Yoga according to sages well versed in Ayurveda.

मोक्षो रजस्तमोऽभावात बलवत्कर्मसंक्षयात । वियोग सर्वसंयोगैरपुनर्भव उच्यते ॥ (च.शा. 1/42)

Moksha is nothing but an absolute detachment of all contacts by virtue of the absence of Rajas and Tamas in the mind and annihilation of effects of potent past actions. This is a state after which there are no more physical and mental contacts.

### Moksha Upaya

सतामुपासनं सम्यगसतां परिवर्जनम । व्रतचर्योपवासौ चनियमाश्च पृथग्विधाः ॥
धारनं धर्मशास्त्राणां विज्ञानं विज्ञने रति । विषयेष्वरतिर्मोक्षे व्यवसायः परा धृतिः ॥
कर्मणामसमारम्भः कृतानां च परिक्षयः । नैष्कम्यमनहकारः संयोगे भयदर्शनम ॥
मनोबुद्धि समाधानमर्थतत्व परिक्षणम । तत्त्वस्मृते सर्वमेतत् प्रवर्तते ॥ (च.शा. 1/43-146)

1. Devotion to noble souls



2. Abandoning company of the bad persons
3. Performa Vrata, Upavasa and Niyama
4. Follow the rules of good conduct
5. Compliance with scriptural prescriptions
6. Scriptural knowledge
7. Liking for lonely, living
8. Detachment from the objects of senses
9. Striving for Moksha
10. Absolute mental control
11. Abstinence from the performance of acts leading to good and sinful effects
12. Annihilation of the effects of past- actions
13. Desire to get away from the wordily tarp
14. Absence of ego.
15. Concentration of mind, body and soul
16. Thinking and remembering about spiritual objects
17. Absence of desires is means to Salvation.

### Eight super-Natural power of Yogi

आवेशश्चेतसो ज्ञानमर्थानां छन्दतः क्रिया । दृष्टिः श्रोत्रं स्मृतिः कान्तिरिष्टतश्चाप्यदर्शनम ॥
इत्यष्टविधमाख्यातं योगिनां बलमैश्वरम । शुद्धसत्वसमाधानात्तत सर्वमुपाजयते ॥ (च.शा. 1/140-141)

1. Entering others body
2. Thought reading
3. Doing things at will
4. Super-natural vision
5. Supernatural audition
6. Miraculous memory
7. Uncommon brilliance
8. Invisibility when desired. These are the eight super Natural powers attained by those practicing Yoga.

### Ashta Aishwarya-Eight Supernormal Powers

Ashta-Siddhis means eight types of supernormal powers. The eight supernormal powers or faculties innate in man but at present generally latent or undeveloped, although attainable when a person reaches the status of a Buddha.

Ashta Siddhis or the eight powers are possessed by yogis or Siddhas (perfect beings). These supernormal powers are believed attained, by the practice of yoga. The Ashta Siddhis are

1. Anima- capability of making the body minute
2. Mahima- increasing body size,
3. Laghima- ability to become light
4. Garima- power to make the body heavy,
5. Ishitva- possess divine powers,
6. Vashitwam- power to attract and bring others under control
7. Prapti- power to secure anything
8. Prakamya- ability to become invisible

**Satyabuddhi**

सर्वं कारनवद्दुःखमस्वं चानित्यमेव च । न चात्मकृतकं तद्धि तत्र चोत्पद्यते स्वता ॥
यावन्नोत्पद्यते सत्या बुद्धिनैतदहं यथा । नैतन्ममेति विज्ञाय ज्ञः सर्वमतिवर्तते ॥ (च.शा. 1/152-153)

Any things that has a cause constitutes misery, it is alien and ephemeral. It is not produced by the soul but ne has got a feeling of its ownerships until one has got a real knowledge to the effect that this is something different from him; and is not his own. As soon as one knows it, he gets rid of all miseries.

**Muktama Lakshana**

तस्मिश्चरमसंन्यासे समूलाः सर्ववेदनाः । ससंज्ञाज्ञान विज्ञाना निवृत्ति यान्त्यशेषतः ॥ (च.शा. 1/154)
अतः परं ब्रह्मभूतो भूतात्मा नोपलभ्यते । निःसृतः सर्वभावेभ्यश्चिन्हं यस्य न विद्यते ॥
ज्ञानं ब्रह्मविदां चात्र नाज्ञस्तज्ज्ञातुमर्हति ॥ (च.शा. 1/155)

Final renunciation in respect of all subsequent actions is attained; the very consciousness together with its final causes in the form of indeterminate, determinate or scriptural knowledge is completely eradicated. One identifies himself with Brahman and the emprirical soul ceases to exist. He is easily distinguishable from all other manifestations. He does not leave any indication of his existence. This is what those well versed in the knowledge of Brahman say.

नात्मनः करणाभवल्लिङ्गमप्युपलभ्यते । स सर्वकरणायोगान्मुक्त इत्याभिधीयते ॥ (च.शा. 5/22)

It is not possible even to characterize the liberated soul. For he has no contact what over with mental or other sense faculties. So, being detached of all sensory contacts, he is considered to be a liberated Soul.



**Tatwasmriti**

एतत्तदेकमयनं मुक्तैर्मोक्षस्य दर्शितम । तत्तस्मृति बलं, येन गताः न पुनरागताः ॥
अयनं पुनराख्यामेतद्योगस्य योगिभिः । संख्यातधर्मैः सांख्यैश्च मुक्तैर्मोक्षस्य चायनम ॥
(च.शा. 1/150-151)

The power of metaphysical memory constitutes the best way of libration, as shown by the liberally ones. Persons following this way do not come back to worldly tarps. This is again the best way to the attainment of Yoga as well as Moksha. This is what the Yogis, the virtuous ones, the followers of the Samkhya system, and the libration ones say.

## Naishthiki Chikitsa

Ayurveda has always emphasized the importance of treating the mental aspects for complete relief. Accordingly various treatment modalities are mentioned to keep the patient's mind healthy by maintaining the balance between the Manas Doshas. Satva, Raja and Tama are considered the Manas Dosha amongst which one should aim at developing the Satva Guna as it can help to keep our mind stable. Increase in Raja Guna leads to disturbed coordination of mind and body and causing unnecessary thinking. Increase in Tama Guna makes one lethargic and non enthusiastic thereby generating negative thoughts in his mind.

Thus Naishthki Chikitsa helps to increase the good qualities of Mana( Mind) which is also called as Satva. Hence this treatment is also termed as Sattvavajaya Chikitsa.

.... चिकित्सा तु नैष्ठोकी या विनोपधाम । उपधा हि परो हेतु र्दुःख दुःखाश्रयप्रदः ।
त्यागः सर्वोपधानां च सर्वदुःकव्यपोहकः । कोषकारो यथा ह्यंशूनुपादत्ते वधप्रधान ।
उपादत्ते यथाऽर्थेभ्यस्तृष्णमज्ञः सदाऽतुरः । यस्त्वग्निकल्पानर्थाञ्ज ज्ञो ज्ञोत्वा तेभ्यो निवर्तते ।
अनारम्भाद संयोगात्तं दुःखं नोपतिष्ठते । (च.शा. 1/94-97)

Nisththika Chikitsa means Upadharahita, as Upadha is the root cause of all miseries. Elimination of desires, leads to the eradication of all miseries. A silk warm provides for itself suicidal threads. So does an ignorant person, bound with worldly miseries, provides for himself desires arising out of the various objects. A wise person, who abstains from the objects of senses, considering them as dangerous as burning fire, does not subject himself to any wishful acts and contacts with their objects with the result that miseries never overcome him.

According to Charakacharya Hetu (cause), Utapatti (birth), Vriddhi (growth), Upaplava (decay) and Viyoga (dissolution) of the natural state. His attachment to the various actions constitutes a causative factor of all his miseries and detachment of

cessation of all miseries. Satyabuddhi of the fact that attachment leads to miseries and detachment to happiness is the real knowledge. This knowledge can be achieved only by virtue of the realization of the identity of the universe and man.

**Pravritti (Cause of attachment) Cha. Sha. 5/9**

Attachment is caused by Ahankara, Sanga, Samshaya, Abhisamplava, Abhyavapata, Vipratyaya, Avishesha, and Anupaya arising from attachment overcome and engulf and individual as the trees with very long branches overcome and engulf a young tree.

Ahankara- represents an egoistic feeling, such as I am endowed with best, descent, beauty, wealth, character, intelligence, conduct, learning, locality, age, potency and influence.

Sanga- represents that mental, vocal or bodily action which is not conducive to the attainment of salvation.

Samshaya- stands for doubt regarding the existence of the result of the past action, salvation, life after death etc.

Abhisamplava- stands for vanity, I am second to none in any situation, I am the creator; I am an accomplished person by nature; I am in the excellent state of the health, sense organs, intelligence and memory.

Abhyavapata- attachment of mother, father, brother, wife, progeny, keen, friends and servants to me and I belong to them.

Vipratyaya- when a person considers desirable, beneficial things as harmful and an auspicious one as inauspicious called as Vipratyaya.

Avishesha- lack of distinction between a conscious and an unconscious element, nature and its modifications, attachment and detachment is Avishesha.

Anupaya- actins like Prokshana (consecration), Anasana (fasting), Agnihotra, Trisevana (three Oma libations), Abhyukshana (wetting), Anahana (invocation), Yajana (priesthood), Yacana (bagging), and entering into water and fire are known as Anupaya.

**Nivutti (method of detachment)**

निवृत्तिरपवर्गः तत परं प्रशान्तं तत्तदक्षरं ततब्रह्मं स मोक्षः। (च.शा. 5/12)

Detachment is salvation. It is Para (absolute). It is Parashant. It is Akshara. It is Brahma. It is Moksha (salvation).



## Therapeutic Index

**Abdomen : (General Toning And Strengthening)**

Asana: General- Pawanmuktasana, Sputa Vajrasana, Shashankasana, Ushtrasana, Trikonasana, Matsyasana, any backward or forward bending asana, ardha Matsyendrasana, Halasana, Mayurasana, Paschimottanasana.

Pranayama: Bhastrika, Kapalbhati.

Bandha: Uddiyana Bandha.

Shatkarma: Agnisar Kriya, Nauli, Shankhaprakshalana, Kunjal.

**Acidity**

Asana: Vajrasana for at least 10 minutes after every meal.

Pranayama: Nadi Shodhana, Bhramari.

Shatkarma: Agnisara Kriya, Kunjal.

Other: Relaxation and cultivation of mental tranquillity through yoga Nidra and meditation.

**Adenoids: (Enlargement)**

Asana: Simhasana, Surya Namaskara.

Pranayama: Ujjayi with Khechari Mudra.

Shatkarma: Neti, Kunjal.

Diet: Avoid non-vegetarian food, milk products and sour food.

**Adrenal Glands: (General Toning)**

Asana: General - Surya Namaskara, Bhujangasana, Ushtrasana, Trikonasana, Dhanurasana, Shalabhasana, Paschimottanasana, Chakrasana, Padahastasana, Ardha Matsyendrasana, Halasana, Merudandasana, Mayurasana,

Pranayama: Bhastrika.

Mudra: Pashinee Mudra.

Bandha: Uddiyana Bandha.

Shatkarma: Agnisara Kriya, Nauli.

Other: Stress free, regular lifestyle.

**Anaemia**

Asana: Surya Namaskara, Bhujangasana, Shalabhasana, Sarvangasana, Halasana, Matsyasana, Paschimottanasana.

Pranayama: Nadi Shodhana, Shitali, Sitkari, Ujjayi in Shavasana (without Khechari).

Diet: Rich in green leafy vegetables and fresh fruits.

**Anxiety: (And Nervous Tension)**

Asana: General-Pawanmuktasana, Suryanamaskara, Shashankasana, Yogamudrasana, Paschimottanasana, Bhujangasana, Shalabhasana, Sarvangasana, Halasana, Shavasana.

Advanced : Garbhasana, Koormasana.

Pranayama : Nadi Shodhana, Kapalabati, Bhastrika, Bhramari, Sheetali, Seetkari.

Mudra: Vipareeta Karani, Pashinee, Shambhavi, Bhoochari, yoga, Prana and yoni Mudras.

Shatkarma: Trataka, Jala Neti, Kunjal.

**Appetite**

Asana: Forward and backward bends, Surya Namaskara.

Pranayama: Agnisar Kriya.

Bandha: Uddiyana Bandha.

Shatkarma: Nauli.

**Arthritis**

Asana: pawanmuktasana

Pranayama: Nadi Shodhana, deep abdominal breathing, Bhramari, Kapalabhati.

Diet: Light veg. meals, avoid sour and artificial food.

Shatkarma: Neti, Kunjal, Laghoo Shankhaprakshalana.

Other: Yoga Nidra, meditation.

**Asthma**

Asana : Surya Namaskara, Shashankasana, Pranamasana, Sarvangasana, Supta Vajrasana, Marjari-asana, Ushtrasana, Hasta Uttanasana, Utthita lolasana, Dwikonasana, Matsyasana, backward bending Asanas, Padahastasana, Baddha Padmasana.

Shavasana with breath awareness.

Pranayama: Nadi Shodhana, Bhastrika, Kapalbhati. Deep abdominal breathing at all times.

Shatkarma: Vastra Dhouti, Shankhaprakshalana, Kunjal, Jala Neti.

Diet: Avoid mucus producing foods such as milk and milk products, rice and non-vegetarian foods. Eat fruit and vegetables in season, and cooked, rather than raw vegetables (salads) especially in winter.



Other: Yoga Nidra, Ajapa Japa, Antar Mouna and other meditation and relaxation techniques to remove the source of nervousness.

**Backache**

Asana: Pawanmuktasana and Supta Vajrasana, Shashankasana, Bhujangasana, Vyaghrasana, Tadasana, Tiryaka Tadasana, katichakrasana, Makarasana, all backward bending Asanas, Meru Wakrasana, Bhunamanasana.

Pranayama: Ujjayi, Bhramari.

Diet: Light vegetarian diet.

**Cold or Cough**

Asana: Surya Namaskara, regular practice of Asanas and Pranayama. Simhasana is especially recommended. During a cold only relaxing practices should be attempted.

Shatkarma: Neti, Kunjal, Laghoo Shankhaprakshalana.

Diet: Avoid mucus-producing foods such as milk and milk products, rice and non-vegetarian foods.

**Constipation**

Asana : Tadasana, Tiryaka Tadasana, Katichakrasana, Surya Namaskara, Pawanmuktasana, sputa Vajrasana, Shashankasana, Ushtrasana, Trikonasana, Yogamudrasana, Matsyasana, all backward and forward bending Asanas, all spinal twist Asanas, Halasana.

Drink 2 to 3 glasses of body temperature warm water before morning practice.

Sit in Vajrasana for at least 10 minutes after every meal.

Pranayama : Nadi Shodhana.

Mudra : Ashwini Mudra.

Bandha : Uddiyana and Maha Bandhas.

Shatkarma: Laghoo Shankhaprakshalana, Agnisara Kriya, Nauli.

Diet: Fresh fruit, vegetables and drink plenty of water.

**Diabetes**

Asana: General - Surya Namaskara, Tadasana, Yogamudrasana, Shashankasana, Supta Vajrasana, Paschimottanasana, Bhujangasana, Ardhamatsyendrasana, Halasana, Sarvangasana, Matsyasana, Gomukhasana, Shavasana.

Advanced : Dwihasta Bhujangasana, Vatayanasana.

Pranayama : Nadi Shodhana, Bhramari, Bhastrika, Ujjayi.

Shatkarma : Laghoo Shankhaprakshalana, Kunjal, Neti.

Diet: Food restrictions should be followed.

**Headache: (Also Migraine)**

Asana: Relaxation poses, Pawanmuktasana, eye exercise, Shashankasana, Tadasana, Dwikonasana.

Pranayama: Nadi Shodhana, Bhramari, Ujjayi

Shatkarma: Neti (Kunjal for migraine).

Precautions: Avoid eye strain.

Other: Yoga Nidra.

**Impotence**

Asana: Pawanmuktasana, Surya Namaskara, Sarvangasana, Halasana.

Pranayama: Nadi Shodhana, Bhastrika, Ujjayi.

Bandha: Moola Bandha.

Mudra: Vajroli, Ashwini Mudras.

**Insomnia**

Asana: Pawanmuktasana , Shashankasana.

Pranayama: Bhramari, Ujjayi, abdominal breathing in Shavasana before going to sleep.

Shatkarma: Trataka.

Other: Yoga Nidra before sleep.

**Obesity**

Asana: Pawanmuktasana, Vajrasana, Surya Namaskara, Padahastasana, Halasana, Vipareeta Karani Asana, Matsyasana.

Pranayama: All Pranayamas, especially Bhastrika, Sheetali or Seetkari.

Diet: Avoid oily, fried or starchy foods, oscillating between fasting and overeating, eating between meals.

**Piles**

Asana: Sarvangasana or Vipareeta Karani asana for extended periods, Ashwini Mudra or Moolabandha while in the inverted position, Pawanmuktasana, Tadasana,



Tiryaka Tadasana, Katichakrasana, Shashankasana, Shashank Bhujangasana, Supta Vajrasana, Ushtrasana, Matsyasana, Paschimottanasana.

Mudra: Ashwini Mudra for extended periods.

Shatkarma: Laghoo Shankhaprakshalana, Moola Shodhanam.

Diet: Light, easily digestible food such as fresh fruit and vegetables. Drink plenty of water, fruit and vegetable juice, herbal teas. Avoid heavy foods like meat, cheese, fried or oily food, rich sauces, and desserts.

**Pregnancy : (Antenatal) and Reproductive Organs : (General Toning - Male and Female)**

**Asana : Months 1 To 3**

General - Pawanmuktasana and Surya Namaskara, Shashankasana, Marjariasana, Shashank Bhujangasana, Ushtrasana, Vyaghrasana, Kati Chakrasana, Tadasana, Meru Prishthasana, Utthanasana, Trikonasana, Yogamudrasana, Matsyasana, Tolangulasana, all backward bending Asanas, Ardhamatsyendrasana, inverted Asanas, Kandharasana, Garudasana, Vashishthasana, Pada Angushthasana.

Advanced : Moolabandhasana, Dhanurakarshanasana, Hanumanasana.

Males : Mayurasana, Brahmacharyasana.

Pranayama : All Pranayamas.

Mudra : Ashwini, Vajroli, Vipareeta Karani, Maha and Maha Bheda Mudras.

Bandha : Moola and Maha Bandhas.

Shatkarma : Agnisar Kriya, Nauli.

Other : Yoga Nidra, meditation.

**Months 4 to 6 -** Pawanmuktasana, Matsyakridasana, meditation Asanas, Vajrasana, Bhadrasana, Majariasana, Hasta Utthanasana, Tadasana, Tiryakatadasana, Kati Chakrasana, Utthanasana.

**Months 7 to 9 -** Only Pawanmuktasana.

Pranayama: Nadi Shodhana, Bhramari, Ujjayi, light Bhastrika. After 3 months discontinue Bhastrika.

Mudra: Ashwini and Vajroli Mudras.

Bandha: Moola Bandha.

Diet: Nutritious, vegetarian diet.

Shatkarma: Kunjal to relieve morning sickness, After 3 months only do Neti.

Other: Yoga Nidra, Ajapa Japa and meditation.

Precautions: Avoid Uddiyana Bandha, Agnisara Kriya and Nauli. Take special care not to strain.

**Pregnancy: (postnatal )**

**Asana:** Week 1 - Relaxation Asanas.

Week 2 - Add Pawanmuktasana

Week 3 - Add Pawanmuktasana, Standing Asana, backward bends, spinal twists.

Week 4 - Emphasise Pawanmuktasana, Addutthanasana and slow Surya Namaskara.

Pranayama: Week 2 onwards - Nadi Shodhana, Bhramari, Ujjayi, gentle Bhastrika.

Mudra: Week 3 onwards - Ashwini and Vajroli Mudras.

Bandha: Week 3 onwards - Moola Bandha.

Other: Week 1 on - Yoga Nidra, Ajapa Japa, meditation.

# CHAPTER 23 Nisargopachara (Prakritikachikitsa)

Nature Cures, not the Physician. - Hippocrates

Nature cure is a constructive method of treatment which aims at removing the basic cause of disease through the rational use of the elements freely available in nature. It is not only a system of healing, but also a way of life, in tune with the internal vital forces or natural elements comprising the human body. It is a complete revolution in the art and science of living.

Naturopathy is centuries old therapy; it is the healing power of nature. Naturopathy is a primary health care which emphasizes the prevention and treatment of disease, maintenances of optimal health and promotion of individual inherent self healing process. Naturopathy includes all the available noninvasive treatment and diagnostic modalities which do not inference with the body's natural functional capacity and healing process.

"Health is wealth" health is not merely the absence of disease, but is a positive quality of living body. Human health and happiness are governed by the laws of nature, which should not be violated. Disease of acute nature is a vital response and the body has innate ability to care a disease which is known as vital power.

Naturopathy explains that the health can be promoted by eating well balanced diet rich in fruits and vegetables, regular exercise, maintenance of healthful weight and avoiding toxic habits like smoking, drug addiction etc. Naturopathy is one of the important branch of alternative medicine. The scope of naturopathic medicine in the field of clinical nutrition, homeopathy, botanical medicine, physical medicine, natural child health, counseling and stress management, also it covering all aspects of family health from prenatal through to geriatric care.

The U.S. Department of Labor defines naturopathic physicians as doctors who "diagnose, treat, and help prevent diseases using a system of practice that is based on the natural healing capacity of individuals. May use physiological, psychological or mechanical methods. May also use natural medicines, prescription or legend drugs, foods, herbs, or other natural remedies."

**Definition and derivation**

Naturopathy, Naturopathic medicine, Nature cure, Nisargopachara these all synonymously used terminologies.

निसर्गोपचार-निसर्गोपचार is the combination of two words निसर्ग+उपचार

निसर्ग is an 'अ' कारान्त पुल्लिग शब्द, derived from नि and सृज धातु, घञ् प्रत्यय ( वाचस्पति ) means स्वभावतः

उपचार is an 'अ' कारान्त पुल्लिग शब्द, derived from उप् चर् धातु, घञ् प्रत्यय ( वाचस्पति ) means रुक् प्रतिक्रिया.

- Naturopathy – (na" cher-op'ah-the) A drugless system of healing by use of physical methods. (Dorland's medical dictionary)
- (nature +o + pathy) A system of treating diseases, largely employing natural agencies such as air, water, sunshine etc. and rejecting the use of drugs and medicine (New millennium 4th edition)
- The treatment of diseases etc. without drugs involving diet, exercise, massage etc (Oxford dictionary 3rd edition)
- The therapeutic living application of constrictive laws of nature is called Naturopathy (Dr. Henry Lindlahr).

**Aims of Naturopathy**

Naturopathy aims at educating people, for following healthier way of life & protects themselves against diseases by natural methods like Mud Therapy, hydrotherapy, fasting etc.

**Development of naturopathy**

The basic original idea of Nature cure is of Vedic origin in India where since antiquity was considered divine and all healing was attributed to the functions of nature. The original Hindus religion is really hall marked with the worship of Nature gods like Sun, Water, Air, and Earth. The man recognized the role of these natural forces in sustenance of life, hence a tradition of worship of nature gods became prevalent. Although the term 'naturopathy' is of relatively recent origin, the philosophical basis and several of the methods of nature cure treatments are ancient. It was practiced in ancient Egypt, Greece and Rome. Hippocrates, the father of medicine (460-357 B.C.) strongly advocated it. India, it appears, was much further advanced in older days in natural healing system than other countries of the world. There are references in India's ancient sacred books about the extensive use of nature's excellent healing agents such as air, earth, water and sun.



The Great Baths of the Indus Valley civilization as discovered at Mohenjo-Daro in old Sind testifies to the use of water for curative purposes in ancient India.

The modern methods of nature cure originated in Germany in 1822, when Vincent Priessnitz established the first hydropathic or 'water cure' (hydrotherapy) establishment there. With his great success in water cure, the idea of drugless healing spread throughout the civilized world and many medical practitioners throughout the civilized world and many medical practitioners from America and other countries became his enthusiastic students and disciples.

Water cure is synonymous with nature cure in those early days. The credit of making water cure world famous goes to Vincent Priestnitz (1799-1851). Dr. Henry Lindlahr and others go to the extent of crediting him as "father of naturopathy."

The word "Naturopathy" has been coined by Dr. John Scheel in the year 1895 and was propagated and popularized in western world by Dr. Benedict Just. A number of Doctors of modern medicine and others became nature cure enthusiasts and gradually added a number of modalities within the fold of naturopathy and scientifically developed them. Nature cure movement gained momentum in India as Mahatma Gandhiji (father of nation) became much interested in this system and included it in his programmers.

Nature cure is based on the realization that man is born healthy and strong and that he can stay as such as living in accordance with the laws of nature. Even if born with some inherited affliction, the individual can eliminate it by putting to the best use the natural agents of healing. Fresh air, sunshine, a proper diet, exercise, scientific relaxation, constructive thinking and the right mental attitude, along with prayer and meditation all play their part in keeping a sound mind in a sound body.

**Principles and Practice of Nature Cure**

The first and most basic principle of nature cure is that all forms of disease are due to the same cause, namely, the accumulations of waste materials and bodily refuse in the system.

These waste materials in the healthy individual are removed from the system through the organs of elimination. But in the diseased person, they are steadily piling up in the body through years of faulty habits of living such as wrong feeding, improper care of the body and habits contributing to enervation and nervous exhaustion such as worry, overwork and excesses of all kinds. It follows from this basic principle that the only way to cure disease is to employ methods which will enable the system to throw off these toxic accumulations. All natural treatments are actually directed towards this end.

The second basic principle of nature cure is that all acute diseases such as fevers, colds, inflammations, digestive disturbances and skin eruptions are nothing more than self-initiated efforts on the part of the body to throw off the accumulated waste materials and that all chronic diseases such as heart disease, diabetes, rheumatism, asthma, kidney disorders, are the results of continued suppression of the acute diseases through harmful methods such as drugs, vaccines, narcotics and gland extracts.

The third principle of nature cure is that the body contains an elaborate healing mechanism which has the power to bring about a return to normal condition of health, provided right methods are employed to enable it to do so. In other words, the power to cure disease lies within the body itself and not in the hands of the doctor.

### Nature Cure vs Modern System

The modern medical system treats the symptoms and suppresses the disease but does little to ascertain the real cause. Toxic drugs which may suppress or.relieve some ailments usually have harmful side-effects. Drugs usually hinder the self-healing efforts of the body and make recovery more difficult. According to the late Sir William Osler, an eminent physician and surgeon, when drugs are used, the patient has to recover twice - once from the illness, and once from the drug.

Drugs cannot cure diseases; disease continues. It is only its pattern that changes. Drugs also produce dietary deficiencies by destroying nutrients, using them up, and preventing their absorption. Moreover, the toxicity they produce occurs at a time when the body is least capable of coping with it. The power to restore health thus lies not in drugs, but in nature.

### Methods of Nature Cure

The nature cure system aims at the readjustment of the human system from abnormal to normal conditions and functions, and adopts methods of cure which are in conformity with the constructive principles of nature. Such methods remove from the system the accumulation of toxic matter and poisons without in any way injuring the vital organs of the body. They also stimulate the organs of elimination and purification to better functioning. To cure disease, the first and foremost requirement is to regulate the diet.

To get rid of accumulated toxins and restore the equilibrium of the system, it is desirable to completely exclude acid-forming foods, including proteins, starches and fats, for a week or more and to confine the diet to fresh fruits which will disinfect the stomach and alimentary canal. If the body is overloaded with morbid matter, as in acute disease, a complete fast for a few days may be necessary for the elimination of toxins.



### Principles of Naturopathy

1. All disease their cause and their treatment are one.
2. The basic cause of disease is not bacteria, bacteria develops after the accumulation of morbid matter when favorable atmosphere for their growth develops in body. Basic cause is morbid matter and not the bacteria.
3. Acute diseases are our friends not the enemies. Chronic diseases are the outcome of wrong treatment and suppression of the acute diseases.
4. Nature is the greatest healer. Body itself is having capacity to prevent from diseases and regain health if unhealthy.
5. Patient is treated and not the disease.
6. Long waiting for diagnosis is not required for treatment.
7. Patients suffering from the chronic aliments are also treated successfully in comparatively less time in naturopathy.
8. After emerging, suppressed diseases can be cured by naturopathy.
9. Naturopathy treats physical, mental, social and spiritual all four aspects at the same time.
10. Naturopathy treats body as a whole instead of giving treatment to each organ separately.
11. Naturopathy does not use medicines according to naturopathy "food is medicine."
12. According to Gandhi Rama Nama is best natural treatment means doing prayer ones spiritual faith is a important part of treatment.

### Applied Principles of Naturopathic Medicine

- The healing power of nature
- Identify and treat the cause
- First do no harm
- Treat the whole person
- Nature as a physician, physician as a teacher
- Prevention

### Panchabhutopasana Relation of Ayurveda and Naturopathy

The material world is composed of five basic elements- ether, air, fire, water and earth. They represent the five fundamental qualities of matter. They are the physical moieties of all physical components of our body. Likewise they constitute the biological assembly of the entire animal and plant kingdom besides the inanimate. Their presence

in a prescribed balance is the basis of health and their imbalance forms a disease state. The transient imbalances in the body can be restored to balance by appropriate consumption of five elements from the nature following the law of Samanya and Vishesha i.e. homologous vs hetrologus. Naturopathy believes that the five elements approach is two-fold, firstly the balancing of bodily five elements by supplementing or depleting them by extra-bodily through food, drug, life style as in Ayurveda. Secondly the five elements are also used in Naturopathy as purifying tools. According to naturopathy because of hypo functioning Agni and ingestion of unwanted materials from the polluted toxic materials get stagnated in the body. Because of their toxic and antigenic blocking effects those stagnated toxic materials produce different diseases. This is the main cause of disease in Nature cure tradition and hence removal of these toxins is the principle line of treatment. The principle medium and method of purification of stagnated toxins is through the five elements like water, air, light, mud etc. there is no better medium than water for cleansing. Similarly there is nothing stronger than air and sunlight for drying and exhausting the impurities anywhere, in the body or elsewhere. Mud application is known to dissolve and adsorb the toxins and cleanse the body to make it pure. Hence all purifying therapies in naturopathy are comprised of water treatment, mud application and mud poultice, sun bath, air bathetic. Thus the five elements are important and fundamental tools of treatment in Ayurveda and naturopathy.

**Importance of Naturopathy in present era.**

- Naturopathy is a science, which provides complete health with help of nature.
- Being a system without medicine
- It is free from side effects.
- It is safe for all.
- In Naturopathy patient's diet is his medicine.
- Naturopathy puts lot of emphasis on well balanced diet.
- Naturopathy does not make one dependent on doctor. So one can learn the principles & follow them in their routine life to maintain health.

Naturopathy believes in the treating disease produced by nature by natural way. By utilizing five element found in nature that is mud, water, sunlight, air, fasting and exercise. Another aspect is consumption of positive food, which is beneficial to health. The methods adopted in naturopathy are as follow.

# CHAPTER 23 Jalachikitsa (Hydrotherapy)

Water is the most important therapeutic tools in Naturopathy. Hydrotherapy may be defined as the use of water, in any of its forms, for the maintenance of health or the treatment of disease. Hydrotherapy has been used to treat disease and injury by many different peoples. Also called (Hydrothermal therapy) additionally uses its temperature effects, as in hot baths, saunas, wraps, etc.

**History of Hydrotherapy**

Father of Hydrotherapy is LUI KUHNE

First contributed by Hippocrates.

Hydrotherapy is commonly attributed to Father Sebastian Kneipp (1821-97), who believed that water would 'dissolve, remove and strengthen'.

- Curri
- Jackson
- Wincent prieesnitz

Hydro - water

Therapy - healing

Hydrotherapy is use of water, either internally or externally, to maintain health and prevent disease. Water will be used in different forms and at different temperature

Classification on Temperature-

Very cold - 32 to 55 Degree F

Cold - 55 to 65 Degree F

Cool - 65 to 80 Degree F

Tepid - 80 to 92 Degree F

Warm neutral - 92 to 98 Degree F

Hot - 98 to 104 Degree F

Very hot - 104 Degree F Above

**Types of Hydrotherapy**

1. Internal hydrotherapy

2. External hydrotherapy

Internal Hydrotherapy: Enema, Colon Hydrotherapy, Drinking hot or cold water etc.

External hydrotherapy: Baths, Packs, Douches, Frictions, Whirlpool, Aqua exercises, Cold rubbings, Fomentation etc.

**Different Methods of External Hydrotherapy**

**A. BATHS-** Hot water bath, cold water bath, neutral water bath and alternate bath.

**Based on applications**

a. Foot Bath (Pada Snana)
b. Calf Bath (Pindika Snana)
c. Hip Bath (Kati Snana)
d. Spinal Bath (Prushta Snana)
e. Eye Bath (Akshi Snana)
f. Sitz Bath (Mehana Snana)
g. Arm Bath (Hasta Snana)
h. Steam Bath (Bashpa Snana)
i. Full Immersion Bath (Avagaha Snana)

**B. Compression**

**C. Fomentations**

**D. Packs**

a. Full wet sheet pack
b. Trunk pack
c. Ice pack
d. Chest pack
e. Abdominal pack
f. Knee pack eye pack
g. Head pack

**Bath**

Water has been used as a valuable therapeutic agent since time immemorial. In all major ancient civilizations, bathing was considered an important measure for the maintenance of health and prevention of disease. It was also valued for its remedial properties. The ancient Vedic literature in India contains numerous references to the efficacy of water in the treatment of disease.

In modern times, the therapeutic value of water was popularized by Vincent Priessnitz, Father Sebastian Kneipp, Louis Kuhne and other European water-cure



pioneers. They raised water cure to an institutional level and employed it successfully for the treatment of almost every known disease.

**Hot Foot Bath**

In this method, the patient should keep his or her legs in a tub or bucket filled with hot water at a temperature of 40°C to 45°C. Before taking this bath, a glass of water should be taken and the body should be covered with a blanket so that no heat or vapor escapes from the foot bath.

The head should be protected with a cold compress. The duration of the bath is generally from 5 to 20 minutes. The patient should take a cold shower immediately after the bath.

The hot foot bath stimulates the involuntary muscles of the uterus, intestines, bladder and other pelvic and abdominal organs. It also relieves sprains and ankle joint pains, headaches caused by cerebral congestion and colds. In women, it helps restore menstruation, if suspended, by increasing supply of blood especially to the uterus and ovaries.

**Cold Foot Bath**

Three to four inches of cold water at a temperature of 7.2°C to 12.7°C should be placed in a small tub or bucket. The feet should be completely immersed in the water for one to five minutes. Friction should be continuously applied to the feet during the bath, either by an attendant or by the patient by rubbing one foot against the other. A cold foot bath, taken for one or two minutes, relieves cerebral congestion and uterine hemorrhage. It also helps in the treatment of sprains, strains and inflamed bunions when taken for longer periods. It should not be taken in cases of inflammatory conditions of the genito-urinary organs, liver and kidneys.

**Arm Bath**

The hand and arm may be immersed in neutral, hot or cold water or the two latter alternately. For this purpose employ a foot tub (better one of elliptical shape) with sufficient water to immerse the hand and forearm to the elbow, or including the elbow. Very deep pails may be used. When hot water is used, it should be as hot as can be borne. Immersion of the hands in cold water is useful in controlling epistaxis. To give hot and cold immersion to an infected hand or arm (blood poisoning)employ two pails or tubs, one of the hottest water that can be borne, and the other of ice water with a block of ice in it. To the cold water maybe added one-fourth or one-half dram of crystals of permanganate of potassium, and to the hot water about five times this quantity of oxalic acid.

Immerse the hand and arm in hot water for one and one-half to two minutes, then in the cold for fifteen to thirty seconds. Continue these alternations for twenty-five minutes to an hour, finishing with the cold. Hot water should be added to the tub as fast as can be borne. The procedure should be repeated from one to four times daily as indicated. Other parts of the body, as the foot, may be treated in a similar manner. Massage is strictly contraindicated in infected conditions.

### Spinal Bath

The spinal bath is another important form of hydrotherapic treatment. This bath provides a soothing effect to the spinal column and thereby influences the central nervous system. It is given in a specially designed tub with its back raised so as to provide proper support to the head. The bath can be administered at cold, neutral and hot temperatures. The water level in the tub should be an inch and a half to two inches and the patient should lie in it for three to 10 minutes.

The cold spinal bath relieves irritation, fatigue, hypertension and excitement. It is beneficial in almost all nervous disorders such as hysteria, fits, mental disorders, loss of memory and tension. The neutral spinal bath is a soothing and sedative treatment, especially for the highly strung and irritable patient. It is the ideal treatment for insomnia and also relieves tension of the vertebral column. The duration of this bath is 20 to 30 minutes. The hot spinal bath, on the other hand, helps to stimulate the nervous, especially when they are in a depressed state. It also relieves vertebral pain in spondylitis and muscular backache. It relieves sciatic pain and gastrointestinal disturbances of gastric origin.

### Hip Baths

It is a treatment where hip region from upper half of thigh region & up to lower body is immersed in water of required temperature to get the desired effect.

The hip bath is one of the most useful forms of hydrotherapy. As the name suggests, this mode of treatment involves only the hips and the abdominal region below the navel. A special type of tub is used for the purpose. The tub is filled with water in such a way that it covers the hips and reaches up to the navel when the patient sits in it. Generally, four to six gallons of water are required. If the special tub is not available, a common tub may be used. A support may be placed under one edge to elevate it by two or three inches. Hip bath is given in cold, hot, neutral or alternate temperatures.

#### Cold Hip Bath

The water temperature should be $10^0$C to $18^0$C. The duration of the bath is usually 10 minutes, but in specific conditions it may vary from one minute to 30 minutes. If the patient feels cold or is very weak, a hot foot immersion should be given with the cold hip bath.



The patient should rub the abdomen briskly from the navel downwards and across the body with a moderately coarse wet cloth. The legs, feet and upper part of the body should remain completely dry during and after the bath. The patient should undertake moderate exercise like Yogasanas, after the cold hip bath, to warm the body.

A cold hip bath is a routine treatment in most diseases. It relieves constipation, indigestion, obesity and helps the eliminative organs to function properly. It is also helpful in uterine problems like irregular menstruation, chronic uterine infections, pelvic inflammation, piles, hepatic congestion, chronic congestion of the prostate gland, seminal weakness, impotency, sterility, uterine and ovarian displacements, dilation of the stomach and colon, diarrhoea, dysentery, hemorrhage of the bladder and so on. The cold hip bath should not be employed in acute inflammations of the pelvic and abdominal organs, ovaries and in painful contractions of the bladder, rectum or vagina.

#### Hot Hip Bath

This bath is generally taken for eight to 10 minutes at a water temperature of 40°C to 45°C. The bath should start at 40°C. The temperature should be gradually increased to 45°C. NO friction should be applied to the abdomen. Before entering the tub,the patient should drink one glass of cold water. A cold compress should be placed on the head. A hot hip bath helps to relieve painful menstruation, pain in the pelvic organs, painful urination, inflamed rectum or bladder and painful piles. It also benefits enlarged prostatic gland, painful contractions or spasm of the bladder, sciatica, neuralgia of the ovaries and bladder. A cold shower bath should be taken immediately after the hot hip bath.

Care should be taken to prevent the patient from catching a chill after the bath. The bath should be terminated if the patient feels giddy or complains of excessive pain.

#### Neutral Hip Bath

The temperature of the water should be 32°C to 36°C. Here too, friction to the abdomen should be avoided. This bath is generally taken for 20 minutes to an hour. The neutral hip bath helps to relieve all acute and sub-acute inflammatory conditions such as acute catarrh of the bladder and urethra and sub acute inflammations in the uterus, ovaries and tubes. It also relieves neuralgia of the fallopian tubes or testicles, painful spasms of the vagina and prorates of the anus and vulva. Besides, it is a sedative treatment for erotomanis in both sexes.

#### Alternate Hip Bath

This is also known as revulsive hip bath. The temperature in the hot tub should be

40°C to 45°C and in the cold tub 10°C to 18°C. The patient should alternately sit in the hot tub for five minutes and then in the cold tub for three minutes. The duration of the bath is generally 10 to 20 minutes. The head and neck should be kept cold with a cold compress. The treatment should end with a dash of cold water to the hips.

This bath relieves chronic inflammatory conditions of the pelvic viscera such as salpingitis, ovaritis, cellulitis and various neuralgias of the genito-urinary organs, sciatica and lumbago.

### Immersion Baths

This is also known as full bath. It is administered in a bath tub which should be properly fitted with hot and cold water connections. The bath can be taken at cold, neutral, hot, graduated and alternate temperatures.

### Cold Immersion Bath

This may be taken for four seconds to 20 minutes at a temperature ranging from 10°C to 23.8°C. Before entering the bath, cold water should be poured on the patient's head, chest and neck and the head should be protected with a cold moist towel. During the bath, the patient should vigorously rub his or her body. After the bath the body should be quickly dried and wrapped up in a blanket. If the climate is favourable, moderate exercise should be undertaken.

This bath helps to bring down fever. It also improves the skin when taken for five to 15 seconds after a prolonged hot bath, by exhilarating circulation and stimulating the nervous system. This bath should not be given to young children or very elderly persons, nor be taken in cases of acute inflammation of some internal organs such as acute peritonitis, gastritis, enteritis and inflammatory conditions of uterus and ovaries.

### Graduated Bath

The patient should enter the bath at a temperature of 31°C. The water temperature should be lowered gradually at the rate of 10°C per minute until it reaches 25°C. The bath should continue until the patient starts shivering. The graduated bath is intended to avoid nervous shock by sudden plunge into the cold water. This bath is often administered every three hours in cases of fever.

It effectively brings down the temperature except in malarial fever. Besides, it also produces a general tonic effect, increases vital resistances and energizes the heart.

### Neutral Immersion Bath

This bath can be given from 15 to 60 minutes at a temperature ranging from 26°C to 28°C. It can be given for long duration, without any ill-effects, as the water



temperature is akin to the body temperature. The neutral bath diminishes the pulse rate without modifying respiration.

This treatment is the best sedative. Since the neutral bath excites activity of both the skin and the kidneys, it is recommended in cases relating to these organs. It is also beneficial for cases of organic diseases of the brain and spinal cord, including chronic inflammatory conditions such as meningitis, rheumatism and arthritis.

A neutral immersion bath taken for 30 to 60 minutes is highly beneficial in general dropsy, due to cardiac or renal diseases. It also helps those suffering from multiple neuritis, alcoholism and other narcotic habits, chronic diarrhoea, peritonitis and chronic affections of the abdomen. In such cases the bath may be given daily for 15 to 30 minutes. This bath is also useful in the toxemic conditions caused by dyspepsia and purities. The neutral bath should not be prescribed in certain cases of eczema and other forms of skin diseases where water aggravates the symptoms, nor in cases of extreme cardiac weakness.

### Hot Immersion Bath

This bath can be taken from two to 15 minutes at a temperature from 36.6°C to 40°C. Generally this bath is started at 37°C and the temperature is then gradually raised to the required level by adding hot water. Before entering the bath, the patient should drink cold water and also wet the head, neck and shoulders with cold water. A cold compress should be applied throughout the treatment. This bath can be advantageously employed in dropsy when there is excessive loss of tone of the heart and blood. This bath also relieves capillary bronchitis and bronchial pneumonia in children. It relieves congestation of the lungs and activates the blood vessels of the skin muscles. The bath should be terminated as soon as the skin becomes red.

In pneumonia and suppressed menstruation, the bath should be administered at 37.7°C to 40°C for about 30 to 45 minutes. This bath should be given when the menstruation is due and may be repeated for two to three days in succession. In dysmenorrheal, this bath should be given at 38°C to 44.4°C for 15 minutes.

In chronic bronchitis a very hot bath taken for 5 to 7 minutes should be accompanied with rubbing and friction. This relieves congestion of the mucous membrane and provides immediate relief after the bath; oil should be applied to the skin if necessary.

The hot bath is a valuable treatment in chronic rheumatism and obesity. It gives immediate relief when there is pain due to stones in the gall bladder and the kidneys. The hot bath should not be taken in cases of organic diseases of the brain or spinal cord, nor in cases of cardiac weakness and cardiac hypertrophy.

### Epsom Salt Bath

The immersion bath tub should be filled with about 135 liters of hot water at 40°C. One to 1½ kg. of Epsom salt should be dissolved in this water. The patient should drink a glass of cold water, cover the head with a cold towel and then lie down in the tub, completely immersing the trunk, thighs and legs for 15 to 20 minutes. The best time to take this bath is just before retiring to bed. This is useful in cases of sciatica, lumbago, rheumatism, diabetes, neuritis, cold and catarrh, kidney disorders and other uric acid and skin affections.

### Precaution

Certain precautions are necessary while taking these therapeutic baths. Full baths should be avoided within three hours after a meal and one hour before it. Local baths like the hip bath and foot bath may, however, be taken two hours after a meal. Clean and pure water must be used for baths and water once used should not be used again. While taking baths, temperature and duration should be strictly observed to obtain the desired effects. A thermometer should always be used to measure the temperature of the body. Women should not take any of the baths during menstruation. They can take only hip baths during pregnancy till the completion of the third month.

### Full Wet Sheet Pack

This is a procedure in which the whole body is wrapped in a wet sheet, which in turn is wrapped in a dry blanket for regulating evaporation. The blanket should be spread on the bed with its edges hanging over the edge of the bed. The upper end should be about eight inches from the head of the bed. Then spread a linen sheet wrung out in cold water over the blanket so that its end is slightly below the upper end of the blanket. The patient should lie on the bed sheet with his shoulders about three inches below the upper age. The wet sheet should be weekly wrapped round the body of the patient, drawn in, tightly tucked between the legs and also between the body and the arms. The sheet should be folded over the shoulders and across the neck. Now the blanket should be drawn tightly around the body and tucked in along the side in a similar manner, pulling it tightly. The ends should be doubled up at the feet. A Turkish towel should be placed below the chin to protect the face and neck from coming into contact with the blanket and to exclude outside air more effectively. The head should be covered with a wet cloth so that the scalp remains cold. The feet should be kept warm during the entire treatment. If the patient's feet are cold, place hot water bottles near them to hasten reaction. The pack is administered for half an hour to one hour till the patient begins to perspire profusely. He may be given cold or hot water to drink. This pack is useful in cases of fever especially in typhoid and continued fevers, and benefits those suffering from insomnia, epilepsy and



infantile convulsions. It is useful in relieving chronic cold and bronchitis and helps in the treatment of rheumatism and obesity.

### Steam Bath

Steam bath is one of the most important time-tested water treatments which induces perspiration in a most natural way. The patient, clad in minimum loin cloth or underwear, is made to sit on a stool inside a specially designed cabinet. Before entering the cabinet, the patient should drink one or two glasses of cold water and protect the head with a cold towel. The duration of the steam bath is generally 10 to 20 minutes or until perspiration takes place. A cold shower should be taken immediately after the bath.

Very weak patients, pregnant women, cardiac patients and those suffering from high blood pressure should avoid this bath. If the patient feels giddy or uneasy during the steam bath, he or she should be immediately taken out and given a glasss of cold water and the face washed with cold water.

The steam bath helps to eliminate morbid matter from the surface of the skin. It also improves circulation of the blood and tissue activity. It relieves rheumatism, gout, uric acid problems, and obesity. The steam bath is helpful in all forms of chronic toxemias. It also relieves neuralgias, chronic nephritis, infections, tetanus and migraine.

### Enema

Also known as rectal irrigation, an enema involves the injection of fluid into the rectum. In nature cure treatment, only lukewarm water is used for cleaning the bowels. The patient is made to lie on his left side extending his left leg and bending the right leg slightly. The enema nozzle, lubricated with oil or Vaseline, is inserted in the rectum. The enema can containing the lukewarm water is then slowly raised and water is allowed to enter into the rectum. Generally, one to two liters of water is injected. The patient may either lie down on his back or walk a little while retaining the water. After five to 10 minutes, the water can be ejected along with the accumulated morbid matter.

A warm water enema helps to clean the rectum of accumulated faecal matter. This is not only the safest system for cleaning the bowels, but also improves the peristaltic movement of the bowels and thereby relieves constipation. A cold water enema is helpful in inflammatory conditions of the colon, especially in cases of dysentery, diarrhoea, ulcerative colitis, haemorrhoids and fever. A hot water enema is beneficial in relieving irritation due to inflammation of the rectum and pain full haemorrhoids. It also benefits women in leucorrhoea.

### Kuhne's Friction Sitz Bath

This is also known as genital bath or Linga Snan.

**Requisites-** Hip bath tub, a stool specially made for this, soft linen cloth.

Water Temperature- Cold water 18-24 °C.

**Duration-** 2-10 minutes.

**Procedure-** In the hip bath tub, the stool specially made for this bath is placed. The tub is filled with cold water leaving the top of the stool dry. The patient then sits on the stool, keeping the legs outside. In case of a female patient, she dips a soft linen cloth in the water and gently washes the genitals from top, downwards. It is important that the external lips only be washed and inner parts of sexual organs remained unwashed and untouched.

In case of males, the extreme edges of the foreskin of the genitals are washed in cold water. The patient should hold the foreskin between his middle and forefinger of the left hand and draw as far as possible over tip of the glans penis still the skin touches the water level in the tub. He should then gently wash the extreme end of the foreskin with soft cloth. Under no circumstance should the cloth in the right hand touch the glans penis.

**Uses-** This treatment stimulates the nervous system, since the genitals are known as an important centre of central nervous system. Fast healing of Painful anal fissure, haemorrhoids, dysmenorrhea, prostate, bladder infalmmaton, PID and atonic constipation.

**Whirl Pool Bath**

Water Temperature- Cold 18-24 °C, neutral 32-36°C

**Duration-** Between 15 to 45 minutes

**Procedure-** The water revolves in a big well - types tub. When the patient enters the tub he gets a gentle massage by the whirling water. A normal adult with good physique can take this bath with cold water.

**Uses-** The bath is a powerful stimulant for muscular and circular activities. When given with cold water it reduces the temperature of the body, but stimulates perspiration, hearts activity and other vital functions. Since the cold bath increases the blood pressure, it is not advisable for the high blood pressure patients. Because of increased respiratory movement there will be rigorous fluxion through the brain thereby making the brain more alert and active. The sudden contact of cold water stimulates the activity of the kidneys, liver and peristalsis of intestines, hence is useful in chronic constipation and disorders of the kidney and liver. Persons emaciated due to deficient absorption of nutrition will benefits as this increases the appetite as well as the digestion and assimilation like steam bath, sun bath, sauna bath etc, for short duration.



Poor circulation, chronic edema, Separate dead tissue, Pain relief in amputations (phantom pain), After removal of plaster cast (fractures), Stiff joints, Infected wounds with added antiseptic agent, Arthritis with stiff and swollen joints, Poliomyelitis and paraplegia to improve circulation, Traumatic and chronic inflammatory conditions, Weak and painful feet, As preparation to massage, passive stretching and exercises.

**Contraindication-** Diabetes mellitus, varicose veins, Advanced arteriosclerosis, Advanced peripheral vascular diseases.

It can be created in any size tub or tank, making it possible to immerse the whole body for hydro-massage effect.

The whirlpool bath combines the values of conductive heat and gentle massage.

The hydro-massage effect accomplishes the following :

- A sedative action.
- A relief of pain by stimuli which act through the pain gait mechanism.
- A relaxation of muscle spasms.

**Action :**

- Producing vasodilatation
- Improving local arterial and lymphatic circulation.
- Softening of scar tissue.
- Breaking down old adhesions after fractures of sprains.
- Cleaning and stimulation of wounds.
- Mechanically removing dirt, dead tissue and pus.
- Causing regression of the inflammatory process.
- Diminution of edema and effusion.

**Types of Whirl Pool Baths**

1. Combination of arm/leg and hip whirlpool tank. The electric turbine ejector produces a stream of aerated water. A seat provides comfort and security to the patient.
2. Vibra bath unit: the water is agitated or circulated by means of air blown into water or by turbine or by one or several ejector placed water jets. There are portable whirlpools for the elbow. The Whirlpool bath use can be started as soon as the second day after a soft tissue injury.
3. Jacuzzi (hydro-massage unit): can be used in any tank to provide a controlled supply of whirling aerated water.

**Compression**

**Cold compression :** Cold compression is a local cold application by means of a cloth dipped in cold water.

**Requisites-** Thick cotton or linen cloth or large towel 2 nos.

**Water temperature-** Cold water 18-24°C or ice water 0 ° C wherever indicated.

**Duration-**20 minutes, may be prolonged in some condition.

**Procedure-**The cloth should be folded into four folds and dipped in cold water. Before application it should be wrung well and applied on the concerned part of the body. When the compress is applied continuously, it should be renewed frequently by using two compresses alternately. The compress can be applied to head, neck, chest, abdomen, spine or on any inflamed portion of the body.

**Uses-** The cold compress is used to regulate the blood circulation and function of liver, spleen, stomach, kidneys, intestines, lungs, brain, uterus, bladder and other internal organs. It is used to control inflammatory conditions of these organs. Treating localized inflammatory condition superficial or deep. In cases of fever, applied over area of heart reduces palpitation. It is helps stop bleeding from piles and hemorrhage. In severe vomiting, the ice bag may apply over the stomach.

### Abdominal Cold Compress

**Procedure-** Dip a towel in cold water and bring it to remove excess water. Fold the towel into 3 or 4 folds to make it 12-14 inches long and 10 inches wide. Place the towel on the abdomen, covering it with another dry towel or woolen cloth. After 10 minutes, reverse the towel so that the top portion touches the abdomen and leave it there for another 10 minutes. If necessary repeat the process for longer time by dipping the towel in cold water.

**Effects-** it increases the blood circulation to the abdominal organs, activates metabolic functions, reduces inflammation and calms the nervous system. It produces a feeling of comfort and relives pain and congestion in digestive, reproductive and urinary organs.

### Heat Compress

The heating compress is a cod compress covered up in such a manner that warming occurs soon. The effect is that of a mild application of moist heat. A heating compress consists of three or four folds of linen cloth dipped in cold water and wrung out and covered completely with dry cloth and flannel or blanket to prevent circulation of air and help accumulation of body heat. The duration of the application is minimum one hour, but sometimes can be extended to several hours. If applied at night and the patient falls asleep he /she should not be disturbed. After removing the compress, the area should be rubbed with a wet cloth and dried with a towel. The heating compress is applied to throat, chest, abdomen, joints and so on.



### Chest Compress or Chest Pack

**Requisties-** Two cotton chest compress and blanket. The size of compress should be 2 to 2.5 meters long and 0.5 meter wide depending upon the size of the chest of the patient.

**Duration-** 1 hour

**Procedure-** One cotton compress is dipped in cold water and wrung out. The cloth is placed on the back and the two ends are brought forward under the armpit on each side. The right half is crossed over the left shoulder and the left part over the end, across the right shoulder. Both are again crossed at the aback and ends are brought forward under the armpits and tucked in at the front. Cover this with a dry cloth and then with a flannel. The pack should be as comfortably tight as possible.

**Uses-** This application will have very soothing effect, most of patients fall asleep within minutes. It is helpful in relieving Cold, Bronchitis, Asthma, Pleurisy, Pneumonia, Fever, Cough, and Whooping Cough.

### Abdominal Pack

**Requisties-** Two Cotton cloths of 2 meters long and ½ meter wide. Blanket 1X ½ meter.

**Duration-** 1 hour.

**Procedure-** Dip the cotton cloth in cold water and wring out to remove the excess water. Wrap the cloth around the abdomen from lower part of the ribs to the groin. Over this, wrap the dry cloth and finally the flannel so that the pack fits snugly.

**Uses-** abdominal compress is useful in cases of Gastritis, hyperacidity, indigestion, poor blood circulation to the liver, Jaundice, constipation and other complaints relating to the abdominal organs.

### Throat Pack

**Requisties -** Two cotton cloths and a flannel.

**Procedure-** wraps the cold cloth around the neck in several layers and on that the dry cloth like in any other pack and finally dry flannel.

**Duration-** 1 hour

**Uses-** Throat compress is useful in treating sore throat, hoarseness, tonsillitis, Pharyngitis, Laryngitis, inflammation of Eustachian tubes etc.

### Knee pack

Knee pack is the heating compresses applied to the knees, like the other packs.

**Requisties-** Materials as used in throat pack.

**Duration-** 1 Hour

**Uses-** The knee joint compress is helpful in treating inflamed knee and is useful in Arthritis to relieve pain and stiffness.

**Fomentation**

**Requisties-**

1. Hot water bag or cotton wrung in hot water
2. A cold compress
3. Dry cloth.

Water Temperature- 42 -45 °C.

Duration- 5-7 minutes

**Procedure** - when the hot water bag is used, it is advisable to cover the area of the application with a cotton cloth wrung in cold water. Fomentation is then applied over it. After the application is over, a cloth dipped in cold water should be placed on the area of application for 1-2 minutes. After removing the wet cloth, the area should be covered with a dry cloth for at least 30-40 minutes. If the symptoms recur, the application should be renewed.

**Uses-** for relieving acute pain in any part of the body, especially in the abdomen, it is an invaluable treatment. In arthritic pains, this may be repeated twice or thrice in a day for better results. In cases like Bronchitis, Asthma, Pneumonia, Pleurisy, fomentation to the upper back gives immediate relief. It also helps to relives pain caused due to gall stones, kidney stones, infections, jaundice etc.

| No. | Bath. | Temperature | Average Degrees F | Duration of Bath. Temp. |
|---|---|---|---|---|
| 1. | Sponge bath | 50-70 | 60 | No fixed time |
| 2. | Cold compress | 34-50 | 40 | Until warmed |
| 3. | Cooling compress | 60-70 | 60 | Until warmed |
| 4. | Stimulating compress | 50-60 | 60 | Until dry |
| 5. | Hot compress | 110-130 | 120 | Until cooled |
| 6. | Hot fomentation | 120-160 | 140 | No fixed time |
| 7. | Dry full pack Warm | - | - | Until sweating |
| 8. | Hot wet pack | 120-130 | 125 | ½ to 1 hour |
| 9. | Cold wet pack | 40-70 | 60 | ½ to 1 hour |



| | | | | |
|---|---|---|---|---|
| 10. | Hot foot bath | 105-120 | 110 | 5 to 30 minutes |
| 11. | Cold foot bath | 50-60 | 55 | 1 to 5 minutes |
| 12. | Hot sitz bath | 105-120 | 110 | 5 to 20 minutes |
| 13. | Cold sitz bath. | 50-8- | 60 | 5 to 15 minutes |
| 14. | Hot full bath | 100-115 | 104 | 2 to 10 minutes |
| 15. | Cold full bath | 50-70 | 60 | 3 to 10 minutes |
| 16. | Warm full bath | 96-100 | 98 | 5 to 30 minutes |
| 17. | Neutral full bath | 94-96 | 95 | 20 to 60 minutes |
| 18. | Turkish bath | 150-200 | 180 | 10 to 20 minutes |
| 19. | Russian bath | 110-130 | 120 | 10 to 15 minutes |

# CHAPTER 25 Mrittikachikitsa (Mud Therapy)

Mud is one of the five elements of nature having immense impact on the body in health as well as in sickness. It can be employed conveniently as a therapeutic agent in naturopathy treatment as its block color absorbs all the colors of the sun and conveys them to the body.

Secondly as the mud retains moisture for a long time, when applied over the body part it causes cooling. Thirdly its shape and consistency can be changed easily by adding water. Moreover, it is cheap and easily available.

Earth was used extensively for remedial purposes in ancient times as well as the middle ages. In modern times, it again came into prominence as a valuable therapeutic agent in the last century through the indefatigable efforts of Emanuel Felke, a German-born Lutheran minister who was nicknamed the "Clay Pastor."

Felke found that the forces of earth have remarkable effects upon the human body, especially during the night. These effects are described as refreshing, invigorating and vitalizing. Felke believed that for wounds and skin diseases, application of clay or moistened earth was the only true natural bondage. The body is thus repaired with the element from which it is assumed to be made.

Adolf Just (1838 - 1936), one of the pioneers of nature cure in modern times, believed that all diseases, but especially the serious nervous troubles of our age, would lose their terrors, if only sleeping or lying on the earth at night became customary in the curing of diseases.

According to him, by sleeping on the ground, " the entire body is aroused from its lethargy to a new manifestation of vital energy, so that it can now effectively remove old morbid matter and masses of old faces from the intestines, and receive a sensation of new health, new life and new unthought-of of vigor and strength."

### Types of soil

Mud found in different parts of the world has different properties. Mud composition varies with the place of origin. Firstly, a mineral constituent of mud varies with the kind of rocks found in the region and the process of soil formation. Secondly, mud property is influenced by kind of flora and fauna of the region.

**Black mud:** Dark cotton soil having some greasiness is suitable for mud therapy as it is rich in minerals and also retains water for long time. It should always be free from contamination and any kind of pollution.



**Fango** – Thermal mud of hot springs

**Moor** – Peat-based organic mud's.

**Mud from Dead Sea:** Cleopatra and Queen Sheeba used it for enhancing beauty; black mud of Dead Sea has beautifying and therapeutic powers. It is contains more than 20 kinds of salts and minerals including Magnesium, Calcium, Potassium Bromide, Silicates, Natural Tar and organic elements. While these beneficial minerals are useful for healing any kind of skin disorders, the presence of silicates make its masks very beneficial for softening and cleansing skin. The mud enhances blood circulation and leaves the skin with a glow.

### Doctrine of mud selection

Mud procured for treatment purpose should be black cotton soil with greasiness and free from pollution and contamination. Before use mud should be dried, powdered and sieved to separate stones, grass particles and other impurities.

**Mud therapy is used in two forms :** Mud Pack and Mud Bath

**Mud Pack for Eyes:** The pack is typically 9"x 6", enough to cover the eyes completely. It is placed on the eyes for 20 to 30 minutes. An eye mud pack helps in relaxing the eyes; especially good for those who require to sit in front of a computer for long hours. Therapeutically, it reduces irritation, itching, or other allergic conditions such as conjunctivitis and hemorrhage of the eyeball. It also helps in correcting refractive errors like short/long sightedness. It is effective in glaucoma, where it works to reduce the eyeball tension.

**Mud Pack for Head:** A head mud pack is usually thick, narrow band. It is applied over the forehead and helps to heal congestive headache pain quickly.

**Mud Pack for Face:** Fine mud is used for the face. The paste is evenly applied on the face and kept for 30 minutes. It helps in improving the complexion of the skin. In cases of acne, it helps by absorbing excess oils and toxins from the skin. It also helps in reducing dark circles around the eyes.

**Mud Pack for Abdomen:** The size of a mud pack for abdomen is usually 10" x 6" x 1" for adults. The mud pack is applied for 20-30 minutes. An abdomen mud pack helps in all kinds of indigestion. It is very helpful in decreasing intestinal heat and stimulates peristalsis.

### Mud Bath

Mud or clay bath is another mode of treatment. It is applied in the same way as

packs, but only on a larger scale on the entire body. In this, mud or clay is first ground and sifted to remove all impurities, and then made into a smooth paste mixed with hot water.Mud is applied to the full body either in sitting or a lying down position. Mud is kept for 45 to 60 minutes and ideally exposed to sunlight, at least intermittently. A mud bath helps in increasing the blood circulation and energizing the skin tissues. It thus helps in cleansing and improving the overall skin the complexion, clear spots and patches on the skin following skin disorders or due to smallpox. Regular mud baths may be considered as a natural beauty treatment procedure as it also helps in improving skin complexion and reducing spots and patches, possibly the result of some skin disorder like chickenpox or small pox. Mud baths are useful in many skin diseases such as psoriasis, urticarial, leprosy, and other skin allergic conditions.This bath is also valuable in getting relief from rheumatic pain or pain in the joints caused by injuries. Care should also be taken to avoid the patient catching a chill during the bath.

# CHAPTER 26 Suryakirana Sevana-Sun Bath-Heliotherapy or Surya Kiran Chikitsa - Sun Therapy

Chromo therapy also known as chromopathy, color therapy, light therapy, heliotherapy or color logy is a science of healing with colors in various forms and intensities.

Sun is the prime and ultimate source of energy for all beings. Energy is required by plants, animals and human for their daily activities. We get the energy from food. The stored energy in food is also achieved by sun.

Sun light is a form of energy representing Agni among the Panchamahabhuta. Sun ray have seven colors. (VIBGYOR) each colour having its own properties. These colors are employed through irradiation over body or chemotherapy by administering charged water, oil, pill for treatment.

**Types of chromo therapy**

1. Based upon medium used-
2. Exposure to light
3. Using colored glasses(chromo therapy)
4. using color charged water (hydro chromo therapy )
5. Using color charged oil
6. Using color charged air

**1. Based upon methods of exposure to light**

**1. Basking in morning sun :** Morning time is ideal. One should lie down on the ground in morning sun rays without wearing the cloth or minimum cloths. The head and genitalia should be covered with cotton cloth or green leaves of banana. Expose the body in supine, prone and lateral positions alternatively.

Initially one should practice the sun bath until a pleasant feeling of warmth is felt (about 30 min.) and then continue till the onset of sweating. After sun bath, rub the body with wet towel till it dries. Nothing should be eating 2 hours before and 30 minutes after sun bath. It can be done in sitting or walking condition also.

**Benefits**

1. It is useful in skin disorders e.g. eczema, psoriasis, fungal infections.
2. It stimulates the adrenal and sex hormones.
3. It increases muscular strength.
4. It increases energy.
5. It makes the bones and teeth strong.

**2. Mild sun bath :** This bath is taken when sun raises high in the sky, usually within 3 hours of sunrise when heat is mild. The patient should lie down on a bed sheet spread on the ground and remain almost naked wearing minimum cloth, covered with a thin dry cloth. When his body becomes warm, he should be covered with a wet cloth. The duration is 15 min. initially and then increased gradually up to 40 minutes. Benefits are same as morning sun bath.

**3. Walking sun bath- Louis kuhne's sun bath :** It is taken in the same way as mild sun bath, but a dry cloth is covered on the body and wet cloth is kept on the diseased part, eyes and face. It is continued till sweating starts. The sweat is wiped off with a wet cloth. It is followed by cool bath.

**Duration :** not more than 40 min.

**4. Trunk pack sun bath :** This bath can be taken in spinal bath tub or other tub suitable for taking bath in lying posture. Place the tub in sun with the head side in the shade and spread a thick cushion of wet cloth or Turkish towel of half inch thickness, so as to come under back of the patient from neck to hip. When he lies down on it, a separate wet sheet should be laid for such a length that it may be enough to make a pack around the trunk with the edges overlapping. When the pack gets dried by heat of the sun.

**Duration :** patient may lie down till he feels relieved.

**5. Whole pack sun bath**

**6. Sun gazing** : For defective eye sight, gazing with open eyes during sun ruse in a very mild sun rays daily for 5-15 min. is good. After gazing or before gazing it is desirable to wash the eyes by repeatedly applying balls of wet cloth dipped frequently in very cold water and partially squeezed to hold more amount of water.

**Time for Surya Kirana Chikitsa**

Sun bath is in the morning and within 3 hours after sun rise and evening in mild sun rays.



**Benefits**

- Increase blood circulation and
- Main source of vitamin- D
- Stimulates digestive power and Increases immunity
- Eliminate the toxic substance through skin,
- Stimulate the synthesis of melanin pigment.

**Precaution during sun bath-**

1. The head, face and eyes should be protected from direct sunlight.
2. Start with minimum time of 5 min and gradually increase up to 40-45 min of exposure to sunlight.
3. During sun bath, divide the duration of exposure into 4 and expose all sides of body i.e. supine, prone, left lateral and right lateral.
4. Sun bath should be taken in a place devoid of breeze.
5. After sun bath one should have water bath.

**Chromo therapy**

Chromotherapy is a method of treatment of diseases by colour. It is best used as a supportive therapy along with other natural methods of preserving health such as correct diet, adequate rest and relaxation, exercise, yogic Asanas and so on.

According to practitioners of chromotherapy, the cause of any disease can be traced to the lack of a particular colour in the human system. Colour therapy is a technique of restoring imbalance by means of applying coloured light to the body. It was a popular method of cure even in ancient times. Some 2,500 years ago, Pythagoras applied colour light therapeutically and 'colour halls' were used for healing in ancient Egypt, China and India.

Blue and red colours are considered at the two extremes with yellow representing the midpoint. These are also the three principal colours in a rainbow. A patient is first subjected to an examination to ascertain which colour he lacks. The deficiency is determined by observing the colour of the eyeballs, nails, urine and excrement. In cases of the lack of red the eyes and nails will be bluish, and the urine and excrement white or bluish. If there is a deficiency of the blue colour, the eyes and nails will be reddish and urine and excrement yellowish or red. Every substance on earth contains colour. Even the rays cast on earth by celestial bodies contain colour in the form of white light.

These are natural colours which are highly beneficial to the maintenance of health and for healing diseases.

**Composition of light and colors**

Color is the perceived wavelength of the visible electromagnetic spectrum between 400-700 nm, in which the seven colors (VIBGYOR) namely violet, indigo, blue, green, yellow, orange and red are observed.

**Methods of treatment through colored glasses**

In this method, sheet of glass of size 30cms x 36 cms. and thickness of 2-4 mm of the required colors are needed. These are placed at the window frames or any other convenient place in such a way that the sun rays can pass through them and fall directly on patient's body.

Duration- 30 minutes.

| Color | Symbolic | Helpful for | Effect of excess color |
|---|---|---|---|
| **Red** | Heat, fire and anger | Blood circulation and tones up muscles helpful in cold, anemia, low blood pressure, rheumatism, sprains, polio, paralysis, constipation, indigestion, diabetes, T.B. | Increases anxiety, agitation and stress. |
| **Orange** | Promotes harmony, prosperity and pride | Inflammatory conditions, typhoid and malaria, liver trouble, eye trouble, indigestion, small pox, boils, pimples, skin trouble, eczema | Increases anxiety |
| **Yellow** | Joy and happiness | Treats diabetes, indigestion, kidney and liver disorders, constipation, eye and throat infections, syphilis and impotence. | Causes exhaustion too much mental activity. |
| **Green** | Harmony | Treats nervous conditions, hay fever, ulcers, influenza, malaria, colds, sexual disorders, cancer, eye sight and inflammatory conditions. | Creates negative energy |
| **Blue** | Cooi, soothing and sedative | Pain, reduces bleeding, heals burns, treats dysentery, colic, asthma, respiratory disorders, high blood pressure and skin problems. | Depressing and sad |
| **Indigo** | Truth | Treats cataracts, glaucoma, ear and nose complaints, diseases of lungs, asthma, convulsions and mental complaints and purifies the blood and mind | Headache |
| **Violet** | Serenity | Treats nervous and emotional disturbances, arthritis and insomnia. | Negative thoughts |



**Contraindications**

There are some important contraindications to colour treatment which should be borne in mind while adopting this mode of cure. For instance, the red colour would be injurious in a naturally inflammatory condition of the system, and in case of persons with feverish and excitable temperament. If the red light is employed for too long and frequently, it may produce dangerous fevers.

Similarly, yellow should not be used when the nerves are very active or irritable. Yellow or orange reddish tones may prove injurious in fevers, acute inflammations, delirium, diarrhoea, neuralgia, palpitation of the heart and any condition of over-excitement. In cases of paralysis, chronic rheumatism, gout, consumption and in all cold, pale and dormant conditions of the system, blue, indigo and violet may prove too cooling and constricting and should be avoided.

# CHAPTER 23 Mardana (Massage)

Massage is an excellent form of passive exercise. The word is derived from the Greek word 'massier' which means to knead. It involves the scientific manipulation of the soft tissues of the body. If correctly done on a bare body, it can be highly stimulating and invigorating.

Massage is an important nature cure procedure which is based on VAYU mahabhuta. Ayurveda also advocated massage as a useful Bahiraparamarjana Chikitsa in the name of Abhyanga, Udarvatana, Utsadana.

It is defined as "scientific manipulation of the soft tissue of the body."

As far back as 400 B.C., the great Hippocrates, the father of medicine, employed massage and manipulation in healing his patients. Since then it has been used as a mode of treatment for many ailments and it has restored many a sufferer to health and vigor.

Massage is a term which is used for the group of systematic and scientific manipulation of the bodily tissues. Which are best performed with the hands (palms) for the purpose of affecting nerves and muscular systems and general circulation.

**Benefits**

The general massage, dealing with all parts of the body, is highly beneficial in many ways. It tones up the nervous system, influences respiration and quickens the elimination of poisons and waste material from the body through the various eliminative organs such as the lungs, skin, kidneys and bowels. It also boosts blood circulation and metabolic processes. A massage removes facial wrinkles, helps to fill out hollow cheeks and neck and eases stiffness, sore muscles and numbness. Systemic rubbing or manipulating body parts with oil, water, powder or without them is called massage. However natural massage does not requires massaging media like oil, powder.

**Types of Massage**

1. According to system-

Ayurvedic massage - Away from the heart or in the direction of artery.

Sweedish massage - Towards the heart or in the direction opposite to the artery.



2. According to material -

1. Dry massage-
2. Powder massage
3. Paste massage
4. Oil massage

**Various movements**

There are five fundamental modes of manipulation in massage and these are: effleurage (stroking), friction (rubbing), petrissage (kneading), tapotment (percussion) and vibration (shaking or trembling).

1. Effleurage: This involves sliding with the hands, using long even strokes over the surface of the body. Effleurage is performed in five ways, namely stroking with (I) palms of two hands; (ii) the palm of one hand; (iii) the knuckles; (iv) the ball of the thumb and (v) the finger tips. Effleurage increases blood circulation and soothes the nervous system. It also warms and relaxes. It is very helpful in atrophied condition of the skin.
2. Friction: The movements, which are circular in nature, are performed with the help of the thumb and tips of fingers or the palm of the hand towards the joints or around the joints. Friction limbers up joints, tendons, and muscles and facilitates the removal of deposits by breaking them. It also helps in reducing swelling after nerve inflammation.
3. Petrissage: This is the process of kneading, pressing and rolling of the tissues and is performed with one or both hands, with two thumbs or with thumbs and fingers. One should apply heavy pressure for deep kneading and light pressure for superficial kneading. Petrissage is a treatment of the muscles. It increases nutrition, strengthens muscles, relieves intestinal congestion and helps elimination of the poisons. It boosts long activity and cellular respiration, eliminates fatigue poisons and tones up nerve endings.
4. Tapotement: This involves hacking, tapping, clapping and beating and is achieved by striking the body rapidly. Short and quick blows are generally given from the wrist. Tapotement helps in atrophied condition of the muscles. It increases blood supply, soothes nerves and strengthens muscles.
5. Vibrations: This is achieved by rapidly shaking the pressing movements by use of the hand or fingers on the body. Vibrating hand should move constantly. This is beneficial in neuritis and neuralgia after the inflammatory stage is over. It stimulates circulation, glandular activity and nervous plexuses. It also helps in bowel movement.

Another form of massage helpful in most elements is the vibratory massage. This can be done by trained persons only. The vibratory muscle is more efficiently administered by special, electrically operated machine.

**Material for Massage**

Cotton seed oil is most commonly used for massaging, but butter is used for filling out cheeks and the neck and also for breast enlargement. If the patient is averse to oil, talcum powder may be used. Oil should not be used by persons with excessive body hair. General body massage may be done for 40 to 45 minutes and local body massage for 10 to 15 minutes.

The oil should be washed off completely after massage.

Massage of the Joints : Stiff and swollen joints can be cured by massage combined with mechanical movements.

Massage is, however, not recommended in serious inflammatory cases of the joints and in tubercular joints. It should also be avoided in infectious diseases like diphtheria and gonorrhea which cause formation of pus as massage may spread the pus to the entire system. Sprains and bruises can be cured by massage. In these cases, affected parts should first be bathed with hot water for 15 to 30 minutes. Next the massage should be done for a few minutes. Gentle stroking and kneading is recommended on and around the injured tissues. Fractures can also be treated through massage.

Massage thus provides additional nourishment to feed the muscular tissues, helping them to grow strong. Tapping, striking, and vibrating help the muscle to develop its contractile power. Muscle massage is brought by first effleurage, kneading, followed by tapotement. Later, active and passive movements are given.

**Abdominal Massage**

This form of massage is beneficial in constipation. It stimulates the peristalsis of the small intestines, tones up the muscles of the abdomen walls and mechanically eliminates the contents of both large and small intestines. Abdominal massage should not be done in general, femoral, inguinal and umbilical hernia, inflammation of the uterus, bladder, ovaries and fallopian tubes, kidney stones, bladder or gall bladder, ulcers of the stomach and intestines, and pregnancy.

**Precautions during massage-**

The masseur should have better health and power than the patient.

The masseur should have good temperature of his hands.

The nails should be clean and cut and hands should be washed before massaging.



The masseur should watch the reaction of person and apply the pressure according to that.

**Effect of massage- Mechanical effects**

1. Removes dead surface cells and allow the sweat glands, hair follicles and sebaceous glands to free from obstruction and to function better.
2. Increases warmth by stimulating the blood circulation.
3. Physiological system-
4. CS-Increases venous and lymphatic drainage and thus allowing fresh blood to treated tissue.
5. CNS-Massage removes or reduces the noxious substance and thereby reduces the pain by reducing the response of pain receptor.
6. Musculoskeletal system- massage reduces muscle tension and thus relaxes the muscles.

**Psychological system**

It reduces anxiety, stress, sleeplessness and gives a feeling of well being.

Contraindication of massage-

1. Skin disorder which would be irritated by either increase in warmth or lubricants E.g. Eczema
2. When superficial infection are suppurating.
3. In the presence of recent unhealed scars or open wounds.
4. Inflammation of joint
5. Massage near on recently fractured sites.

# CHAPTER 28 Diet Types - Soothing, Elimininative, Constructive, Positive and Negative Diet, Acidic and Alkaline Diet

Food is considered as medicine in naturopathy. The natural food helps to eliminate the toxins deposited in the body and enhance the vital energy and immunity.

Types of food or diet- in naturopathy there are two types of food i.e. positive and negative.

| Positive (primary food) | Negative (secondary food ) |
|---|---|
| Healthy food | Unhealthy food |
| Alkaline in nature | Acidic in nature |
| Light and easily digestible | Heavy and constipating |
| Rich in cellulose or roughage | Refined food |
| Rich in vitamin and minerals | Rich in carbohydrates, protein and fat |
| Helps to elimination the toxins from the body | Promotes accumulation of the toxins in the body |
| Non mucus food | Mucus producing food |
| Examples-vegetables and fruits | Examples-cereals, pulses, milk, egg, nuts, non vegetarian food |

Again the food has been divided into three categories :

1. Eliminative diet- liquids e.g. lemon juice, fruit juice, coconut water, vegetables soups, butter milk.
2. Soothing diet- fruit juices, gruels, buttermilk, vegetable soups, vegetable juices, raw salads, boiled vegetables, wheat and rice preparations in limited quantity are recommended. Vegetables such as cabbage, celery, lettuce, roots like carrot, string beans, and gourds may be used in the diet. Ripe fruits of all sorts are of great value because they contain germ–destroying acids.
3. Constructive diet- which consists of curds, milk, boiled vegetables, chapatis, rice, dal etc. Meats of all kinds, beef, tea, coffee and animal broths are strictly excluded because of the presence of tissue wastes, uric acid, creatinine and other substances



which are the products of putrefactive changes. The diet should consist of vegetables boiled without adding any type of irritants.

For healthy person the proportion of positive and negative food should be taken 2:1, in diseased it should be 4:1 or 5:1.

According to Naturopathy, the root cause of most of the diseases is the accumulation of morbid matter in the digestive system. It is essential to cleanse it by diverting the energies of the body by fasting. Fasting is essential in almost all diseases. Ayurveda states that it helps not only in cleansing the digestive system, but also all the seven ingredients of the body (lymph, blood, muscle, cartilage, bone marrow, bone and sperm).

Healthy promoting rules of diet in naturopathy :

1. Diet should be taken at fixed trimmings, usually twice a day.
2. Diet should not be taken unless the previous diet is already digestible.
3. Nothing should be taken between the meals, frequent eating and overeating causes indigestion.
4. Adequately chewing of food is necessary it makes the food digestible.
5. During the meals one should be happy and quiet.
6. Water should be taken in less quantity with meals.
7. Fruits and salad should be compulsory ingredients of diet.

# CHAPTER 29 Upavasachikitsa (Fasting Therapy)

Fasting refers to complete abstinence from food for a short or long period for a specific purpose. The word is derived from the old English, 'feast an' which means to fast, observe, be strict.

Fasting is nature's oldest, most effective and yet least expensive method of treating disease. It is recognized as the cornerstone of natural healing. Dr. Arnold Eheret, the originator of the mucus less diet healing system, describes it as "nature's only universal and omnipotent remedy of healing" and "nature's only fundamental law of all healing and curing." The practice of fasting is one of the most ancient customs. It is followed in almost every religion.

The Mohammedan, the Buddhists, the Hindus and many others have their periods of strict fasting. The saints of medieval times laid great stress on this method.

The common cause of all diseases is the accumulation of waste and poisonous matter in the body which results from overeating.

**Definition**

- Fasting is primarily the act of willingly abstaining from some or all food, drink, or both, for a period of time
- Medical context-the metabolic status of a person who has not eaten overnight
- The metabolic state achieved after complete digestion and absorption of a meal.

**Importance of fasting**

1. Fasting is voluntary abstinence from taking any kind of food for definite time, in order to give rest to digestive system.
2. In naturopathy, the toxins and morbid matter accumulated in the body is the cause of disease.
3. During fasting body eliminates these toxins and morbid matter with a greater speed.
4. It improves the vital power or vital economy because the energy engaged in eliminating the toxins and morbid matter is saved.
5. It is the cheapest mode of treatment in nature cure.
6. Fasting can help reverse the ageing process, and if we use it correctly, we will live longer, happier lives. Just three days a month will do it.



7. Your body will have a chance to heal and rebuild its immune system by regular fasting.
8. You can fight off illness and the degenerative diseases so common in this chemically polluted environment we live in.

Types of fasting-

1. According to duration –
   a. Short duration- 2-5 days
   b. Intermittent-1-2 days
   c. Long duration-more than 10 days
2. Depending on the purpose of fasting-
   a. Political
   b. Religious
   c. Therapeutic
3. Depending on the method of fasting-
   a. Dry fasting-without drinking water
   b. Water fasting-only with water
   c. Juice fasting-nursing only juice
   d. Fruit fasting-with eating fruits
   e. Manodiet fasting-by using single type of food
4. Depending on condition-
   a. In healthy person
   b. In acute illness - fast till the disease subside and person has sense of lightness
   c. In chronic illness- short fast (3-5days) is indicated with proper interval. Positive food is given during the period of breaking fast.

**Method of fasting**

The best, safest and most effective method of fasting is juice fasting. Although the old classic form of fasting was pure water fast, most of the leading authorities on fasting today agree that juice fasting is far superior to water fast. According to Dr. Rangar Berg, the world famous authority on nutrition, "During fasting the body burns up and excretes huge amounts of accumulated wastes. We can help this cleansing process by drinking alkaline juice instead of water while fasting ... Elimination of uric acid and other inorganic acids will be accelerated and sugars in juices will strengthen the heart ... juice fasting is, therefore, the best form of fasting. "

Vitamins, minerals, enzymes and trace elements in fresh, raw vegetable and fruit juices are extremely beneficial in normalizing all the body processes. They supply essential elements for the body's own healing activity and cell regeneration and thus speeding the recovery. All juices should be prepared from fresh fruit immediately before drinking. Canned or frozen juices should not be used.

A precautionary measure which must be observed in all cases of fasting is the complete emptying of the bowels at the beginning of the fast by enema so that the patient is not bothered by gas or decomposing matter formed from the excrements remaining in the body.

Enemas should be administered at least every alternate day during the fasting period.

Fasting is considered after the meal has been digested. If feeling of hunger is their, one should drink water during the breakfast.

The duration of fast depends on the purpose of fasting.

After completion of fast, small quantity of light food, fruits, juice, coconut, water, vegetables soups, dilute butter milk etc. should be taken in breaking the fast. When digestion power increases normal food can be taken.

**Beginning of a fast**

a. The patient should get as much fresh air as possible and should drink plain lukewarm water when thirsty.
b. Fresh juices may be diluted with pure water.
c. A person is assumed to be fasting after 8–12 hours after intake of food.
d. Post-absorptive state - Metabolic shifts of fasting begin as absorption of a meal is complete (typically 3–5 hours after a meal).
e. Diagnostic fast refers to prolonged fasting (from 8–72 hours depending on age) conducted under medical observation.

Sign of elimination of toxins during fasting-

a. Formation of gas, due to disintegration of old putrefied matter.
b. Cotton mouth and expulsion of morbid matter in mouth.
c. Bed breath, due to expulsion of morbid matter through respiratory tract.
d. Coated tongue, due to deposition of eliminated toxins.
e. Elevated body temperature.

**Changes during a fast**

Many of the fasting changes we experience are related to the body's cycles incurred during the fast.

1. Elimination cycle- Headaches, Dizziness, Inability to focus, Fatigue, Depression and/or anger, White strands of mucus found in stool, Runny nose, Watery eyes or pink eyes, Loss of Sexual desire
2. Reparation cycle- From day 3 to 14 depending on diet, there is a feeling of a certain "burst" of energy, High stimulation, The body will eliminate, Dead or dying cells, Excess fatty tissue and trans-fatty acids, Hardened mucus from the lungs and sinuses, Toxins in the bloodstream, spleen, liver, kidneys, cells and tissues, Excess cholesterol
3. Replenishing cycle-It is important that we replace vital minerals in the body during this period. Replenishment occurs around day 15 until you "break" the fast. These minerals will gear the body into an adjustment mode that helps to strengthen cell walls, restore the immune system, and prevent the body

**Benefits of fasting**

1. To dissolve & eliminate toxins, congestion that have formed in any part of the body
2. To cleanse the kidneys & the digestive system
3. To purify the glands & cells throughout entire body
4. To eliminate all unusable waste & hardened material in joints & muscles
5. To relieve pressure & irritation in nerves, arteries & blood vessels
6. To build a healthy blood stream
7. To keep youth & elasticity regardless of age

# CHAPTER 30 Visrama Chikitsa

Relaxation is also state of complete sloughness of the body and even mind. It is a state in which all mental and physical strain and tension is absent and it is the only state where complete rest is possible. The muscles are relatively free from tension and are at rest.

It is a conscious effort to relieve tension in muscles.

Interventions that promote general or local relaxation can complement starching program.

Relaxation can be classified into

A. Mental relaxation (reduce mental stress)
B. Physical relaxation (reduce physical stress)

Also it can be classified into:

A. General relaxation
B. Local relaxation

Need of relaxation- In order to conserve energy the human body must have periods of relaxation. In healthy individual, it is brought about every night by sound and deep sleep. During sleep, muscles are soft and pliable. The limbs are heavy and mind is perfectly blank. The work of heart and lungs is greatly minimized because there is practically no demand put on these organs. Many patients need the treatment for increased tension by using technique of relaxation.

Factors responsible for increased muscle tension-

1. Mental attitude like fear, anger, excitement.
2. Atmosphere or certain instances: like learning scooter or car driving.
3. Pathological condition: like lesion of CNS.
4. Muscular pain
5. Normal factor during voluntary movements.

Methods to induce general relaxation-

a. By support, using pillow in various position or by suspension.
b. Comfort
c. Freedom for breathing for which deep breathing exercises are given.
d. Warm room.



e. Removal of heavy clothes.
f. Restful atmosphere.
g. Well ventilated room.
h. Reassurance to patient or talking freely with patient, which will decrease excitement and fear that, is to gain confidence of patient.
i. Brisk walking in open air.
j. Rhythmic relaxed passive movements.
k. General massage
l. Pleasant appearance of therapist.

**Methods foe inducing local relaxation**

1. Relief of pain and spasm- This is achieved by hold and relax technique of P.N.F. This is also useful in spasticity and it gives temporary relaxation.
2. Localized massage- Effleurage and kneading is given gently to induce relaxation.

**Other methods**

1. Contrast method.
2. Reciprocal method.

1. Contrast method- Physiology of contrast method is that a strong contraction of a muscle is followed by an equal relaxation of same muscle. In other words "excitation is equal to inhibition technique which consists of sequence of contration of muscles performed usually in a distal to proximal sequence, in turn this is followed by letting the muscle go for relaxation for equal or for a longer time." The sequence of commands is as follow e.g.

**Command for lower limb**

"Pull your foot and let go", "Tighten your knee and let go", "Tighten your hip and let go."

**Relaxaed Passive Exercise**

**Example 1** - Petition of the patients- Lying in supine with arms about 15 cms. away from the body, palm facing upward. Thin pillow below the head, feet slightly apart to a comfortable position with eyes closed. Head and spine in a straight line.

Relax the whole body without any physical movements. Natural breathing is performed.

**Variation** - When lying in supine, become aware of the right hand and relax it slowly, become aware of right gluteus, waist, knee, calf, heel, sole of the foot and relax one by one. Repeat this process with the left side of the body and all parts of head and trunk.

Make sure that each part of the body is relaxed. Feel each part merging into the floor.

**Mechanism of mental relaxation**

Start counting the breathe from number 27 backward to zero. Mentally repeat, I am breathing in 27, I am breathing out 27, I am breathing in 26, I am breathing out 26 and so on back to zero. If the mind wanders and

**Uses** - Relaxes the whole psycho and physiological system. Repeat this process few times, for relief in mental tension.

**Example 2**- Position of the patient- prone lying, stretch both arms above the head with the palm facing downward. Forehead should be resting on floor. Relax the whole body if there is difficulty in breathing, a pillow may be placed under the chest.

Indication and uses- slip disc, stiff neck and stooping figure.

**Example 3**- Position of patient- prone lying, legs starlight and the fore head resting on floor. Interlock the fingers; place the palms on the back of the head and neck. Allow the elbow to rest on the floor. Relax the whole body and become aware of the breathing process explained in above.

**Indication and uses :** Cervical spondylitis, stiff neck or upper back pain.

**Example 4 :** Position of patient- Prone lying, raise the head and shoulder and rest the chin in the palm of the hands with the elbow on floor. Separate the elbow slightly to relieve excess pressure on the neck and lower back.

If the elbows are too far in front, tension will be felt in the neck, if they are drawn too close to the chest, tension will be felt more in the lower back. Then adjust the position of elbow so that these two points are equally balanced. The whole spine should be relaxed.

**Indication and uses :** Slip disc, sciatica, lower back pain, or other spinal disorders.

**Example 5 :** Position of patient- Lie on the stomach with the fingers interlocked under the head, bend the left side ways and bring it close to the ribs. The right leg should be remain straight. Rest of the position according to the diagram.

**Indication :** Relieves sciatica pain by relaxing the nerve of legs.

**Relaxation treatment in common diseases-**

1. Slip disc
2. Spondylitis
3. Pain in lower back
4. Pain in neck
5. Mental tension
6. Insomnia and others
7. Psycho and Physiological diseases.

# Paper-II

# Samajika Swasthavritta (Part - A)

# CHAPTER 1 Janapadodhwamsa

## Introduction

Janapada- large population, community.

Udhwasa- Destruction of community.

Natural calamities of high magnitude such as floods, famine, cyclone etc. leads to mass destruction. Apart from these calamities, diseases can also lead to such destruction on a mass scale. Such destruction is termed as Janapadodhwamsa.

जनपदानां, जनसमूहानांउध्वंसनमइतिजनपदोदध्वसं–जल्पकल्पतरु ।

The diseases which produce destruction of large population called Janapadodhwamsa.

जनपद– जनस्यलोकस्यंपदंआश्रय स्थानंतत्रजनपदं, जनपदानांसंमूहं ।

जनपद– Group of people living in a specific location.

उध्वंस– Means destruction

Epidemiology- (Epi- among. Demos- people, logas-study)

## Definition of epidemiology

Epidemiology is the study of the distribution and determinants of health-related states or events (including disease) and the application of this study to the control of diseases and other health problems. Epidemiology is the science that studies the patterns, causes, and effects of health and disease conditions in defined populations.

## Janapadodhwamsa

Situation involving the destruction or death of a large population spread over a small locality, or a country or a part of world or even the entire world.

## Disease as per Chakrapani

Chakrapani, the commentator of Charaka Samhita says that even though the individuals have difference in physical constitution, food habits, suitability, strength, immunity, age etc. still there are such factors as are common to all individuals and the vitiation of these factors leads to the simultaneous manifestation of diseases having the same set of symptoms leading to the destruction of countries. The factors which are

common for all the inhabitants of a country are air, water, land and season.

द्विविधोहेतुर्व्याधिजलकः प्रणिनांभवति–साधारणः असाधारणश्चः तत्रसाधारणंप्रतिपुरुषनियतं वातादिजलकमाहाराद्यभिधायबहुजलसाधारणंवात जल देश काल रुपम् साधारण वेगकारनमभिधातुं जनपदोध्वंसनी5योभिधीयते। (चक्रपाणि टिका च.वि. 3/1-2)

1. असाधारणहेतु
   - Pertaining to the individuals.
   - Causing Doshaja Vyadhi's.
2. साधारणहेतु
   - Each individual take such as diet etc. influencing the states of Doshas.

**Cause of a vitiated environment "Adharma"**

- Deviation from stipulated behaviour meant for protection and well-being of both society and individual.
- As this chain of disobedience increases from rulers to his citizens, its intensity increases.
- Its effects are then reflected in material world and super natural forces.
- Leading to disturbance in Rutucharka and vitiation of Jala, Desha, Vayu and Kala.

**Dharma as per Ayurveda**

- Following regimens in Dinacharya and Rutucharya;
- Sadvritta's like Homa, Satya, Pranidya, Dana, Bali, Upaharasa etc.
- In olden days, the frequent Yajnas helped in formation of clouds and purification of environment.
- Dharmacharana leads to Arogya and Harsha.

**Prajnaparadha**

- Cause of Adharmacharana-
- Caused by increased Rajas and Tamas; greed and selfishness; jealousy and anger.
- Leads to disturbance in physical and mental peace of the community and people are susceptible to diseases.

**Etiological factors of Janapadodhwamsa**

As per Charaka :

1. नियतातंकपर्यायहेतु
2. अनियतातंकपर्यायहेतु



Charaka has divided the etiological factors into Niyata Hetu and Aniyata Hetu.

**Niyata Hetu** : The Niyata Hetu are the inevitable disastrous factors includes the harmful effects of sun, moon, stars and planets such as floods, cyclones, landslides, earth quakes, tsunami etc.

**Aniyata Hetu** : Where as the Aniyata Hetu are the evitable disastrous factors includes Prajnaparadhaja (terrorism, accidents etc), Shastra Prabhavaja (wars – nuclear weapons, missiles etc advanced weapons), Abhisyangaja (effects of pathogens, evil forces & unhygienic condition) and Abhishapaja (curse). All these factors not only influence the individuals but also the society leading to destruction of community and even responsible for the disease causing organisms.

**Sastra Prabhava (War) :** Destruction of men and materials on massive scale. Usage of atom bomb and bio-weapons (like anthrax) destroyed population and had disastrous effects. These will results into spread of epidemics. Such diseases are termed as Janapadodhwansa Rogas.

**Janapadodhwamsakara Bhava (Nature of the vitiated factors)**

तेतुखल्वमेभावाः सामान्यजलपदेषुभवन्तितद्यथा–वायु, उदकम्, देश; कालइति। (च.वि. 3/6)

Four factors are Vayu, Jala, Desha and Kala.

**Vayu or Air**

तत्रवातमेवंविधमनारोग्यकरम्विद्यात तद्यथा यथर्तुविषम मतिस्तिमित मतिचल अतिपरुष अतिशीत मत्युष्णमतिरुक्षमत्यभिष्यन्दिनमतिभैरवारावमतिप्रतिहतपरस्परगतिमतिकुण्डलिनमसात्म्यगन्धबाष्प-सिकतापांशुधूमोप हतमिति॥ (च.वि. 3/6(1)

1. Spread of vitiated, hot/cold air with micro-organisms, dust, allergens, pollens and toxic gases.
2. Temperature changes due to pressure gradient in air current from one place to another.
3. Air current flows abnormally; forceful stormy or cyclic wind; severe cyclones and rainfall.

**Jala or Water**

उदकंतुखल्वत्यर्थ विकृत गन्ध वर्ण रस स्पर्श क्लेदबहुल अपक्रान्त जलचर विहङ्गमुपक्षीण जलेशयम प्रीतिकरमपगतगुणंविद्यात॥ (च.वि. 3/6(2)

1. Vitiation by disposal of industrial effluents and sewage to common sources; leakage of underground sewage pipes.

2. Abnormal odor, color, taste and touch.
3. Loses normal healthy qualities.
4. Creatures living in and around water leave and migrate to other areas.

### Desha or Land

देशंपुनः प्रकृतिविकृतवर्णगन्धरसस्पर्शक्लेदबहुल अपसृष्टं सरीसृपव्यालमशकशलभमाक्षिकामूषकोलूक श्माशानिक शकुनिजम्बुकादिभिस्तृणोलपोपनवन्तंप्रतानादिबहुलपूर्ववदवपतितशुष्कनष्ठ शस्यंधूम्रपवनं ॥ (च.वि. 3/6(3)

1. Vitiation due to industries, overpopulation etc.
2. Soil with abnormal color, taste, odor and touch.
3. Becomes damp or marshy.
4. Harmful animals and insects increase; those residing in jungles or graveyard appear.
5. Vegetables and fruits grown get polluted by toxins and pathogens leading to disease.

### Kala or Seasons

कालंतुखलुयथर्तुलिङ्गादविपरितलिङ्ग हीनलिङ्ग चाहितंव्यवस्येत ॥ (च.वि. 3/6(4)

There can be Atiyoga/Hinayoga/Mithyayoga of seasons.

### Importance of Panchakarma and Rasayana Preventing and Control of Janapadodhwasa

विगुणेष्वपि खल्वेतेषु जनपदोदध्वंसकरेषु भावेषु भेषजेनोपपाद्यमानानामभयं भवति रोगेभ्य इति ॥ (च.वि. 3/8)

चतुर्ष्वपि तु दुष्टेषु कालान्तेषु यदा नरा । भेषजेनोपपाद्यन्ते न भवन्त्यातुरास्तदा ॥ येषां न मृत्युसामान्यं सामान्यं न च कर्मणाम । कर्म पञ्चविधं तेषां भेषजं परमुच्यते ॥ रसायनानां विधिवच्चोपयोगः प्रशस्यते । शस्यते देहवृत्तिश्च भेषजैः पूर्वप्तुदधृतैः ॥ सत्यं भूते द्या दानं बलयो देवतार्चनम । सद्वृत्तस्यानुवृत्तिश्च प्रशमो गुप्तिरात्मनः ॥ हितं जनपदानां च शिवानामुपसेवनम । सेवनं ब्रह्मचर्यस्य तथैव ब्रह्मचारिणाम ॥ संकथा धर्माशास्त्राणां महर्षीणां जितात्मनाम । धार्मिकैः सात्विकैर्नित्यं सहास्या वृद्धसंमतैः ॥ इत्येतदभेषजं प्रोक्तामायुषः परिपालनम । येषामानियतो मृत्युस्तस्मिन काले सुदारुणे ॥ (च.वि. 3/12-18)

Epidemic diseases are not being afraid of diseases, if he is assured of proper medication for administration.

One does not suffer from the disease even while all these four vitiated factors ending with seasons are at work if he is administration medicines properly. Those who are not having identical actions during the previous life and those who are not destined to die during the epidemics, for their cure, Panchakarma (five elimination therapies) are the best. They should be properly administered Rasayana Chikitsa (rejuvenation therapy)



and physical health should be maintained with such drugs as are collected before the onset of epidemics.

Truthfulness, compassion for living beings, charity, scarifies, prayer to the gods, adoption of preventive measures, tranquillity, protection of the self by Mantra etc. for things as are good for the self, residence in auspicious localities, observance of Brahmacharya, service to those observing Brahmacharya, discussion of religious scriptures, great sages and those who have self control, and constant associated with religious, Satvika and learned persons these are the therapies which if adopted during the epidemics can easily save the lives of individuals provided the death of a particular individual during the period is not predestined.

# CHAPTER 2 Vayu (Air)

Air is absolutely essential for the maintenance of life. The two main function of air are interchanging of gases in the process of respiration and regulation of body temperature.

Vayu Guna according to Sushruta Samhita (Properties of Vayu as per different directions)

अथवातगुणान्वक्ष्यामः–

पुर्वः समधुरः स्निग्धोलवणश्चैमारुतः । गुरुर्विदाहजननोरक्तपित्ताभिवर्धनः ॥
क्षतानां विषजुष्टानां व्रणिनः श्लेष्मलाश्चये । तेषामेवविशेषेणसदारोगविवर्धनः ॥
वातलानांप्रशस्तश्च श्रान्तानांकफशोशिणाम । मधुरश्चाविदाहीचकषायानुरसोलघुः ।
दक्षिणोमारुंतः श्रेष्ठश्चक्षुष्योबलवर्धनः ॥ रक्तपितप्रशमनोनचवातप्रकोपणः ।
विशदोरुक्षपरुषः खरः स्नेहबलापहः ॥ पश्चिमोमारुतस्तीक्ष्णः कफमेदोविशोषनः ।
सद्यः प्राणक्षयकरः शोषणस्तुशरिरिणाम ॥ उत्तरोमारुतः स्निग्धोमृदुर्मधुरएवच ।
कषायानुरसः शीतोदोषाणांचाप्रकोपणः ॥ तस्माच्चप्रकृतिस्थानाम्क्लेदनोबलवर्धनः ।
क्षीणक्षयविषार्तानांविशेषेणतुपूजितः । (सु.सू. 20/23-29)

Breeze from the **East** is Madhura and Lavana, Snigdha, hard for digestion, produces burning sensation during digestion, and aggravates Rakta and pitta always, it exacerbates the diseases of those suffering from wounds, poison, ulcers and of persons of Kapha, it is good for persons of Vata Prakruti, the fatigued and those suffering from consumption of Kapha origin.

Breeze from **South** is Madhura, does not cause heart burn, is light, it is best for health, good for eyes, enhances strength, alleviates Rakta and Piita and does not aggravate Vata.

Breeze from **West** is dry, rough, string, decreases unctuousness and strength, is penetrating, dries up Kapha and Medas, reduces Prana and causes emaciation.

Breeze from the **North** is unctuous, soft, sweet, astringent in secondary taste, cold, do not aggravates the Doshas, hence it causes moistness and enhances strength in healthy persons, it is beneficial especially for those suffering from emaciation, consumption and poison.

Air is absolutely essential for the maintenance of life. The two main function of air are interchanging of gases in the process of respiration and regulation of body temperature.





### Dushita Vayu-Vitiated air

धूमेऽनिले वा विषसंयुक्ते खगाः श्रमार्ताः प्रपतन्ति भूमौ ॥ कासप्रतिश्यायशिरोरुजश्च भवन्ति तीव्रा नयनामयाश्च ॥ (सु.क. 3/17)

विषौषधिपुष्पगन्धे न वायुनोपनीयतेना क्रम्यते यो देशस्तत्र दोषप्रकृत्यविशेषण कास श्वास प्रतिश्याय शिरोरुग ज्वरैरुपतप्तन्ते ग्रह नक्षत्र चरितैर्वाः ॥ (सु.सू. 6/19)

तत्रवातमेवअनारोग्यकरंविद्यात । तद्यथाऋतुविषमअतिस्थिमितं, अतिचलित, अतिपरुष, अतिशीत, अत्युष्णं अतिरुक्ष, अत्यभिष्यन्दनं, अतिभैरवाराव, अतिप्रतिहतंपरस्परगतिकुण्डलिनिअसात्म्यगन्ध, बाष्प, सिकता, फाशुधूमोपहमिति ॥ (च.वि. 3/7)

Poison which is given in the form of flower produce Kasa, Shwasa, Vamathu, Pratishyaya, Shiroruja, Jwara etc.

### Vayu Karya (air function in normal and abnormal condition)

तद्यथाधरणी, धरणं, ज्वलनोज्ज्वालनम, आदित्यचन्द्रनक्षत्रग्रहगणानां, सन्तानगतिविधान, सृष्टिश्चमेधानां, अपाविसर्ग, प्रवर्तनस्त्रोतसांफलपुष्पानां चाभिनिर्वर्तनं, उद्भेदनंचौदभिदानांऋतुना प्रविभाग, विभागोधातूनांधातूमानसंस्थाव्यक्ति, बीजभिसस्कांरशस्याभिवर्धनविक्लेदोषशोषणिअवैकारिकविकारश्चेति ॥ (च.सू. 12/8)

Function of air sentence of earth, kindling of fire, movement of Surya, Candra, Nakshatra and Graha, creation of clouds, showering rain, flowing of rivers, maturity of flower and fruits, germination of seeds, development of plants, classification of seasons, five Mahabhuta, bring about dryness, hardness and transformation everywhere.

### Vitiated air effects

प्रकुपितस्य खल्वस्य लोकेषु चरतः कर्माणामानि भवन्तिः तद्यथा–शिखरिशिखरावमथनम, उन्मथननोकहानाम, उत्पीडनं सागराणाम, उद्वर्तनं सरसां, प्रतिसरणमापगानाम, आकम्पनं च भूमेः, आध्मनमम्बुदानां, नीहारनिर्हादपांशुसिकता मत्स्यभेकोरगक्षार रुधिराश्माशनिविसर्गः व्यापादनं च षण्णामृतूनां, शस्यानामसघात; भूतानां प्रभवश्चाव्ययश्च, भूतानां भावाभावकरः, सुखासुकायोर्विधाता, मृत्युः, यमः, नियमा, प्रजापतिः, अदितिः, विश्वकर्मा, विश्वरूपः, सर्वगः, सर्वतन्त्राणां विधाता, भ्हवानामणुः, विभुः, विष्णुः, क्रान्ता लोकानां, वायुरेव भगवानिती ॥ (च.सू. 12/8)

Aggravated Vayu, breaking of peak of mountains, uprooting the trees, disturbing of ocean, overflowing of lakes, changing of course of rivers, earth quakes, thunders, storm, disturbance of six seasons, spread epidemics among living beings, clouds etc.

### Vayushudhiprakara-Ayurvedic aspect (purification of air)

लाक्षाहरिद्रातिवेषाभयाद्वसरेणुकैलादलवल्ककुष्ठम ।
प्रियगुकाञ्जाष्ठनिलेनिढायधूमनिलौचापिविशोधयेते ॥ (सु.क. 3/17)

Laksha, Haridra, Ativisha, Abhaya, Harenu, Ela, Valka, Kustha, Priyagu are used in the form of fumes to purity air.

Karpura, Devadaru, Dhup, Chandana, Shreevaasa, Sarjaa, Agaru, Nimba, Somaraji, Gandhaka, Guggulu are used in Havana.

Buring durg like Nagakeshara, Jati, Patola, Nimba, Bilva, Nirgundi, Kamala etc.

Agnihotra for Atmosphere purification

Agnihotra fills the atmosphere with beneficial nutrients and purifies it. It has catalytic effects in the atmosphere and helps reset nature cycles so as to attain the vital harmony and equilibrium. The atmosphere created by performing this ritual is highly appropriate for practicing other spiritual disciplines. Furthermore, Agnihotra may be also be used for medicines or for purifying water resources.

## Air

Air forms the most immediate environment of man with which he is in constant contact throughout his life. The importance of clean air for man's health is thus self evident. Even from a symbolic point of view, it is well to keep in mind that while a man consumes 1.2 kg of solid food and drinks 1.8 kg of liquids, he breathes as much 14 kg of air per day.

### Air atmosphere

a. External atmosphere, i.e. air space outside the room
b. Internal atmosphere, i.e. air space inside the room of a building.

Agents affect the atmosphere

1. Physical agents

   a) Temperature b) Humidity c) Wind velocity d) Pressure of atmospheric air.

2. Chemical agents: Dust, soot, smoke, other organic and inorganic particles eliminating from houses, factories and vehicles, etc.

3. Biological agents: Bacteria and viruses etc.

### Composition

A mechanical mixture of gases.

Normal composition of air by volume is approximately,

| | | |
|---|---|---|
| Nitrogen | : | 78.084% |
| Oxygen | : | 20.947% |
| Argon | : | 0.934 % |
| Carbon dioxide | : | 0.033% |



The balance is made up of other gases which occur in traces like, Neon, Krypton, Xenon Sulfur dioxide, Hydrogen, Nitrogen dioxide & Helium.

In addition, it also contains water vapors, traces of ammonia & suspended matter such as dust, bacteria, spores & vegetable debris.

### Factors affecting atmospheric environment

1. Meteorological variables:

   a. Degree of sunshine
   b. Atmospheric pressure
   c. Humidity
   d. Rainfall
   e. Air temperature

Good climate and pleasant weather are soothing and health promoting.

2. Geographical conditions:

   a. Distance from the equator.
   b. Distance from the sea & high above sea level.
   c. Nature of soil (rocky, sandy, loamy or clayey) and
   d. Terrain (plain or hilly)

The above factors modify the climate by bringing about changes in temperature, rainfall, humidity direction and velocity of winds and atmospheric pressure.

3. Human Activities and industries : Household activities and industries add noise, radiation smoke, soot and various types of dusts to the atmosphere which may become detrimental to healthy living.

### Impurity

Air is rendered by :

- Respiration of men and animals
- Combustion of coal, gas, oil etc.
- Decomposition of organic matters
- Radioactive dusts and isotopes
- Trade, traffic & manufacturing processes.

Self-Cleansing Mechanisms :

- Wind: Dilutes & sweeps away the impurity by its movement.
- Sunlight: The atmospheric temperature & sunlight oxidize the impurities & kills bacteria.

- Rain: Cleanses atmosphere by removing the suspended & gaseous impurities.
- Plant life: Green plants utilize the $CO_2$ & generate $O_2$ & visa versa at night.

**Air of Occupied Room**

Chemical changes:

- Air becomes progressively contaminated by $CO_2$ & $O_2$ content decreases due to metabolic processes.
- An average person at rest gives of 0.7 c. ft. per hour & during physical activity may be up to 2 c. ft. per hour.
- In a mixed gathering the per capita output of $CO_2$ is taken as 0.6 c. ft. per hour.

Physical Changes: most important

- Rise in temperature: Indoor temperature tends to rise as a result of emanation of body heat.
- Increase of humidity: Due to moisture evaporated from skin & lungs. The expired air contains about 6% of water vapor.
- Decrease in air movement: In crowed places, the natural movement of air is impeded.
- Body odors: Unpleasant odors arise from foul breath, perspiration, bad oral hygiene, dirty clothes & other sources. The production of body odors depends upon social status, age & personal hygiene of people.
- Bacterial pollution: Exhaled air contains microorganisms in suspension which are principally saprophytic & may include pathogenic bacteria. These organisms are discharged into the air during conversation, coughing, sneezing & loud talking.

**Discomfort**

- It is a subjective sensation which people experience in ill-ventilated & crowed rooms.
- If temperature & humidity are kept satisfactory, increased $CO_2$ content >5% & decreased $O_2$ content <18% will not affect adversely.
- e.g. 'Black Hole of Kolkata'– 146 prisoners in a room 18 x 14 x 10, with 2 small windows which were sufficient to supply $O_2$ needs; only 23 survived due to physical condition of air leading to 'heat retention'.
- Causes of discomfort are temperature, humidity, air movement & heat radiation.
- These factors determine the "cooling power" of the air with respect to human body.
- "The problems of ventilation are physical not chemical; coetaneous not respiratory" – Professor Lee.



**Indices of Thermal Comfort**

1. Air temperature
2. Air temperature & humidity
3. Cooling power: An instrument was devised by Hill called Kata Thermometer to measure it. A dry Kata reading of 6 & above & a wet Kata reading of 20 & above were regarded as indices of thermal comfort.
4. Effective temperature: An arbitrary index which combines into a single value the effect of temperature, humidity & movements of the internal air.
5. Corrected effective temperature:
   - An improvement over Effective Temperature.
   - Instead of dry bulb temperature, the reading of Globe thermometer is used to allow for radiant heat.
   - CET deals with air temperature, velocity, humidity & mean radiant heat.
   - ET & CET are widely used as indices of thermal comfort.
   - McArdle's Maximum allowable sweat rate.

**Comfort Zones**

It is the range of corrected effective temperature in which the individual or worker in an industry feels comfortable. Defined as the range of effective temperature over which the majority of adults feel comfortable.

Comfort depends on physical, physiological & psychological factors.

Considering only the environmental factors, 'comfortable thermal conditions are those under which a person can maintain normal balance between production & loss of heat, at normal body temperature & without sweating'.

**Comfort Zones (Evaluated In India)**

| | Corrected Effective Temperature $^0C$ |
|---|---|
| Pleasant & cool | 20 |
| Comfortable & cool | 20 – 25 |
| Comfortable | 25 – 27 |
| Hot & uncomfortable | 27 – 28 |
| Extremely hot | 28+ |
| Intolerably hot | 30+ |

| | Predicted four-hour sweat rate ($P_4SR$) |
|---|---|
| Comfort Zone | 1-3 liters |
| Just tolerable | 3-4.5 liters |
| Intolerable | 4.5+ liters |

## Air Pollution

The term Air pollution signifies the presence in the ambient (surroundings) atmosphere of substances (e.g. gases, mixtures of gases and particulate matters) generated by the activities of man in concentrations that interfere with human health, safety or comfort, or injuries to vegetation and animals and other environmental media resulting in chemicals entering the food chain or being present in drinking water and there by constituting additional source of human exposure.

## Direct effect of air pollutants

1. On Plants
2. On Animals
3. On Soil
4. Influences the structure and function of ecosystems, including self regulation ability.
5. In the past air pollution meant smoke.

## Primary air pollutants

They are emitted in to the atmosphere from a source such as a factory chimney or exhaust pipe or through suspension of contaminates dusts by the wind. In principle, therefore, it is possible to measure the amounts emitted at the source itself.

## Secondary air pollutants

They are formed within the atmosphere itself. They arise from chemical reactions of primary pollutants, possibly involving the natural components of the atmosphere, especially oxygen and water.

The most familiar example is ozone, which arises almost entirely from chemical reactions that differ with altitude within the atmosphere. Because of this mode of formation, secondary pollutants cannot readily be included din emissions inventories, although it is possible to estimate formation rates per unit volume of atmosphere per unit time.

## Gaseous air pollutants

They are present as gases or vapors that are as individual small molecules capable



for passing through filters, provided they do not absorb to or chemically react with the filter medium.

They are readily taken into the human respiratory system, although water – soluble, they may very quickly be deposited in the upper respiratory tract and not penetrate to the deep lung.

## Particulate air pollutants

They comprise of material in solid or liquid phase suspended in the atmosphere. Such particles can be either primary or secondary and cover a wide range of sizes.

Newly formed secondary particles can be as small as 1 – 2 μm in diameter, while coarse dust and sea salt particles can be as large as 100 μm in diameter.

## Sources of air pollution

The main sources of air pollution are,

1. **Automobiles:** Motor vehicles are a major source of air pollution throughout the urban areas. They emit hydrocarbons, carbon monoxide, lead, nitrogen oxides and particulate matter. In addition diesel engines when misused or badly adjusted are capable of emitting black smoke and malodorous fumes.
2. **Industries:** They emit a large amount of pollutants into the atmosphere. Combustion of fuel to generate heat and power produces smoke, $So_2$, nitrogen ash and fly ash. Petrochemical industries generate hydrogen fluoride, HCL and organic halides. Many industries discharge CO, $O_3$, $CO_2$, hydrogen sulphide and sulphur dioxide.
3. **Domestic sources:** Domestic combustion of coal, wood or oil is major source of smoke, dust, $SO_2$ and nitrogen oxides.
4. The most direct and important source of air pollution affecting the health of many people is tobacco smoke. Even those who do not smoke may inhale the smoke produced by others (Passive smoking).
5. **Miscellaneous:** These comprise burning of refuse, incinerators, pesticide spraying, natural sources (wind borne dust, fungi, molds, bacteria) and nuclear energy programmes.

## Meteorological factors

Most of the gases are within the first 30 Km of atmosphere. Man is in contact with 8-10 Km. Topography, air movement and climate influences air pollution. Wind helps in dispersal and dilution of pollutants. If the topography is dominated by mountains or big buildings, the wind becomes weak and calm and pollutants tend to concentrate in the breathing zone.

Temperature gradient is also important. When there is a rapid cooling of lower layers of air, there is no vertical motion. Pollutants and water vapor get trapped resulting in smog (Temperature inversion) it affects health.

**Air Pollutants**

More than 100 substances which pollute air have been identified. Carbon monoxide, carbon dioxide, hydrogen sulphide, Sulphur dioxide, sulphur trioxide, nitrogen oxides, fluorine compounds, organic compounds (e.g. hydrocarbons, aldehydes, ketones, organic acids), metallic contaminants (e.g. Arsenic, Zn, iron) radio-active compounds, photochemical oxidants (e.g. ozone) other includes Asbestos, beryllium, mercury, benzene, fluorides, vinyl chloride, lead & radiation. Contaminates differ greatly from place to place depending upon specific complex of contaminant source. Pollutants may be in the form of solids, liquids (vapours) or gases. Combination of smoke and fog is called Smog.

**Carbon Monoxide**

Most common & widely distributed air pollutants.

Sources -

- Unvented kerosene & gas space heaters.
- Leaking chimneys and furnaces
- Back-drafting from furnaces, gas water heaters, wood stoves & fireplaces
- Gas stoves
- Generators and other gasoline powered equipment
- Automobile exhaust from attached garages
- Tobacco smoke
- Incomplete oxidation during combustion in gas ranges & unvented gas or kerosene heaters may cause high concentrations of CO in indoor air.
- Worn or poorly adjusted & maintained combustion devices (e.g. boilers, furnaces).
- Most cities have CO peak levels that coincide with morning & evening rush hrs.
- The fluctuations in ambient concentration is only slowly reflected in the carboxyhaemoglobin levels in humans, as it takes 4-12 hrs for approximate equilibrium between air levels & blood levels to occur.
- Environmental concentrations are expressed in terms of 8 hr average concentration.

**Sulphur Dioxide**

Sources:

- Combustion of sulphur containing fossil fuels, principally coal & heavy oils.



- Smelting of sulphur containing ores & other industrial processes.
- Domestic fires
- Widespread domestic use of coal
- Power plants
- Oil refineries
- Kerosene space heaters.
- Acid aerosol-sulphuric acid is a strong acid that is formed from reaction of $SO_3$ gas with water.
- Strongly hygroscopic.
- 80 microgram / m3 – safe limit in atmosphere.

**Lead**

Sources: In the past, motor vehicles were the biggest source of lead. Since leaded gasoline has been phased out, lead emissions have decreased by about 98 %.

Today, metal processing is the biggest source of atmospheric lead. The highest air concentrations are found in the vicinity of ferrous and nonferrous smelters & battery manufacturers. Paint (for houses and cars), fishing lures, certain parts of bullets, some ceramic ware, water pipes, and a few hair dye products.

## Carbon Dioxide

The principal greenhouse gas emitted as a result of human activity (e.g., burning of coal, oil, and natural gas).

Not commonly regarded as air pollutant, though man generates it in enormous amounts.

It is a natural constituent of air &does not take part in any significant chemical reactions with other substances in air.

**Hydrocarbons**

Man-made sources:

Incineration, combustion of coal, wood, processing & use of petroleum, automobile exhaust, cigarette smoke.These exert their pollutant action by taking part in the chemical reaction which causes photochemical smog. Adverse effect: Lung cancer

**Cadmium**

The steel industries, waste incineration, volcanic action & zinc production seems to account for the largest emission.

Tobacco contains Cadmium & smoking may contribute significantly to the uptake of Cadmium.

Cigarettes may contain from 0.5 - 3mcg Cadmium / Gm of tobacco.

These sources of atmospheric Cadmium pollution are of growing concern.

### Hydrogen Sulphide

Sources :

- Human activities
- Industries - coke production, viscose rayon production,
- Waste water treatment plant,
- Wood pulp production using sulphate method,
- Sulphur extraction process
- Oil refining & tanning industries. Main toxic substance involved in livestock rearing system with liquid manure storage.
- First noticeable effect of this at low is unpleasant odour.
- Conjunctiva irritation is the next subjective symptom.
- Workers exposed to the concentration of less than 30 mcg / $m^3$ are reported to have diffuse neurological & mental symptoms.

### Ozone

Ozone is a gas that is a variety of oxygen; consists of three oxygen atoms. Ozone in the upper atmosphere, where it occurs naturally in what is known as the ozone layer, shields the Earth from the sun's dangerous ultraviolet rays.

However, at ground level where it is a pollutant with highly toxic effects, ozone damages human health, the environment, crops, & a wide range of natural & artificial materials.

Sources:

- The ozone producing & ozone scavenging processes involve absorption of solar radiation by nitrogen dioxide.
- Ground-level ozone comes from the breakdown (oxidation) of volatile organic compounds found in solvents.
- It is also a product of reactions between chemicals that are produced by burning coal, gasoline, other fuels & chemicals found in paints and hair sprays.
- Oxidation occurs readily during hot weather.
- Vehicles & industries are major sources of ground-level ozone.



### Particulate Matter

Any type of solid in the air in the form of smoke, dust, & vapors, which can remain suspended for extended periods. Airborne particulate matter represents a complex mixture of organic & inorganic substances. Mass & composition tend to divide into 2 principle groups:

1. Coarse particles larger than 2.5 mm in aerodynamic diameter
2. Coarse particles smaller than 2.5 mm in aerodynamic diameter

Sources:

- Smaller particles contain the secondarily formed aerosols, combustion particles & re-condensed organic & metal vapours.
- The large particles usually contain earth's crustal material & fugitive dust from roads & industries.
- Particles matter of respirable size may be emitted from number of natural & non-natural sources which are dust storms, burning of diesel fuels by trucks & buses, Fossil fuels, Mixing & application of fertilizers & pesticides, Road construction.
- Industrial processes - steel making, mining, agricultural burning & operation of fire places & wood stoves.

Safe Limit in Air : 100 mcg / m3

### Indoor Air Pollution

One of the four most critical global environmental problems probably exposes more people worldwide to important air pollutants than does the pollution in outdoor air.

Women & young children suffer the greatest exposure.

Sources- Tobacco smoke, pollen, dust, animal dander, mold, mildew, radon, cleaning products, beauty products, building materials, carpets, furniture, air fresheners, pesticides.

### Effects of Air Pollution

**Health aspects :** Immediate-acute bronchitis, suffocation, death.

Delayed- chronic bronchitis, lung cancer, bronchial asthma, emphysema and respiratory allergies. Lead poisons many systems

### Social and Economic aspects

Destruction of plant and animal life, corrosion of metals, damage to buildings, cost of cleaning and maintenance, aesthetic nuisance.

**Major air pollutants, sources and adverse effects**

| Noxious Agent | Sources | Adverse Effects |
|---|---|---|
| Oxides of Nitrogen | Automobile exhaust, gas stove and heaters, wood burning stoves, kerosene space heaters | Respiratory Tract irritation, bronchial hyperactivity, impaired lung defenses |
| Hydrocarbons | Automobile exhaust Cigarette smoke | Lung Cancer |
| Ozone discomfort Sulphur Dioxide | Automobile exhaust Power plants, Smelters, Oil refineries, kerosene space heaters. | Cough Sub-sternal Exacerbation of Asthma and COPD, respiratory tract irritation, hospitalization may be necessary, death in severe exposure |

**Prevention and control of air pollution**

The control of air pollution is ultimately an engineering problem. The WHO recommended the following procedures for the prevention and control of air pollution.

1. **Containment:** It is prevention of escape of toxic materials into the ambient air. It is achieved by verity of engineering methods such as enclosure, ventilation and air cleaning.
2. **Replacement:** That is, replacing a technological process causing air pollution, by a new process that does not. Increased use of electricity in place of coal has greatly helped in smoke reduction.
3. **Dilution:** It is valid so long as it is within the self-cleaning capacity of the environment. For example some air pollutants are readily removed by the vegetation. The establishment of green belts between industrial and residential area is an attempt at dilution.
4. **Legislation:** air pollution is controlled in many countries by suitable legislation, e.g. clean air acts; Govt. of India enacted, The Air (prevention and control of pollution) Act in 1981.
5. **International action:** To deal with air pollution on a world wide scale, the WHO has established an international network of laboratories for the monitoring and study of air pollution. The network consists of two international centers at London and Washington, 3 centers at Mascow, Nagpur and Tokyo and 20 laboratories in various parts of the world.



**Disinfection of Air**

The methods employed for disinfection are,

1. **Mechanical ventilation:** this reduces vitiated air and bacterial density.
2. **UV radiation:** this has been found to be effective in special situations such as operation theaters and infectious diseases wards. Since direct exposure to UV rays is a danger to the eyes and skin, the UV lamps are shaded and kept in the upper portion of the rooms near the inlet of air.
3. **Chemical mists:** Triethyleneglucol vapors have been found to be effective air bactericides, particularly against droplet nuclei and dust.
4. **Dust control:** Application of oil to floors of hospital wards reduces the bacterial content of the air.

## Ventilation

The concept of ventilation implies not only the replacement of vitiated air by a supply of fresh outdoor air, but also control of the quality of the incoming air with regards to its temperature, humidity and purity with a view to provide a thermal environment that is comfortable and free from risk of infection.

**Uses of Ventilation**

1. Smells and odors from the room removed.
2. Bacterial contamination of air in the room is reduced.
3. Chemical composition of air inside the room is maintained constant.
4. The physical conditions of temperature, humidity and movement of room air are maintained constant.

**Ill effects in unventilated room-**

Discomfort felt in a closed or congested room because of chemical changes in the air, such as decrease of oxygen and increase of carbon dioxide, water vapour, bad odour and organic poisons eliminating from human beings.

The ill effects in a congested room are discomfort, restlessness, nausea, vomiting, irritability, giddiness, and fainting etc.

Standards of ventilation

Fixing the standards of ventilation is a matter of much difficulty. Most of the standards of ventilation have been based on the efficacy of ventilation in removing body odour.

1. **Cubic space:** different workers have advocated standards for the minimal fresh air supply ranging from 300 to 3,000 cu. ft. per hour per person.
2. **Air change:** Air change is more important than the cubic space. It is recommended that in the living rooms, there should be 2 or 3 air changes in 1 hour; in work rooms and assemblies 4 to 6 air changes. If the air is changed more frequently that is more than 6 times in 1 hour, it is likely to produce a drought which should be avoided. Based on this concept, it is now considered that a space of 1,000 to 2,000 cu. ft. per person is quite sufficient.

Adults :

a. Residential- 5 sq. m.
b. Factory (as per factories act, 1948) -5 sq. m.
c. General Hospital-10 sq. m.
d. Infectious disease hospital-15 sq. m.
e. Schools - space per child- 0.8 sq. m.

### Types of ventilation

Natural Ventilation & Mechanical Ventilation

### Natural Ventilation

It is the simplest system of ventilating small dwellings, schools and offices. In this method, reliance is placed on certain forces which operate in nature. These are:

1. **Wind:** Wind is an active force in ventilation. When it blows through a room, it is called deflation. When there is an obstruction, it bypasses and exerts a suction action at its tail end this is called aspiration. Doors and windows facing each other provide cross ventilation.
2. **Diffusion:** Air passes through the smallest opening or spaces by diffusion.
3. **Inequality of temperature:** Air flows from a high density to low density; it rises when slightly heated and escapes from openings provided high up in the room. The outside air which is cooler and denser will enter the room through the inlets placed low.

### Mechanical Ventilation

1. **Exhaust / Vaccum ventilation:** In this system, air is exhausted to the outside by exhaust fans usually driven by electricity. As air is exhausted, a vacuum is created which induces fresh air to enter the room through windows, doors and other inlets.
2. **Plenum ventilation :** In this system, fresh air is blown into the room by centrifugal fans so as to create a positive pressure, and displace the vitiated air.



3. **Balanced ventilation:** This is a combination of the exhaust and plenum system of ventilation. The blowing fan must balance the exhaust fan.
4. **Air conditioning:** It is defined as the simultaneous control of all, or at least the first three of those factors affecting both the physical and chemical conditions of the atmosphere with in any confined space or room. These factors include temperature, humidity, air movement, distribution, dust, bacteria, odors and toxic gases, most of which affect in greater or lesser degree the human health and comfort.

## Global Warming

Global warming is unusually rapid increase in earth's average surface temperature over the past century primarily due to the greenhouse gases as people's burn fossils fuels. The global average surface temperature rise 0.6 to 0.9 degree Celsius between 1906 to 2005 and the rate of temperature increase has nearly doubled in the last 50 years.

### Main causes of global warming

1. Increase in the amount of carbon dioxide gas in the atmosphere due to excessive deforestation.
2. Increase in the amount of oxides of carbon, oxides of nitrogen produced during the combustion of fossil fuel like coal and petroleum partially or completely.
3. Collection of chlorofluorocarbon in atmosphere due to use of aerosols in refrigerator and air conditioners, use of foams and fire extinguishers.
4. Nitrogen oxides gas is produced by chemical fertilizers used in agriculture and by the combustion of fuel used in automobile.
5. Various biotic activate, agricultural activates and decay of organic wastes produce green house gases causing Global warming.

### Effects of Global Warming

1. More heat waves
2. Expansion of desert area
3. Natural fires in forest lands
4. More evaporation of water from oceans and water bodies
5. Melting of Ice caps in Arctic and Antarctic regions
6. More cloud formation in the atmosphere
7. Shorter and warmer winters coupled with longer and hotter summers
8. Changes in rainfall pattern
9. Rise in sea level

10. Flooding and submergence of low lying coastal areas
11. Disruption in farming
12. More drought
13. Impact on plants, animals and humans

**Control and remedial measures**

1. Reduction in consumption of fossil fuels such as coal and petroleum
2. Use of bio-gas plants
3. Use of nuclear power plants
4. Increasing forest cover
5. Use of unleaded petrol in automobiles
6. Installation of pollution controlling devices in automobiles (catalytic converter) and industries (Electro Static Precipitators, Bag filters, Wet scrubbers etc.)

**Parvatiya Vayu- Mountain Air & High Altitude-Health Problems**

It is a pathological effect of high altitude on humans, caused by acute exposure to low partial pressure of oxygen at high altitude. It commonly occurs above 2,400 metres (8,000 feet). It presents as a collection of non-specific symptoms, acquired at high altitude or in low air pressure, resembling a case of "flu, carbon monoxide poisoning or a hangover". It is hard to determine who will be affected by altitude sickness, as there are no specific factors that correlate with a susceptibility to altitude sickness. However, most people can ascend to 2,400 metres (8,000 ft) without difficulty.

Acute mountain sickness can progress to high altitude pulmonary oedema (HAPE) or high altitude cerebral oedema (HACE), which are potentially fatal.

Chronic mountain sickness, also known as Monge's disease, is a different condition that only occurs after very prolonged exposure to high altitude.

The altitudes ranging from 9,000 to15,000 feet above sea level. Travelling to this altitude in a short time can lead to acute health problems. Acute mountain sickness is commonly manifested as headache and vomiting. Other symptoms include breathlessness, sleeplessness and cough. Sudden induction to such high altitude has profound effect on the body. It can lead to hypertension, blood coagulation disorders (intravascular blood coagulation, thrombo-embolism) and pulmonary hypertension. The risk of high altitude illness depends on how quickly one ascends to high altitude. The recommendation is that one can safely ascend from sea level to 8,000 feet above sea level in 24 hours.



**Symptoms**

1. Severe Breathlessness
2. Headache
3. Vomiting
4. Ataxia
5. Staggering gait (like drunk)
6. Sleepiness
7. Unconsciousness
8. Pain abdomen
9. Visual Disturbances

# CHAPTER 3 Jala (Ayurvedic and Modern Aspects)

Water is one of the most vital natural resources for all life on earth. The availability and quality of water always have played an important part in determining not only where people can live, but also their quality of life. Even though there always has been plenty of fresh water on earth, water has not always been available when and where it is needed, nor is it always of suitable quality for all uses. Water must be considered as a finite resource that has limits and boundaries to its availability and suitability for use.

Safe and readily available water is important for public health, whether it is used for drinking, domestic use, food production or recreational purposes. Improved water supply and sanitation, and better management of water resources, can boost countries' economic growth and can contribute greatly to poverty reduction.

Water is as essential to the life as air, deprivation of it will kill person earlier than deprivation of food, human body contain water about 60-70 per cent of its total weight. It as an essential constitution of living cell, all the tissues and organs contain water, this quantity varying from time to time.

**Jala Paryaya-(Synonyms of Water)**

पानीयं सलिलं नीरं कीलालं जलमम्बु च। आपो वार्वारि कं तोयं पयः पाथस्तथोटकम ॥
जीवनं वनमम्भोऽर्णोऽमृतं घनरसोऽपि च ॥ (भा.प्र. वारिवर्ग 6/1)

Paniya, Salila, Nira, Kilala, Jala, Ambu, Apa, Vara, Vari, Ka, Toya, Paya, Patha, Udaka, Jivana, Vana, Ambha, Arna, Amruta, Ganasara are synonyms of water.

**Classification of Jala**

पानीयं मुनिभिः प्रोक्तं दिव्यं भौममिति द्विधा। (भा.प्र. वारिवर्ग 6/3-4)

According to Sushrutacharya and Bhavamishra - Antariksha Jala or Divya (Rain Water) and Bhauma Jala (Ground Water).

**1. Antariksha Jala (Rain Water)**

पानीयमान्तरीक्षमनिर्देश्यरसममृतं जीवनं तर्पणं धारणमाश्वासजननं श्रम क्लम पिपासा मद मूर्च्छा तन्द्रा दाहप्रशमनंमेकान्ततः पथ्यतमंच ॥ (सु.सू. 45/3)





शीतंशुचिशिवं मृष्टं विमलंलघुषसगुणम। प्रकृत्यादिव्यमुदकं भ्रष्टं पात्रमपेक्षते ॥ (च.सू. 27/198)

जीवनं तर्पण हृद्यं ह्लादि बुद्धिप्रबोधनम। तन्वव्यक्तरसं मृष्टं शीतं लघ्वमृतोपमम ॥ (सूर्यादधृतप्रमुक्तत्वाल्लघु वातकफापहम। शैत्यजीवनसौम्यत्वैः पित्तरक्तविषर्तिजित ॥ (अ.हृ.सू. 5/1, अ.स.सू. 6/3-4)

Rain water is having taste which is not clearly manifest, is like Amruta(nectar), Jeevan, Tarpana, Dharana (supporting life and comforting the body), relieves fatigue, exhaustion, thirst, toxicity, fainting, Stupor, sleepiness, burning sensation, conquers the abnormal Vata and Kapha and especially suitable for health.

**Types of Antariksha Jala**

दिव्यं चतुर्विधं प्रोक्तं धाराजं करकाभवम ॥
तौषारञ्च तथा हैमं तेषु धारं गुणाधिकम ॥ (भा.प्र. वारिवर्ण 6/3-4)
तत्रान्तरीक्षंचतुर्विधम। तद्यथा–धारं, कारं, कौषारं, हैममिति। (सु.सू. 45/7)

**Antariksha Jala four types**

1. Dhara (falling)
2. Kara (water from hailstones)
3. Taushara (water from dew)
4. Haima (water from melting of snow)

**Dhara Jala of two types**

धाराजलं च द्विविधं गाङ्गसामुद्रभेदतः। (भा.प्र. वारिवर्ग 6/9)

1. Ganga
2. SamudraJala

Ganga Jala is rain water usually falling in Ashvayuja month (mid-September-mid October).

**2. Bhauma Jala (ground water)**

Bhauma Jala is divided into three kinds Jangal, Anupa, Sadharana.

According to Bhavamishra Varivarga 6/25-31

Jangala Desha Jala- which is very little water, small sized trees and people who suffering from diseases of Pitta and Rakta. This causes dryness, salty, easy for digestion, mitigates Pitta, increases digestive fire, mitigates many diseases of Kapha origin and good for health

Anupa Desha Jala- there is plenty of water, big sized and people suffering from diseases of Vata and Kapha. This causes accumulation of more moisture inside sweet,

unctuous, thick and heavy for digestion, destroys digestive fire, increases Kapha and causes diseases Kapha and good for heart.

Sadharana Desha Jala-mixture of the both features. Causes sweetness, increases digestive fire, cold in potency, easy for digestion, is nourishing, helps taste, relieves thirst, burning sensation, and mitigates all three Doshas.

ततसर्वकालमुपयुञ्जीत, तस्यालाभेभौमम । तच्चाकाशगुणबहुलम । ततपुनः सप्तविधम । तद्यथा– कौपं, नादेयं, सारसं, ताडागं, प्रास्तावणम, औद्भिदं, चौण्ट्यमिति ॥ (सु.सू. 45/7)

कौपसारसताडागचौण्डप्रास्त्रवणौद्भिदम । वापीनदीतोयमिति तत पुनः स्मृतमष्टधा ॥ (अ.स.सू. 6/12)

Bhouma Jala seven types

1. Kaupa (well)
2. Nadeya (river)
3. Sarasa (natural lake)
4. Tadaga (Artificial lake)
5. Prasravana (waterfalls)
6. Audbhida (springs)
7. Cauntya (step well )
8. Vapi (well) according to Vagbhatacharya.

सक्षारं पित्तकृत्कौपम् दीपनम् नातिवातलम । सारसं स्वादु लघु च ताडागं गुरु वातलम ॥
चौण्ड्यं तु पित्तलं दोषहरं प्रस्त्रवणोदकम । औद्भिदं स्वादु पित्तघ्नं स्वादु वापीजलं लघु ॥
नाद्येयं वातलं रुक्षं कटुकं च तथाऽऽदिशेत । धन्वानूपमहीध्राणां सामीप्यादगुरुलाघवम ॥
(अ.स.सू. 6/13-15)

Kupa- alkaline and increases Pitta and digestive power and hence does not increase Vata much.

Sarasa- light, sweet.

Tadaga- Heavy, increases Vata.

Caunda- increases Pitta

Prasravana – normalizes all Doshas

Audbhida- sweet and normalizes Pitta.

Vapi- sweet and light

Nadeya- increases Vata, dry and Katu Rasa.

लोहितकपिलपाण्डुनीलपीतशुक्लेष्ववनिप्रदेशेषुमधुराम्ललवणकटुतिक्तकषायाणियथासङ्ख्यमुदकानिसंभवन्ति इत्येकेभाषन्ते ॥ (सु.सू. 45/5)



Rain water falling on the ground which is red, brown, white, yellowish –white, blue, yellow, and white coloured soiled will be having tastes such as Madhura, Amla, Lavana, Katu, Tikta, Kashaya respectively.

तत्र वर्षास्वान्तरिक्षमौद्भिदं वा सेवेत महागुणत्वातः शरदि सर्व प्रसन्नत्वात; हेमन्ते सारसं ताडागं वा; वसन्ते कौपं प्रास्त्रवणं वा; प्रावृषि चौण्ट्यमनभिवृष्टं सर्व चेति । (सु.सू. 45/8)

During Varsha Rutu, atmospheric water or water from spring may be used, because of their profound good qualities, during Sarada Rutu all kind of water may be used because of being clear free from contamination, during Hemanta Rutu water of either natural lake or artificial lake may be used, during Grishma Rutu also same manner, during Pravruta Rutu water collected in burrow and all other kinds which are not rain may be used.

## Safe and Wholesome Water

निर्गन्धमव्यक्तरसंतृष्णाघ्नंशुचिशीतलम । अच्छंलघुचहद्यंचतोयंगुणवदुच्यते ॥ (सु.सू. 45/20)
जीवनं तर्पण ह्रद्यं ह्रादि बुद्धिप्रबोधनम । तन्वव्यक्तरसं मृष्टं शीतं लघ्वमृतोपमम ॥ (अ.ह.सू. 5/1)
अगन्धमव्यक्तरसं सुशीतं तर्षनाशनम । स्वच्छं लघु च ह्रद्यञ्च तोयं गुणवदुच्यते ॥ (भा.प्र. वारिवर्ग 6/77)

Water which has no smell, no prominent taste, quenches thirst, clean, cold, light (easy for digestion) and pleasing to the mind is said to the best in qualities or suitable water for drinking.

Water intended for human consumption should be both safe and wholesome. This has been defined as water that is,

a. Free from pathogenic agents
b. Free from harmful chemical substances
c. Pleasant to the taste, i.e. free from color and odor
d. Usable for domestic purpose

## Contaminated / Impotable Water

Water is said to be polluted or contaminated when it does not fulfill the above criteria.

पिच्छिलं क्रमिलं क्लिन्नं पर्णशैवालकर्दमः । विवर्णं विरसं सान्द्रं दुर्गन्धं न हितं जलम ॥ (भा.प्र. 6/78)
कीटमूत्रपुरिषाण्डशवकोथप्रदूषित । तृणपर्णोत्करयुतं कलुषं विषसंयुतम ॥
योऽवगाहेत वर्षासु पिबेद्वाऽपि नवं जलम । स बाह्याभ्यन्तरान रोगान प्राप्नुयात क्षिप्रमेव तु ॥
(सु.सू. 45/9)

किटाहिमूत्रविटकोथतृणजालोत्करावलिम । पङ्कपङ्वशैवालहटपर्णादिसंस्तृतम ।
सूर्यन्दुपवनादृष्टं जृष्टं च क्षुद्रजन्तभिः । अभिवृष्टं विवर्णं च कलुषं दन्ताग्राह्यतिशैत्यतः ।
(अ.स.सू. 6/21-22)

Water is slimy, with worm, unctuous, contaminated with leaves, algae, slug etc. with various colors, with excreta or urine, ova, dead bodies of animals, petrified, accumulation of grass, bad taste, and bad smell. Which is dirty or containing poisonous, or who drink fresh water in during Varsha Rutu will gets affected by both external and internal diseases quickly.

### Dushita Jala (Shad Doshayukta)

तत्र यत पङ्कशैवालहठतृणपद्मपत्रप्रभूतिभिरवच्छन्नं रविशशिकिरणनिलैर्नाभिजुष्टं गन्धवर्णरसोपसृष्टं तद्यापन्नमिति विद्यात । तस्य स्पर्शरुपरस गन्धवीर्यविपाकदोषाः षट संभवन्ति । तत्र खरता पैच्छिल्यमौष्ण्यं दन्तग्राहिता च स्पर्शदोषः पकं सिकताशैवालबहुवर्णता रुपदोषः व्यक्तरसता रसदोष; अनिष्टगन्धता गन्धदोष; यदुपयुक्तंतृष्णागौरवशूलकफप्रसेकानापाद्यति स वीर्य दोषः यद्युपयुक्तं चिराद्विपच्यते वीष्टम्भयति रा स विपाकदोष इति । (सु.सू. 45/11)

Water which is covered over with slush, algae, weed, grass, leaves of lotus etc. which is not exposed to rays of sun and moon and air, which is having odour, color, and taste very prominently, should be understood as polluted. Its blemishes will be of six kinds- such as of touch, sight, taste, odour, potency, and taste after digestion, roughness, sliminess, warmth, producing tingling of the teeth are blemishes of touch, presence of slush, sand, algae and many colors are blemishes of sight; prominence of taste is the blemish of taste, unpleasant odour is the blemish of smell, producing thirst, feeling of heaviness, abdominal pain, more elimination of Kapha from the mouth etc. are blemishes of potency; getting digested after a long time or causing constipation are the blemishes of taste after digestion. These blemishes are not present in atmospheric water (pure water).

### Water Requirements

The basic physiological requirements for drinking water have been estimated at about two litres per head per day. This is just for survival. But from the standpoint of public health and improvement of the quality of life, water should be provided in adequate volume. It helps to reduce the incidence of many water related diseases among the people most at risk. The consumption of water, however, depends upon climate condition, standard of living and habits of the people.

A daily supply of 150-200 litres per capita is considered as an adequate supply to meet the need for all urban domestic purpose. In India 40 litres of water supply per capita per day was the set target to be achieved in rural areas.



### Uses of Water

पानीयं प्राणिनां प्राणा विश्वमेव च तन्मयम । अतोऽत्यन्तनिषेधेऽपि न क्वचिद्वारि वार्यते ॥
आस्यशोषाङ्गसादाद्या मृत्युर्वा तदलाभतः । न हि तोयाद्विना वृत्तिः स्वस्थस्य व्याधितस्य च ॥
(अ.स.सू. 6/30)

Water is the supporter of life of all living creatures; whole world is filled with it; hence even in prohibited condition also, water is not fully prohibited; non availability of water leads to dryness of mouth, weakness and pain of body, or even death. There is no existence and acidity without water even for a healthy or diseases person.

The uses of water in a community are many, and the requirement in quantity and quality are varied. Conventionally, it has been convenient and economical to provide a single water supply sufficient in quantity to serve all uses and suitable in quality to meet drinking requirements.

1. **Domestic use-** on domestic front, water is required for drinking, cooking, washing and bathing, flushing of toilets, gardening etc.
2. **Public purpose-** cleaning streets, recreational purpose like swimming pools, public fountains and ornamental ponds, fire protection and public parks.
3. **Industrial purpose-** for processing and cooling
4. **Agricultural purpose-** irrigation
5. **Power production-** from hydropower and steam power
6. Carrying away waste from all manner of establishment and institutions.
7. Water is essential factors in the economic, social and cultural development of the community. It can eliminate diseases, promote rural development and improve quality of life.

### Sources of Water Supply-

Water may be abstracted for use from any one of a number of points in its movement through the hydrological cycle. Generally, water sources must conform to two criteria

a. Quantity must be sufficient to meet present and future requirement.
b. The quality of water must be acceptable.

Source of water-

1. Rain
2. Surface water-

- Impounding reservoirs
- Rivers and streams
- Tanks, ponds and lakes

3. Ground water-

- Shallow wells
- Deep wells
- Springs

**1. Rain :** Rain is the prime source of all water. Apart of the rain water sinks into the ground to from ground water, a part of it evaporates back into the atmosphere and some runs off to form streams and rivers which flow ultimately into the sea.

पानीयमान्तरीक्षममनिर्देश्यरसममृतं जीवनं तर्पणं धारणमाश्वासजननं श्रम क्लम पिपासा मद मूर्च्छा तन्द्रा दाहप्रशमनमेकान्ततः पथ्यतमंच ॥ (सु.सू. 45/3)

Rain water is having taste which is not clearly manifest, is like Amruta (nectar), Jeevan, Tarpana, Dharana (supporting life and comforting the body), relieves fatigue, exhaustion, thirst, toxicity, fainting, Stupor, sleepiness, burning sensation, conquers the abnormal Vata and Kapha and especially suitable for health.

**Characteristics of rain water**

- Rain water is the purest water in nature.
- Physically- it is clear, bright and sparkling.
- Chemically- it is very soft water containing only traces of dissolved solids (0.0005 per cent). Being soft it has a corrosive action on lead pipes.
- Bacteriologically- rain water from clean districts is free from pathogenic agents.

Impurities- it picks up suspended impurities from atmosphere such as dust, soot and micro-organisms and gases such as carbon dioxide, nitrogen, oxygen and ammonia. Gaseous sulphur and nitrogen oxides are emitted from power plants that use fossils fuels. These gases react with atmospheric water, forming dilute solution of sulphuric and nitric acid.

**2. Surface water :** Surface water originates from rain water. It is the main source of water supply in many areas. Examples of surface water include rivers, tanks, lakes, wadies, man-made reservoirs and sea water. Surface water is prone to contamination from human and animal's source.

The vast majority of Indian cities and town depend upon surface water source which are :

- Impounding reservoirs
- Rivers and streams
- Tanks, ponds, and lakes

**1. Impounding reservoirs** : These are artificial lakes constructed usually of earthwork or masonry in which large quantities of surface water is stored. Dams built across rivers and mountains streams also provide large reserves of surface water.



**Catchment area-** the area draining into the reservoir is called catchment area. Mumbai, Chennai and Nagpur derive their water supply from impounding reservoirs.

**Disadvantages** – storing water for long periods in reservoirs is the growth of algae and other microscopic organisms, which impart bad tastes and odours to water.

**Characteristics-** impounding reservoirs usually furnish a fairly good quality of water. The water is usually clear, palatable and ranks next to rain water in purity. If the surrounding hills are covered with peat, the water may acquire a brownish coloration. The water is usually soft and considered to be free of pathogenic organisms.

**2. Rivers-**

नादेयमुदकं रुक्षं वातलम् लघु दीपनम । अनभिष्यन्दि विशदं कटुकं कफपित्तनुत ॥ (भा.प्र. 6/33)

River water causes dryness, increases Vata, easy for digestion, increases digestive fire, not cause accumulation of more moisture inside, viscid, pungent and mitigates Kapha and Pitta.

Many rivers furnish a dependable supply of water. Cities such as Delhi, Kolkata and Allahabad rely on river water for their needs.

**Characteristics-** river water is turbid during rainy season; it may be clear in other seasons. Clarity of water is no guarantee for its purity. River water contains dissolved and suspended impurities of all organisms.

**Impurities-** River is direct connection between the alimentary canal of a people living upstream and the mouth of those below. Surface washings, sewage and sullage water, industrial and trade wastes, and drainage from agricultural areas. The customs and habits of the people like bathing, animals washing, and disposal of the dead bodies contaminates the river water.

**Purification-** self-purification does occur in river water by natural forces of purification such as dilution, sedimentation, aeration, oxidation, sunlight, plant and animal's life but these agencies are not sufficient to render the water potable. River water needs purification before it can be used for drinking purpose.

**According to Sushruta Sutra Sthana-45/21**

Water of rivers which flow

- Westward is healthy because of lightness;
- Eastward is not ideal because heaviness,

- Southwards do not increase the Doshas.
- Water of river arising from,
- Sandhya - leprosy
- Vindhya - worm infections
- Mahendra - Filariasis, abdominal enlargement (Udararoga)
- Himalaya - heart diseases, dropsy, diseases of head, filiariasis and goitre.
- Pracya - (central Bengal north Orissa) and Avanti (round about city of Ujjain) and Aparavantya (Konkan) produces Arsha
- Pariyatra (western ranges of Vindya) are healthy, increases strength.

**3. Tanks-**

**Vapya Jala- artificial tanks with step**

पाषाणैरिष्टकाभिर्वा बद्धः कूपो बृहत्तरः । ससोपानो भवेद्वापी जज्जलं वाप्यमुच्यते ॥
वाप्यं वारि यदि क्षारं पित्तकृत्कफवातहृत । तदेअव मिष्टं कफकृद्वातपित्तहरं भवेत ॥ (भा.प्र. 6/46-47)

A big large, deep, broad tank constructed with stones or bricks and having flights of steps is called Vapi. Water of artificial tank, if alkaline in taste, increases Pitta and mitigates Kapha and Vata, and if sweet, it increases Kapha and mitigates Vata and Pitta.

Tanks are large excavations or depression in which surface water is stored. They are an important source of water supply in some Indian villages. They are full of silt and colloidal matter, especially immediately after the rains. The older tanks may be full of aquatic vegetation. Tanks are used for washing of cloths, cattle, humans, cooking pots, children use it for swimming and there may be regular defecation around the edges which will be washed into the tank at next rains.

**Improvement of tanks**

1. The edges of tanks should be elevated in order to prevent the entry of surface washings,
2. There should be a fence around the tank to prevent access to animals,
3. No one should be permitted to get into the tank directly,
4. There should be an elevated platform from where people can draw water
5. The weeds should be periodically removed
6. The tank should be cleaned at the end of the dry season.

**Sea Water**

Though this source is plentiful, it has great many limitations. It is contains 3.5 per cent of salt in solution.



Salt concentration - 30-36 gm per litre
Chloride - 19 gm per litre
Sodium - 10.6 gm per litre
Magnesium - 1.27 gm per litre.

It is adopted in places where sea water is the only source available.

**4. Ground water :** Rain water percolating into ground constitutes ground water. Water used by humans comes mainly from land. Ground water is the cheapest and most practical means of providing water to small communities. Ground water is superior to surface water, because the ground itself provides an effective filtering medium.

**Advantage**

1. It is likely to be free from pathogenic agents.
2. It usually requires no treatment.
3. The supply is likely to be certain even during dry season.
4. It is less subject to contamination than surface water.

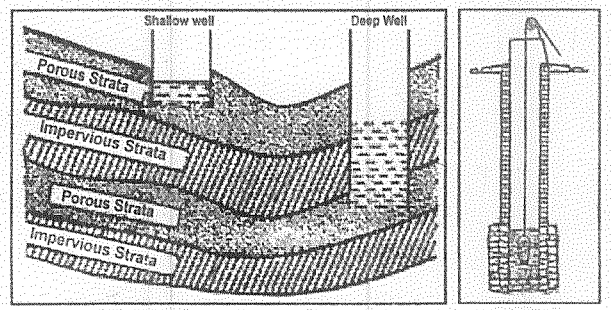
**Disadvantages**

1. It is high in mineral content e.g. salts of calcium and magnesium which render the water hard.
2. It requires pumping or some arrangement to lift the water.

**Wells / कौपजल**

भूमौ खातोऽल्पविस्तारो गम्भीरो मण्डलाकृति । वद्धोऽबद्धः स कूपः स्यातदम्भः कौपमुच्यते ॥
कौपं पयो यदि स्वादु त्रिदोषघ्नं हितं लघु । तत्क्षारं कफवातघ्नं दीपनं पित्तकृत्परम ॥ (भा.प्र. 6/48-49)

A pit dug in the ground, small in breadth, deep and round, built or not built known as Kupa. Water of deep well is sweet, mitigates all three Doshas, good for health, and




**Shallow well and Deep well Sanitary well**

easy for digestion, and if alkaline in taste, it mitigates Kapha and Vata, increases Pitta and augments digestive fire.

Traditionally wells are an important source of water supply. Even today, they are an important source of water supply in many communities.

Technically, wells are of two kinds-

**Shallow wells :** Shallow wells tap subsoil water i.e. the water from above the first impervious layer in the ground. They yield limited quantities of water, and the water is notoriously liable to pollution unless care is taken in well construction.

**Deep wells :** A deep well is one which taps water from the water-bearing stratum below the first impervious layer in the ground. Deep wells are usually machine–dug and may be several hundred meters deep. Deep wells furnish the safest water, and are often the most satisfactory source of water supply.

**Difference between a Shallow Well and Deep Well**

| | Shallow well | Deep well |
|---|---|---|
| **Definition** | Taps the water from above the first impervious layer | Taps the water from below the first impervious layer |
| **Chemical quality** | Moderately hard water | Much hard water |
| **Bacteriological quality** | Often grossly contaminated | Taps purer water |
| **Contamination** | Liable for contamination | Non-liable for contamination |
| **Yield** | Usually goes dry in summer | Provides a source of constant supply |
| **Cost** | Easy and cheap to construct | Difficult and cost to construct |

**Artesian wells :** It is a kind of deep wells in which the water rises above the level of ground water, because it is held under pressure between two impervious strata. Artesian wells are not common in India.

Well may be classified, according to the method of construction, into

- Dug wells
- Tube wells.



**Dug wells-** Dug well are by far the commonest types in India. Two types of dug well exist in our rural areas,

**Katch well-** It is hole dug into the water bearing stratum

**Pucca well-** It is an open well, built of brick or stones.

**Step well-** Steps well are a kind of Pucca wells which are becoming obsolete, fortunately. Steps well are constructed into these wells to enable people to descend into the well to fetch water. In these well, there is considerable personal contact between the user and the water.

**Sanitary Well**

A sanitary well is one which is properly located, well constructed and protected against contamination with view to yield a supply of safe water.

**Location-** Well should be located not less than 15 meter (50feet) from source of contamination. The well should be located at a high of the users should be her elevation with respect to a possible source of contamination. The distance between well and houses of users should be considered. No user will have to carry water for more than 100 meters.

**Lining-** It should be built of bricks or stone set in cement up to a depth of at least 6 meters, so that water enters from the bottom and not from sides of the well.

**Parapet-** There should be a parapet wall up to a height of at least 70-75 cms above the ground.

**Platform-** It should be a cement concrete platform round the well extending at least 1 meter in all direction with gentle slope outwards towards a Pucca drain built along its edges.

**Drain-** There should be a Pucca drain to carry off spilled water to a public drain or a soakage pit constructed beyond the "cone of filtration" of the well.

**Covering-** The top of the well should be closed with cement concrete because the bulk of the pollution is produced into the well directly through the open top.

**Hand Pump-** The well should be equipped with a hand pump for lifting the water in a sanitary manner.

**Consumer responsibility-** strict cleanliness should be enforced. Personal ablutions, washing of cloths and animals, dumping of refuse and wastes should be prohibited. Ropes and buckets from individual homes should not be used for drawing a supply from well. Water from the well should be carried in clean sanitary vessels to individual houses.

**Quality-** The physical, chemical and bacteriological quality of water should conform to the acceptable standards of quality of safe and wholesome water.

**Tube well**

Tubes well are successful as a source of drinking water in many parts of India. They yield water which is bacteriological safe and are also cheap in comparison to other source of supply. The tube well consists of pipe usually galvanized iron sunk into water bearing stratum and fitted with a strainer at the bottom and a hand pump at top. A water tight concrete platform with a drain all around should be provided. The area within 15 meter of the tube well should keep free from pollution with liquid and solid wastes. The hand pump should kept in good repair. The life of tube well is not the same everywhere. An average well may last for period of 5 to 10 years.

**Springs-Audbhida Jala**

विदार्यं भूमिं निम्नां यन्महत्या धारया स्त्रवेत । तत्तोयमौद्भिदं नाम वदन्तीति महर्षयः ॥
औद्भिदं वारि पित्तघ्नमविदाह्यतिशीतलम । प्रीणनं मधुरं बल्यमीषद्वातकरं ॥ (भा.प्र. 6/38-39)

Water which comes out in a big stream bursting the ground is called Audbhida Jala. This water mitigates Pitta, does not causes heart burn, very cold in potency, enlivening, sweet, strengthen, increases Vata slightly and is easily digestible.

When ground water comes to the surface and flow freely under natural pressure, it is called a "spring". Spring may be of two types,

Shallow spring- dry up quickly during summer months.

Deep spring- do not show seasonal fluctuation in the flow of water

Springs are simpler to exploit, as no pumping is needed to bring the water to the surface.

**Water Pollution**

Pure uncontaminated water does not occur in nature. It contains impurities of various kinds- natural and man-made.

Impurities- Dissolved gases- nitrogen, carbon dioxide, hydrogen sulphide etc.

Dissolve minerals- salt of calcium, magnesium, sodium etc.

Impurities- Suspended- clay, silt, sand and mud and microscopic organism.

Water pollution is caused by human activity- urbanization and industrialization.



**Sources of water pollution**

a) **Sewage-** which contain decomposable organic matter and pathogenic agents.

b) **Industrial and trade wastes-** which contain toxic agents ranging from metal salts to complex synthetic organic chemicals.

c) **Agricultural pollutants-** which comprise fertilizers and pesticides

d) **Physical pollutants-** thermal and radioactive substances.

**Water related diseases**

**A. Biological water borne diseases-**

**Viral-** Viral hepatitis A, hepatitis E, poliomyelitis, rotavirus diarrhoea in infants.

**Bacterial-** Typhoid and paratyphoid fever, bacillary dysentery, Esch. Coil diarrhoea, cholera.

**Protozoal** –amoebiasis, giardiasis

**Helminthic-** roundworm, threadworm, hydatid disease.

**Laptospiral-**weil's disease

**Snail-**schistosomiasis

**Cyclops-** guinea worm, fish tape worm.

**B. Chemical-** Chemical pollutants of diverse nature derived from industrial and agricultural wastes are increasingly finding their way into public water supplies. These pollutants include detergent solvents, cyanides, heavy metals, minerals and organic acids, nitrogenous substances, bleaching agents, dyes, pigments, sulphides, ammonia, toxic and biocidal organic compounds great variety. Chemical pollutants may affect man's health not only directly, but also indirectly by accumulating in aquatic life used as human food.

Dental health- The presence of fluoride at about 1 mg/ litre in drinking water is known to protect against dental caries, but high levels of fluoride causes mottling of the dental enamel.

Cyanosis in infants- high nitrate content of water is associated with methaemoglobinaemia. This is a rare occurrence but may occur when surface water from farm land, treated with fertilizer.

Cardiovascular diseases- hardness of water

Some diseases are transmitted because of inadequate use of water like shigellosis, trachoma and conjunctivitis, ascariasis, scabies.

Some diseases are related to the disease carrying insects breeding in or on near water like: malaria, filarial etc.

## Purification of Water

Purification of water is of great importance in community medicine. It may considered under two headings

1. Purification of water on a large scale
2. Purification of water on a small scale

## Purification of Water on A Large Scale

The method of treatment to be employed depended upon the nature of raw water and the desired standards of water quality. For example ground water (well and spring) may need no treatment, other than disinfection. Surface water (river and lake water) which tends to be turbid and polluted requires extensive treatment.

The components of typical water purification-

1. Storage 2. Filtration 3. Disinfection

**1. Storage-** Natural purification and we may look at it from three points-

**A. Physical-** By mere storage, the quality of water improves. About 90 per cent of the suspended impurities settle down in 24 hours by gravity. The water becomes clearer. This allows penetration of light, and reduces the work of the filters.

**B. Chemical-** Certain chemical changes also take place during storage. The aerobic bacteria oxidize the organic matter present in the water with the aid of dissolved oxygen.

**C. Biological** – A tremendous drop takes place in bacterial count during storage. The pathogenic organisms gradually die out. It is found that when river water is stored the total bacterial count drops by as much as 90 per cent in the first 5-7 days. This is the one of the greatest benefits of storage. The optimum periods of storage of river water is considered to be about 10-14 days. If the water is stored for long duration, there is development of vegetable growth such as algae which impart a bad smell and color to water.

**2. Filtration-** Filtration is the second stage in the purification of water and quite an important stage because 98-99 per cent of bacteria are removed by filtration, apart from other impurities.

Two types of filters are use :

1. Slow sand or Biological filters
2. Rapid sand or Mechanical filters

## Slow Sand or Biological Filter

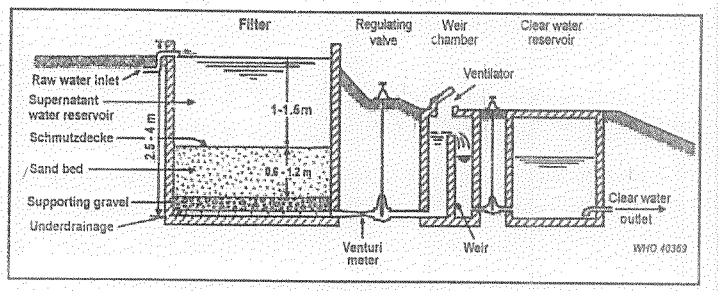
Slow sand filters were first used for water treatment in 1804 in Scotland designed by



John Gibb and subsequently in London. Slow sand filtration is a type of centralized or semi-centralized water purification system. A well-designed and properly maintained slow sand filter (SSF) effectively removes turbidity and pathogenic organisms through various biological, physical and chemical processes in a single treatment step. Only under the prevalence of a significantly high degree of turbidity or algae-contamination, pre-treatment measures (e.g. sedimentation) become necessary. Slow sand filtration systems are characterized by a high reliability and rather low lifecycle costs. Moreover, neither construction nor operation and maintenance require more than basic skills. Hence, slow sand filtration is a promising filtration method for small to medium-sized, rural communities with a fairly good quality of the initial surface water source. As stated by the WHO, slow sand filtration provides a simple but highly effective and considerably cheap tool that can contribute to a sustainable water management system.

### Elements of a slow sand filter

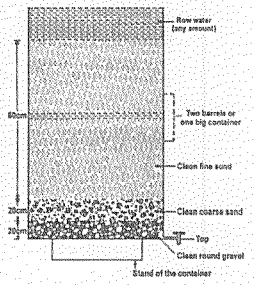
1. Supernatant water
2. A bed of graded sand
3. An under-drainage system
4. A system of filter control valves




**Slow Sand Filter**

1. **Supernatant water-** The supernatant water above the sand bed, whose depth varies from 1 to 1.5 metre, serves two important purpose; it provides a constant head of water so as to overcome the resistance of the filter bed and thereby promote the downward flow of water through the sand bed; and secondly, it provides waiting period of some period of some hours (3 to 12 hours, depending upon the filtration velocity) for the raw water undergo partial purification by sedimentation, oxidation and particle agglomeration. The level of supernatant water is always kept constant.
2. **Sand bed-** The most important part of the filter is the sand bed. The thickness of sand

bed about 1 meter. The sand grains are carefully chosen so that they are preferably rounded and have an "effective diameter" between 0.2 to 0.3 mm. The sand should be clean and free from clay and organic matter. The sand bed is supported by a layer of graded gravel 30-40 cm deep which also prevent the fine grains beings carried into the drainage pipes.




**Sand Bed**

The sand bed presents a vast surface area one cubic meter of filter sand presents some 15,000 sq. meter of surface area. The designed rate of filtration of water normally lies between 0.1 and 0.4 $m^3$ per hour per square meter of sand bed surface.

**Vital layer/ Zoogleal / Schmutzdecke / biological layer** –When the filter is newly laid, it acts merely as a mechanical strainer, and cannot truly be considered as "biological". But very soon, the surface of sand bed gets covered with slimy growth known as "Schmutzdecke", vital layer, Zoogleal layer or biological layer. This layer is slimy and gelatinous and consists of threadlike algae and numerous forms of life including plankton, diatoms, and bacteria. The formation of vital layer is known as "ripening" of the filter. It may take several days for the vital layer to form fully, and when fully formed it extended for 2 to 3 cm into the top portion of sand bed. The vital layer is the "heart" of the slow sand filter. It removes organic matter, holds back bacteria and oxidizes ammonical nitrogen into nitrates and helps in yielding bacteria-free water. Until the vital layer is fully formed, the first few day filtrates is usually run waste.

**3. Under-drainage system :** At the bottom of the filter bed is the under – drainage system. It consists of porous or perforated pipes which serve the dual purpose of providing an outlet for filtered water, and supporting the filter medium above. Once the filter bed has been laid, the under-drainage system cannot be seen.

Filter box- The first three elements (supernatant water, sand bed and under drainage system) are contained in the filter box. The filter box is an open box, usually rectangular in shape, from 2.5 to 4 metres deep and built wholly or partly below ground. The walls may be made of stone, brick or cement. The filter box consists from top to bottom:

| | |
|---|---|
| Supernatant water | 1 to 1.5 metre |
| Sand bed | 1.2 metre |
| Gravel support | 0.30 metre |
| Filter bottom | 0.16 metre |



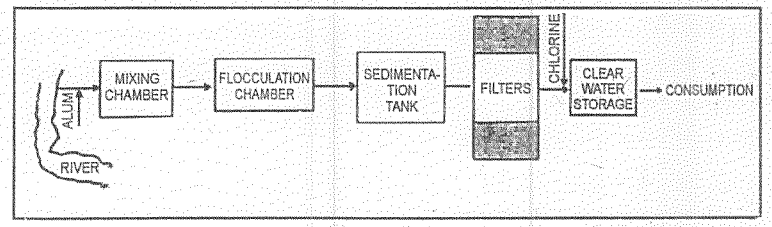
**4. System of filter control valves :** The filter is equipped with certain valves and devices which are incorporated in the outlet–pipe system. The purpose of devices is to maintain a constant rate of filtration. An important component of regulation system is the "Venturi meter" which measures the bed resistance or "loss of head". When the loss of head exceeds 1.3 metre it is uneconomical to run the filter.

**Filter cleaning-** normally the filter may run for weeks or even month without cleaning. When the bed resistance increases to such an extent that the regulating valve has to be kept fully open, it is time to clean the filter bed, since any further increase in resistance is bound to reduce the filtration rate. At this stage, the supernatant water is drained off, and sand bed is cleaned by 'scraping' off the top portion, and say 20 or 30 scarping, the thickness of send bed will have reduced to about 0.5 to 0.8 metre. Then the plant is closed down and a new bed is constructed.

**Advantages**

1. Simplicity of design (simple and cheap construction)
2. Cost of constriction is cheaper than rapid sand filters. (Construction with local material and knowledge)
3. Very effective removal of most contaminants
4. Slow sand filter have been shown to reduce total bacterial counts by 99.9 to 99.99 per cent and E. coli by 99 to 99.9 per cent.
5. Physical, chemical and bacteriologically quality of filtered water is very high
6. High self-help compatibility (simple operation and maintenance)
7. No electricity required
8. No chemicals involved

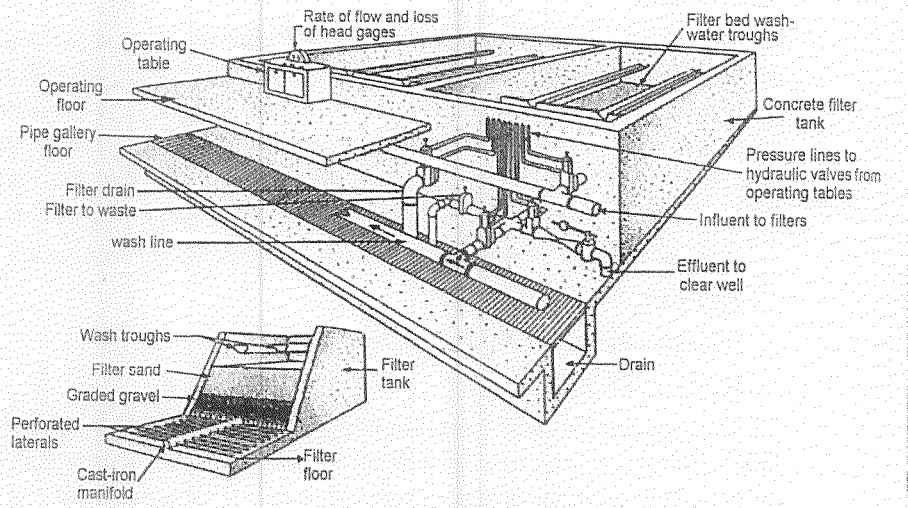
**Rapid Sand or Mechanical Filters**




**Flow diagram of a Rapid Sand Filtration plant**

Rapid sand filters evolved at the end of the 19th century in the United States and quickly gained popularity. Rapid sand filtration is a purely physical drinking water

purification method. Rapid sand filters (RSF) provide rapid and efficient removal of relatively large suspended particles. Two types of RSF are typically used: rapid gravity (Paterson's filter) and rapid pressure sand filters (candy's filter). For the provision of safe drinking water, RSFs require adequate pre-treatment (usually coagulation-flocculation) and post-treatment (usually disinfection with chlorine). Both construction and operation is cost-intensive. It is a relatively sophisticated process usually requiring power-operated pumps, regular backwashing or cleaning and flow control of the filter outlet. Rapid sand filtration is common in developed countries for the treatment of large quantities of water where land is a strongly limiting factor, and where material, skilled labour, and continuous energy supply are available.




**A view of a rapid sand filter**

The following steps are involved in the purification of water by rapid sand filters:

1. **Coagulation-**The raw water is first treated with a chemical coagulant such as alum, the dose of which varies from 5-40 mg or more per liter, depending upon the turbidity and color, temperature and the pH value of the water.
2. **Rapid mixing-** The treated water is then subjected to violent agitation in a mixing chamber for few minutes. This allows a quick and thorough dissemination of alum throughout the bulk of the water, which is very necessary.
3. **Flocculation-** The next phase involves a slow and gentle stirring of the treated water in a "flocculation chamber" for about 30 minutes. The mechanical type of flocculator is the most widely used. It consists of a number of paddles which rotate at 2 to 4 rpm. The paddles rotate with the help of motors. This slow and gentle stirring results in the formation of a thick, copious, white flocculent precipitate of aluminum hydroxide. The thicker the precipitate or flock diameter, the greater the settling velocity



4. **Sedimentation-** The coagulated water is now led into sedimentation tank where it is detained for period varying from 2-6 hours when the flocculent precipitate together with impurities and bacteria settle down in the tank. At least 95 per cent of flocculants precipitate needs to be removed before the water is admitted into the rapid sand filters.

**5. Filtration-**

**Filter beds-** each unit of filter bed has a surface of about 80-90 $m^2$ (about 900 sq. feet). Sand is the filtering medium. The "effective size" of sand particles is between 0.4-0.7 mm. The depth of the sand bed is usually about 1 meter. Below the sand bed is a layer of graded gravel, 30 to 40 cm deep. The gravel supports the sand bed and permits the filtered water to remove freely toward the under-drains. He depth of the water on the top of the sand bed is 1.0 to 1.5 m. the rate of filtration is 5-15$m^3/m^2$/hour.

**Filtration-** as filtration proceeds, the "alum-floc" not removed by sedimentation is held back on the sand bed. It forms a slimy layer comparable to the zoogleal layer in the slow sand filters. It adsorbs bacteria from the water and effect purification. Oxidation of ammonia also takes place during the passage of water through the filters. As filtration proceeds, the suspended impurities and bacteria clog the filters. The filters soon become dirty and begin to lose their efficiency. When the "loss of head" approaches 7-8 feet, filtration is stopped and the filters are subjected to a washing process known as "back washing".

**Back washing**

Rapid sand filters need frequent washing daily or weekly, depending upon the loss of head. Washing is accomplished by reversing the flow of water through the sand bed, which is called "backwashing". Back washing dislodges the impurities and cleans up the sand bed. The washing is stopped when clear sand is visible and the washing water is sufficiently clean. The whole process of back washing takes about 15 minutes. In some rapid sand filters compressed air is used as part of the back washing process.

**Advantages**

1. Rapid san filter can deal with raw water directly. No preliminary storage is needed
2. The filter beds occupy less space

3. Filtration is rapid, 40-50 times that of slow sand filter
4. Washing of filter is easy
5. There is more flexibility in operation.

**Comparison of rapid and slow sand filters**

| Items | Rapid sand filter | Slow sand filer |
|---|---|---|
| Space | Occupies very little space | Occupies large area |
| Pre treatment | Coagulation, flocculation, and sedimentation | Not required except plain sedimentation |
| Effective size of sand | 0.4 to 0.7 mm | 0.2 to 0.3 mm |
| Rate of filtration | 200 m. g. a. d. | 2-3 m. g. a. d. |
| Operation | Not essential | Essential |
| Loss of head allowed | 6-8 feet | 4 feet's |
| Washing | By Back washing | By scraping the sand bed |
| Removal of Turbidity | Good | Good |
| Removal of colour | Good | Fair |
| Removal of bacteria | 98-99 per cent | 99.9-99.99 per cent |
| Cost | High | Low |
| Cleaning interval | One to two days | Three to four months |

**Disinfection**

Disinfection is an important step in ensuring that water is safe to drink. Water systems add disinfectants to destroy micro-organisms that can cause disease in humans. The surface water treatment rule requires public water systems to disinfect water obtained from surface water supplies or groundwater sources under the influence of surface water. Primary methods of disinfection are chlorination, chloramines, ozone, and ultraviolet light. Other disinfection methods include chlorine dioxide, potassium permanganate, and Nano-filtration.

**Criteria's**

a) It should be capable of destroys the pathogenic organisms present, within the contact time available and not unduly influence by the range of physical and chemical properties of water encountered particularly temperature, pH and mineral constituents.



b) Should be leave products of reaction which render the water toxic or impart color or otherwise make it unpotable.

c) Have ready and dependable availability at reasonable cost permitting convenient, safe and accurate application to water.

d) Possess the property of leaving residual concentration to deal with small possible recontamination.

e) Be amenable to detection by practical, rapid and simple analytical technique in the small concentration ranges to permit the control of the efficiency of the disinfection process.

**Chlorination**

Chlorination is one of the greatest advances in water purification. It is supplement, not a substitute to sand filtration. Chlorine kills pathogenic bacteria, but is has no effect on spores and certain viruses (e.g. polio, viral hepatitis) except in high doses. Apart from its germicidal effect, chlorine has several important secondary properties of value in water treatment: it oxidizes iron, manganese and hydrogen sulphide; it destroys some taste and odour producing constituents; it controls algae and some organisms and aids coagulation.

Mode of chlorine- Formation of hydrochloric and hypochlorous acids.

$H_2O + Cl_2$——HCl + HOCl.

HCl is neutralised by alkalinity of the in water

HOCl—— H + OCl.

The hypochlorous acid ionizes to form hydrogen ions and hypochlorite ions from HOCl. Chlorine acts best as a disinfectant when the pH of water is around 7 because of the predominance of hypochlorous acid. When the pH value exceeds 8.5 it is unreliable as disinfectant because about 90 per cent of the hypochlorous acid gets ionized to hypochlorite ions. It is fortunate that most waters have a pH value between 6-7.5.

**Principles of chlorination**

1. First of all, the water to be chlorinated should be clear and free from turbidity.
2. Chlorine demand of water should be estimated
3. Contact period- the presence of free residual chlorine for a contact period of at least one hour is essential to kill bacteria and viruses.
4. The minimum recommended concentration of free chlorine is 0.5 mg/liter for one hour.
5. The sum of the residual demand of the specific water plus the free residual chlorine of 0.5 mg/liter constitutes the correct dose of chlorine to be applied.

### Methods of chlorination

For disinfecting large bodies of water, chlorine is applied either,

1. Chlorine gas
2. Chloramine
3. Perchloron

1. **Chlorine gas-** It is the first choice, because it is cheap, quick in action, efficient and easy to apply. Chlorine gas is an irritant to eyes and poisonous, special equipment known as chlorinating equipment is required. Paterson's chloronome is one such device for measuring, regulating and administering gaseous chlorine to water supplies.
2. **Chloramine-** Chloramine uses instead of chlorine gas. Chloramines are loose compounds of chlorine and ammonia. They have a less tendency to produce chlorinous tastes and give a more persistent type of residual chlorine. Drawback- slower action compared to chlorine gas.
3. **Perchloron/ high test hypochlorite (H.T.H.)-** It is a calcium compound which carries 60-70 per cent of available chlorine. Solutions prepared from H.T.H. are also used for water disinfection.

### Break point chlorination

The addition of chlorine to ammonia in water produces chloramines which do not have the same efficiency as free chlorine. If the chlorine dose in the water is increased, a reduction in the residual chlorine occurs, due to the destruction of chloramine by added chlorine. The end products do not represent any residual chlorine.

**Super chlorination-** Addition of large doses of chorine to water and removal of excess of chlorine after disinfection, this method is applicable to heavily polluted waters whose quality fluctuates greatly.

### Orthotolidine Test (OT)

Orthotolidine test enable both free and combined chlorine in water to be determined with speed and accuracy. The test was developed in 1918.

In this test, 1 ml of chlorinated sample of water is taken after the required contact period, in a glass tube. To this 0.1 ml of orthotolidine solution is added. The colour formed is observed after 5 minutes. The formation of yellow colour normally indicates the presence of chlorine (either combined or free) in the water. The more yellow the colour, the greater, is the chlorine residual. The amount of residual chlorine can be ascertained by comparing the colour developed in the glass tube with the standard colours already kept in the laboratory.



### Orthitolidine-Arsentite Test (OTA)

This modification of the OT teat to determine the free and combined chlorine residual separately. Sodium arsenite is added to the chlorinated sample of water. This will dechlorine the sample and orthodolidine is then added. The colour formed (X1) now is only the intensity of colour caused by interfering agents like nitrates, iron, manganese. Now another sample is taken in another test tube and orthotolidine solution is added first, and just after 5 seconds, sodium arsenite is added. The sodium arsenite will arrest the colour to be formed by the combined chlorine.

The colour observed at the end of the experiment (X2) will be due to the free residual plus due to the interfering colour causing compounds of iron, manganese etc. Then, a third test is conducted on a third sample of water. In this, only the orthotoldine solution is added to the given sample of water and the colour is noted after 5 minutes. The noted colour (X3) will evidently be due to the free and combined chlorine plus due to interfering colour causing compounds.

Different chlorine residuals can be easily determined as follows:

Free residual chlorine = (X2) - (X1)

Combine residual chlorine = (X3) - (X2)

In the orthotolidine test as well as in the OTA test, the temperature of water is to be controlled to room temperature.

**Ozonation-** Ozone is a relatively unstable gas. It is a powerful oxidizing agent. It elimination undesirable odour, taste and colour, and removes all chlorine from the water. Ozone has a strong virucidal effect. Draw back- after disinfection, ozone decomposes and disappears. No residual germicidal is present, so used as per treatment before chlorination. Dosage- 0.2-1.5 mg/litre.

### Ultraviolet Irradiation (UV)

UV radiation effectively destroys bacteria and viruses. As with ozone, a secondary disinfectant must be used to prevent re-growth of micro-organisms. UV radiation can be attractive as a primary disinfectant for small systems because:

- It is readily available,
- It produces no known toxic residuals,
- It requires short contact times, and
- The equipment is easy to operate and maintain.
- No residual germicidal effect colour and turbidity and suspended or colloidal constitutes for efficient disinfection.

## Purification of Water on a Small Scale

**1. Household purification of water** - three methods is generally available for purifying water on an individual or domestic scale.

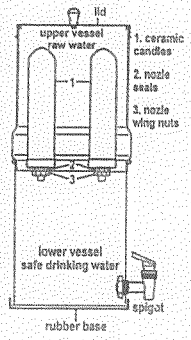
**A) Boiling-** Boiling is a satisfactory method of purifying water for household purposes. Water should be placed in a container and heated until boiling. The water should be allowed to boil for at least 10-20 minutes. Once cooled the water will be ready to use. It is free from spore, cysts and ova and yields sterilized water. Boiling also removes temporary hardness of water. The taste of water is altered, but this harmless.

**B) Chemical Disinfection**

1. **Bleaching powder or chlorinated lime ($CaOCl_2$)-**It is a white amorphous powder with a pungent smell of chlorine. When freshly made, it contains about 33 percent of "available chlorine". It is an unstable compound. On exposure to air, light and moisture, it rapidly loses its chlorine content. But when mixed with excess of lime, it retains its strength this is called "stabilized bleach". Bleaching powder should be stored in a dark, cool, dry place in closed container that is resistant to corrosion. The principle in chlorination is to ensure "free" residual chlorine of 0.5 mg/ liter at the end of one hour contact.
2. **Chlorine solution-** Chlorine solution may be prepared from bleaching powder. 4 kg bleaching powder with 25 percent chlorine is mixed with 20 liters of water; it will give 5 percent solution of chlorine. Ready-made chlorine solutions in different strengths are also in the market. Chorine solution loses chlorine on exposure to light and prolonged storage. This solution should be kept in a dark, cool and dry place in a closed container.
3. **High test hypochlorite-** Calcium compound which contain 60 to 70 per cent available chlorine. It is more stable than bleaching powder.
4. **Chorine tablets-** Under various trade names (Halazone tablets) are available in the market. It is good for disinfecting small quantities of water, 0.5gm is sufficient to disinfect 20 liters of water.
5. **Iodine-** Iodine may be used for emergency disinfection of water. Two drops of 2 per cent ethanol solution of iodine will sufficient for one litre of clear water. Contact time 20-30 minutes is needed for effective disinfection.
6. **Potassium permanganate** - Once widely used it is no longer recommended for water disinfection. Although a powerful oxidizing agent, it is not a satisfactory agent for disinfecting water. It may kill cholera vibrio, but is of little use against other disease organisms. Drawback- altering the colour, smell and taste of water.



**C) Filtration-** Water can be purified on a small scale by filtering through ceramic filters as, Pasteur Chamberland filter, Berkfeld filter, Katadyn filter.




**Berkfeld filter**

**2. Disinfection of wells-** Well are the main sources of water supply in the rural areas. The need often arises to disinfect them, sometimes on a mass scale, during epidemics of cholera and gastroenteritis. The most effective and cheapest method of disinfecting wells is by bleaching powder.

Steps in well disinfection-

1. Volume of water in well-

   Depth of water in a well – (h) metre

   Diameter of well – (d) in metre

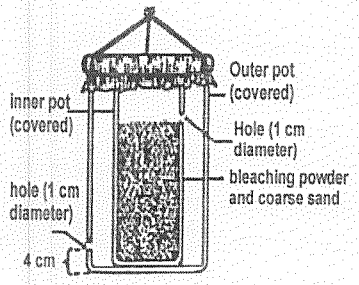
   Volume in litres=$\frac{3.14 X\ d^2\ X\ h}{4}$ X 1000

2. Amount of bleaching powder required for disinfection- Estimate the chlorine demand of well water by "Horrock's Apparatus" and calculate the amount of bleaching powder required to disinfect the well. Roughly, 2.5 grams of good quality bleaching powder would be required to disinfect 1000 liters of water. Approximate dose of 0.7 mg per liter of water.
3. Dissolve bleaching powder in water- The bleaching powder required for disinfection the well is place in a bucket (not more than 100 gm in one bucket of water) and made into a thin paste. More water is added till the bucket is nearly three-fourths full. The content is stirred well, and allow to sediment for 5-10 minutes when lime settles down.
4. Delivery of chlorine solution into the well - Bucket containing the chlorine solution is lowered some distance below the water surface, and the well water is agitated by moving the bucket violently both vertically and laterally.
5. Contact period- A contact period of one hour is allowed before the water is drawn for use.
6. Orthotolidine Arsenite Test- It is practice to test for residual chlorine level is less than 0.5 mg/ liter; the chlorination procedure should be repeated before any water drawn.

## Double Pot Method

During an emergency, it is desirable to ensure a constant dosage of chlorine to well water. Several simple and effective methods have been developed for the purpose. The

double pot method is an improvement devised by the national environmental engineering research institute, Nagpur, India. This method uses two cylindrical pots, one placed inside the other. The inside height and diameter are 30 cm and 25 cm respectively, for the outer pot. A hole one cm in diameter is made in each pot; in the inner pot the hole is in the upper portion, near the rim and in the outer pot it is 4 cm above the bottom.




**Double pot method**

A mixture of 1 kg of bleaching powder and 2 kg coarse sand (approx 2 mm in diameter) is prepared and slightly moisture with water. The inner pot is filled with this mixture up to 3 cm below the level of the hole. The inner pot is introduced into the outer one, and the mouth of latter closed with polyethylene foil. The pot should be immersed at least 1 m below the water level to prevent damage by the buckets used for drawing water. It works satisfactory for 2-3 weeks in small household wells containing 4500 litres of water and draw off rate of 360-450 litres per day.

Water quality- criteria and standard

The guideline for drinking water quality recommended by WHO relate to following variables-Acceptability aspects, Microbiological aspects, Chemical aspects, Radiological aspects.

**Acceptability aspects**

**A. Physical parameters-** The ordinary consumer judges the water quality by its physical characteristics.

**Turbidity-** drinking water should be free from turbidity. Turbidity interferes with disinfection and microbiological determination. Water with turbidity of less than 5 nephelometric turbidity units (NTU) is usually acceptable to consumer.

**Color-** drinking water should be free from color which may be due to presence of colored organic matter, metals, such as iron and manganese, or highly colored industrial wastes. The guideline value is up to 15 true color units (TCU) although levels of color.

**Taste, odour and palatable-** free from disagreeable taste, no disagreeable odour. No health based guideline value is proposed for taste and odour.

**Temperature-** cool water is generally more palatable.

**B. chemical or inorganic constituents-**

**Chlorides-** All water including rain water containing chlorides. The standard



prescribed for chloride is 200 mg/ liter. The maximum permissible level is 600 mg/ liter.

**Hardness-** water hardness in excess of 500mg/liter is tolerated by consumers.

**Ammonia-** natural levels in ground and surface water are usually below 0.2 mg/ liter.

**pH-**an acceptable drinking water pH should be in between 6.5 to 8.5.

| Chemical | Limit per liter |
|---|---|
| Hydrogen sulphide | 0.05-0.1 mg/ liter |
| Iron | 0.3 mg/ liter |
| Sodium | 200 mg /liter |
| Sulphate | 250 mg /liter |
| Dissolved solids | Less than 600 mg/liter |
| Zinc | 5 mg/liter |
| Manganese | 0.1 mg/liter |
| Copper | 1 mg / liter |
| Aluminum | 0.2 mg/ liter |

**Microbiological aspects-** Natural and treated water vary in microbiological quality, ideally, drinking water should be contain any micro-organisms known to be pathogenic. It should also be free from bacteria indicative of pollution with excreta.

Coliform organisms- sample should not be detectable in any 100ml.

Faecal streptococci- regularly occur in faeces, but in smaller number than E. coli.

Cl. Perfringens- it is also regularly in faeces, through generally in much smaller than E. coli.

**Virological aspects-** It is recommended that, to be acceptable, drinking water should be free from any viruses infections for man. Disinfection with 0.5 mg/L of free chlorine residual after contact period of at least 30 minutes at a pH of 8.0 is sufficient to inactivate virus.

**Biological aspects-** Drinking water should not contain any pathogenic intestinal protozoa and helminths and free living organisms.

**Chemical Aspects**

The health risk due to toxic chemicals in drinking water differs from that caused by micro-biological contaminants. There are few chemical constituents of water that can lead to acute health problem except through massive accidental contamination of supply.

| Constituents | Recommended maximum limit of concentration |
|---|---|
| **Inorganic chemical** | |
| Arsenic | 0.01 mg/litre |
| Cadmium | 0.003 µg/litre |
| Chromium | 0.05 mg/litre |
| Cyanide | 0.07 mg/litre |
| Fluoride | 1.5 gm/litre |
| Lead | 0.01 mg/litre |
| Mercury | 0.001 mg/litre |
| Nitrate and nitrite | 50 mg /litre and 3 mg /litre |
| Selenium | 0.01 mg/litre |
| **Organic chemical** | |
| Chlorinated alkanes | |
| Carbon tetrachioride | 2 µg/litre |
| Dichloromethane | 20 µg/litre |
| Chlorinated ethenes | |
| Vinyl chloride | 55 µg/litre |
| 1.1 –dichloroethene | 30 µg/litre |
| 1.2 – dichloroethene | 50 µg/litre |
| Aromatic hydrocarbons | |
| Benzene | 10 µg/litre |
| Toluene | 700 µg/litre |
| Xylenes | 500 µg/litre |
| Ethylbenzene | 300 µg/litre |
| Styrene | 20 µg/litre |
| Benzolalpyrene | 0.7 µg/litre |

**Radiological Aspects**

The effects of radiation exposure are called "somatic". The aim of radiation protection therefore exist harmful non-stochastic effects and reduce the probability of stochastic effects to a level deemed acceptable.



Gross alpha activity 0.1 Bq/L

Gross beta activity 1.0 Bq/ L

**Hardness of Water**

Hardness may be defined as the soap destroying power of water. The consumer considers water hard if large amounts of soap are required to produce lather. The hardness in water caused mainly by four dissolved compounds.

1. Calcium bicarbonate
2. Magnesium bicarbonate
3. Calcium sulphate
4. Magnesium sulphate

The presence of any one of these compounds produces hardness. Chlorides and nitrates of calcium and magnesium, iron, manganese, aluminum can also cause hardness but they occur generally in small amounts.

Hardness is classified as carbonate and non-carbonate.

**Carbonate hardness-** the carbonate hardness which formerly designed as "temporary" hardness is due to presence of calcium and magnesium bicarbonates.

**Non-carbonate hardness-** formerly designed as "permanent" hardness, it is due to calcium and magnesium sulphate, chlorides and nitrates.

Hardness in water is expresses in terms of "milli-equivalents per liter (mEq/L)". One mEq/L of hardness producing ion is equal to 50 mg calcium carbonate in one liter of water. Drinking water should be moderately hard. Softening of water is recommended when the hardness exceeds 3 mEq/L

| Classification | Level of hardness (mEq/L) |
|---|---|
| Soft water | Less than 1 (50mEq/L) |
| Moderate water | 1-3 (50-150mEq/L) |
| Hard water | 3-6(150-300mEq/L) |
| Very hard water | Over 6 (>300mEq/L) |

**Disadvantages of hardness**

1. Hardness in water consumes more soap and detergents.
2. Hard water is heated, the carbonate are precipitated and bring about furring or scaling of boilers. This leads more fuel consumption, loss efficiency and sometimes causes boiler explosions.

3. Hard water adversely affects cooking, food cooked soft water retains its natural color and appearance.
4. Fabrics washed with soap in hard water do not have a long life.
5. There are many industrial processes in which hard water is unsuited and gives rise to economic losses.
6. Hardness shortens the life of pipes and fixtures.

**Special Treatment**

**a) Removal of hardness-**

Temporary Hardness-

1. Boiling
2. Addition of lime
3. Addition of sodium carbonate
4. Permutit process

Permanent Hardness-

1. Addition of sodium carbonate
2. Base exchange process

1. **Boiling** –Boiling removes the temporary hardness by expelling carbon dioxide and precipitating the insoluble calcium carbonate. It is an expensive method to soften water on a large scale.

$$Ca(HCO_3)_2 \longrightarrow CaCO_3 + H_2O + CO_2$$

2. **Addition of lime-** Lime softening not only reduces total hardness total hardness but also accomplishes magnesium reduction. Lime absorbs the carbon dioxide and precipitates the insoluble calcium carbonate. In Clark's method of softening water. One ounce of quick lime is added to every 700 gallons of water for each degree of hardness.

$$Ca(OH)_2 + Ca(HCO_3)_2 \longrightarrow 2CaCO_3 + 2H_2O$$

3. **Addition of Sodium Carbonate-** Sodium carbonate removes both temporary and permanent hardness.
4. **Base Exchange process-** in the treatment of large water supplies, the permutit process is used. Permutit is a complex compound of sodium, aluminum and silica. It has the property of exchanging the sodium cation for the calcium and magnesium ions in the water. When hard water is passes through the permutit the calcium and magnesium ions are entirely removed by Base Exchange and sodium permutit is finally converted into calcium and magnesium permutit. By this process, water can be softened to zero hardness. Permutit process removes both temporary and permanent hardness.



Water hardness and cardiovascular disease- reports from several countries have shown an inverse statistical association between the hardness of drinking water and the death rate from cardiovascular diseases. Areas supplied with soft drinking water showed a significantly higher prevalence of arteriosclerotic heart disease, or degenerative heart disease, hypertension, sudden deaths of cardiovascular origin, or a combination of these.

**b) Fluoridation of water-** Fluorine is one of the constituents naturally present in water supplies. In fact, the main source of fluorine is drinking water. Deficiency of fluorine in drinking water is associated with dental cries, and excess with dental and skeletal fluorosis. 0.5 to 0.8 ppm in drinking water as optimum.

**c) Defluoridation-** water may contain a high level of fluorides. In such communities, water is defluroidated by phosphate to reduce fluorides to optimum levels.

**Horrock's Apparatus**

Horrock's water testing apparatus is designed to find out the dose of bleaching powder required for disinfection of water.

**Contents-**

1. 6 white ups (200ml capacity each)
2. One black cup with circular mark on the inside
3. 2 metal spoons (each holds 2gm of bleaching powder when filled level with the brim)
4. 7 glass stirring rods
5. One special pipette
6. Two droppers
7. Starch-iodide indicator solution
8. Instruction folder

**Procedure-**

1. Take one level spoonful 2 gm. of bleaching powder in the black cup and make it into a thin paste with a little water. Add more water to the paste and make up the volume up tc the circular mark vigorous stirring. Allow to settle. This is the stock solution.
2. Fill the 6 white cups with water to be tested, up to about a cm below the brim.

3. With the special pipette provided add one drop of the stock solution to the 1st cup, 2 drops to 2nd cup, 3 drops to the 3rd cup, and so on.
4. Stir the water in each cup using a separate rod.
5. Wait for half an hour for the action of chlorine.
6. Add 3 drops of starch-iodine indicator to each of the white cups and stir again. Developments of blue color indicate the presence of free residual chlorine.
7. Note the first cup which shows distinct blue color. Supposing the 3rd cup shows blue color, then 3 level spoonful's or 6 grams of bleaching powder wound be required tom disinfect 455 liters of water.

### Jala Pariksha (Test for purity of water)

तयोर्द्वयोरपिपरीक्षणंकुर्वीत–शाल्योदन पिण्डकुथित विदग्धंरजतभाजनोहीतंवर्षतिदेवेबहिष्कुर्वीत, सयदिमुहूर्त स्थितस्तादृश एव भवतितदागाङ्गंपततीत्यवगन्तव्यंवर्णान्यत्वेसिक्थप्रक्लेदेचसामुद्रमितिविधात, तन्नोपाद्येम ॥

Ganga is rain water usually falling in Asvayuja (September and October month). Both these should be put to test-rain water collected in a silver vessel and lump ofboiled rice is immersed in it, when examined after staying for a Muhurta, if l the lump is seen not very moist and not changed in colour but remain as it was before, then that water is to be understood as Ganga, if there appears a change of colour or the particles of lump are highly moist, slimy and very soft then that water should be understood as Samudra.

Samudra Jala also qualities of Ganga water during month of Asvaja.

During Varsha Rutu rain water or water from spring may be used.

During Sharat Rutu all kinds of water may be used because of being clear.

During Hemanta Rutu water of either natural lake or artificial lake may be used.

During Vasanta Rutu water of artificial tank may be used

During Grishma Rutu also same manner

During Varsha Rutu water collected in burrow and all kind which are not rain may be used.

### Jala Shodhana-Purification Of Water

व्यापन्नस्य चाग्निक्वथनं सूर्यातप प्रतापनं तप्तायः पिण्ड सिकतालोष्ट्राणांवाविर्वापणं प्रसादनम्चकर्तव्यं, नाग चम्पकोत्पल पाटलापुष्पप्रभृतिभिश्चाधिवासनमिति ॥ (सु.सू. 45/12)

Boiling over fire, heating by exposing to sunrays, immersing heated iron balls, sand or stone into water are the method to purify contaminated water. Putting flower such as



Naga Champaka, Utapala, Patala etc. Into water and allowing these for some time to stay in it removes bad smell and imparts good smell.

सौवर्णेरजतेताम्रेकांस्येमणिमयेऽपिवा । पुष्पावतंसंभौमेवसिगन्धिसलिलंपिबेत ॥ (सु.सू. 45/13)

Water kept stored in vessels made of gold, silver, copper, bronze, precious stones or in earthen pots and made fragrant by putting flower into it should be used for drinking.

### Jala Prasadana (Clearing turbidity of water)

तत्रसप्तकलुषस्यप्रसादनानिभवन्ति ।

तद्यथा–कतक गोमेद बिसग्रन्थि शैवालमूलवर्ताणिमुक्तामणिश्चेति ॥ (सु.सू. 45/17)

Methods of clearing the turbidity of polluted water are seven- such as the use of Kataka, Gomedaka, Bisagranthi, Saivalamula these are immersed in water; Vastra, Mukta and Mani(gems) .

### Jala Nikshepana (Water stands)

पञ्चनिक्षेपणानिभवन्ति ।

तद्यथा–फलकं, त्र्यष्टकं, मुञ्जवलय, उदकमञ्चिकाशिक्यंचेति ॥ (सु.सू. 45/18)

Water stands are five, such as wooden planks, tripod stand with eight steps, rings of Munja grass, water shed and pot hangers.

### Jala Sitikarana (Water cooling)

सप्तशीतीकरणानिभवन्ति तद्यथा प्रवातस्थापनम, उदकप्रक्षेपणं, यष्टिकाभ्रामणं, व्यजनं, वस्त्रोद्धरणं, वालुकाप्रक्षेपणंशिक्यावलम्बनंचेति ॥ (सु.सू. 45/19)

Methods of keeping the water cool, are seven such as exposing to breeze, keeping pots of cold water one over the other, wrapping the pots with cloth and sprinkling water frequently, stirring with sticks, fanning, lifting through cloth dipping clean cloth in water and lifting, repeating this acts frequently; keeping the water pot hidden in a sand bed and keeping the pot in a hanger.

## Rain Water Harvesting and Water Recycling

Water forms the lifeline of any society. Water is essential for the environment, food security and sustainable development. All the known civilizations have flourished with water source as the base and it is true in the present context too. Availability of drinking water and provision of sanitation facilities are the basic minimum requirements for healthy living. Water supply and sanitation, being the two most important urban services, have wide ranging impact on human health, quality of life, environment and productivity. Despite the technological advancements, the global scenario still remains grim, as all the inhabitants of the world do not have access to safe water and adequate sanitation.

Declining trend of rainfall and rapid urbanization with industrialization has created increasing demand for water. Growing water shortage is already causing problems in several areas and available resources like rivers, ponds, lakes are shrinking, causing more and more pressure on the sub soil water resources. The rate of water extraction is exceeding the replenishment that takes place by natural processes- mainly recharge due to rainfall.

Rainwater harvesting is a technique used for collecting, storing, and using rain water for landscape irrigation and other uses. The rain water is collected from various hard surfaces such as roof tops and other types of manmade above ground hard surfaces. This ancient practice is currently growing in popularity throughout our communities due to interest in reducing the consumption of potable water and the inherent qualities of rainwater. This web site will mainly focus on general information about rainwater harvesting systems, rain water system advantages and disadvantages, and helpful links and references.

**Conservation of water resources requires**

1. **Prevention of wastage-** Wide-spread awareness needs to be developed among people about economical use of water. It has to be propagated that people about make effort not waste water, and help in reducing consumption of the invaluable water reserves. Efficient water management can substantially reduce total water required of communities, domestic consumption of water can be reduced by individuals, by cultivating better habits in kitchen and bathroom use, to avoid free running of water.
2. **Water harvesting-** Simple innovative ideas like water harvesting are extremely important to preserve and buildup underground water reserves in urban and semi urban areas, where considerable water is drawn out by tube well for domestic consumption.

**Rainwater harvesting means capturing the rain where it falls or capturing the runoff and taking measures to store that water and keep it clean.** Rainwater harvesting can be undertaken through a variety of ways:

Capturing run-off from roof tops

Capturing run-off from local catchments

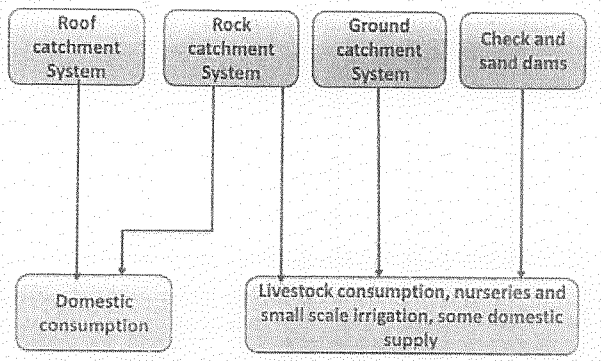
Capturing seasonal flood water from local streams

Conserving water through watershed management

**Rainwater Harvesting Advantages**

1. Makes use of a natural resource and reduces flooding, storm water runoff, erosion,






**Rainwater Harvesting**

and contamination of surface water with pesticides, sediment, metals, and fertilizers.

2. Reduces the need for imported water (the San Diego region imports between 80%-90% of its water from Northern California and Colorado River).
3. Excellent source of water for landscape irrigation, with no chemicals such as fluoride and chlorine, and no dissolved salts and minerals from the soil.
4. Home systems can be relatively simple to install and operate may reduce your water bill.
5. Promotes both water and energy conservation.
6. No filtration system required for landscape irrigation.

**Rainwater Harvesting Disadvantages**

1. Limited and uncertain local rainfall.
2. Can be costly to install.
3. The payback period varies depending on the size of storage and complexity of the system.
4. Can take considerable amount of time to "pay for itself".
5. Requires some technical skills to install and provide regular maintenance.
6. If not installed correctly, may attract mosquitoes. (i.e. West Nile Disease and other waterborne illnesses)
7. Certain roof types may seep chemicals, pesticides, and other pollutants into the water that can harm the plants.
8. Rainwater collected during the first rain season is generally not needed by plants until the dry season. Once catchment is full, cannot take advantage of future rains.

# CHAPTER 4 Bhumi and Nivasasthana (Land and Housing)

## Soils

Soil is one of the important and valuable resources of the nature. Life and living on the earth would be impossible without healthy soil. 95% of human food is derived from the earth. Making plan for having healthy and productive soil is essential to human survival. Entrance of materials, biological organisms or energy into the soil will cause changes in soil quality. This problem causes soil to remove from its natural state.

The dead part of the soil includes weathered rocks and minerals which are obtained from the decay of plants and animals, which is called organic matter or humus, and water and air are categorized in this part. But the live soil is the soil which enjoys small animals like insects and worms and plants, fungi, bacteria and other microbes are grown in the live soil. The soil is composed of 50% of organic and inorganic matters, and 50% of air and water which fills existing vacant spaces of the soil and keeps live organisms of the soil.

Formation of soil from the parent material (bedrock): mechanical weathering of rocks by temperature changes, abrasion, wind, moving water, glaciers, chemical weathering activities and lichens. Under ideal climatic conditions, soft parent material may develop into 1 cm of soil within 15 years.

Land = earth = soil

Soil is critical to life Plants get nutrients from soil and Animals get nutrients from plants.

Four major components-

1. Mineral particles (rocks and clays)
2. Organic matter
3. Water
4. Air

Soils vary in different aspects

a. Color
b. Thickness





c. Layers
d. Amount of clay, salt, & organic matter

### Samanya Bhumi Pariksha (General Examination of Land)

श्वभ्रशर्कराश्मविषमवल्मीकश्मशानघातनदेवतायतनसिकताभिरनुपहतानमनूषराम ।
भङ्गुरामदूरोदकांस्निग्धांप्ररोहवतींमृद्वीस्थिरांसमांकृष्णांगौरील्लोहितांवाभूमिमौषधग्रहणायपरिक्षेत ।
तस्यांजातमपिकृमिविषशस्त्रातपपवनदहनतोयसंबाधमगैरनुपहतमेकरसं ।
पुष्टंपृथ्ववगाढमूलमृदीच्यांचौशधमाददीतेत्येषभूमिपरिक्षाविशेषः सामान्यः ॥ (सु.सू. 36/3)

Land for the temple and house for Brahmins should be square elevated and in south –west direction. Smell of horse, elephant, bamboo, water store, Nagakeshar, Mallika, Dhanya and Patala in the land is good.

Land with good smell, plane land which is fertile so that seeds germinate fast, dark coloured, Snigdha and soft to touch is good for construction. Tree of Bilwa, Nimba, Nirgundi, Saptaparnaka , Amra, Bibhitaki should be grown nearby land should be plane, without big pieces of mud pot, stone, manure pits, small wood pieces and big gravels, ash and yellow colour.

Land with smell of curd, ghee, honey, oil, blood, cow and lotus and white, red, yellow and black colour, sound of elephants and horse and having six Rasa, single coloured, devoid of stones, saw dost etc. spines, bones, cervices, elevated in south eastern direction are ideal land for construction.

### Panchavidha Bhumi (Five kinds of lands)

विशेषतस्तु तत्र, अश्मवती स्थिरा गुर्वी श्यामा कृष्णा वा स्थूलवृक्षाशस्यप्राया स्वगुणभूयिष्ठ; स्निग्धा शीतलाऽऽसन्नोदका स्निग्धशस्यतृणकोमलवृक्षप्राया शुक्लाऽम्बुगुणभियिष्ठा; नानावर्णा लध्वश्मवति प्रविरलाल्पपाण्डु वृक्षप्ररोहाऽग्निगुणभूयिष्ठा; रुक्षा भस्मरासभवर्णा तनुवृक्षाप्लरसकोटर-वृक्षप्रायाऽनिलगुणभूयिष्ठाः मृद्वि समा श्वभ्रवत्यव्यक्तरसजला सर्वतोऽसारवृक्षा महापर्वतवृक्षप्राया श्यामाचाकाशगुणभूयिष्ठा ॥ (सु.सू. 36/4)

The land which is rocky, stable, heavy, blue black or black, with more of big trees and plants of the same features of Parthiva Bhumi.

Snigdha, cold, with water nearby all around with more of unctuous plants, grass, tenter trees- all of white colour, is the land with qualities of water Apya Bhumi.

More of small rocks, of many colours, small white trees, plants and sprouts; growing sparsely is land predominant in qualities of Agni is Agni Bhumi.

Which is dry, with soil of colour of ash or donkey, predominant in thin trees with less of sap and more of hallow pockets is the land with qualities of wind predominately is Vayaviya Bhumi.

Which has soft soil, pits in the ground, juice of plants and water being not tasty, sapless trees, growing all around, with more of huge mountains and trees and blue black soil is the land with qualities of the sky is Nabhasa Bhumi.

### Land unfit for construction

Land having smell of dead body, fish and birds is not good. Land near holy tree, king's palace, public halls, temple and spiny plants are unfit for construction. Land which is round, triangular, irregular, very hard, situated near Candana tree, leather processing is not good for construction.

The use of Vastu Sashtra is specific to an individual and involves complex mathematical calculations along with the knowledge of astrology, geometry and philosophy and the purpose for which the construction of the building is required.

### Nivasa Yogya Bhumi

सुगन्धा ब्राह्मणी भूमी रक्तगन्धा तू क्षत्रिया । मधुगन्धा भवेदद्वैश्या मद्यगन्धा च शूद्रिका ॥ (कल्पद्रुम)

Sugandha Yukta Bhumi for Brahmina, Raktagandha Yukta Bhumi for Kshatriya, Dhanyagandha Yukta Bhumi for Vaishya and Madyagandha Yukta Bhumi for Shudra.

मनसश्चक्षुषो यत्र सन्तोषो जायते भुवि । तथां गृहं सर्वैरिति गर्गादिसम्मतम ॥ (गृहभूषण)

Land which is pleasing for eyes and mind is ideal for construction of house.

### Grahyabhumi (land fit for construction)

शस्तौषधिद्रुमलता मधुरा सुगंधा स्निग्धा समा न सुषिरा च माही नराणाम् अ ।
अप्यध्वनिश्रमविनोदमुपागतानां धते श्रियं किमुत शाश्वतमन्दिरेषु ॥ (बृहत्संहिता)
श्रेत्वासृक पीत कृष्णा ह्यगजनिनदा षड्रसा चैकवणां, गोधान्याम्भोजगन्धोपलतुषरहिताप्रतीच्युन्नता या ।
पूर्वो दग्वारिसारा वरसुरभिमसा शूलहिनास्थिवर्ज्या, सा भूमिः सर्वयोग्या कणदररहिता सम्मताद्यैर्मुनीन्दैः । (मयमतम)

Land with white, red, yellow, black, sound horse, elephant and having six Rasa, single coloured, devoid of stones, saw during spines, bones, cervices and elevated is south eastern direction is the ideal land for construction of hourses.

### Agrahyabhumi (land unfit for construction)

शवमीनपक्षिगन्धा या सा धरा निन्दिता वरैः । सभा चैत्य समीपस्था नूपमन्दिर संश्रिता ।
देवालय समीपस्था कण्टकीद्रुमसंयुता । वृत्त त्रिकोण विषमा वज्राभा कच्छपोन्नता ।
चण्डालवासगच्छाया चर्मकारालायश्रिता ॥ (मयमतम)

Land having smell of dead body, fish and bird is not good. Land near Caitya Vruksha, king's palace, public halls, temple and spiny plants is unfit for construction. Land which is round, triangular, irregular, very hard like diamond, elevated like tortoise, situated near house of Canadal, shadowed and leather processing unit nearby is unfit for construction.



According to Mayamatama, Brihat samhita of Varaha Mihira, Vastu Shastra.

**Types of Earth:** Earth is classified according to its colour brick red, dark brown; white, red, yellow, mixed colour, black and also according to their smell, taste. Texture, etc., Black and clayey soil is not good for construction and while designing the foundation/ footings, the load bearing capacity of the soil should be ascertained. Sites with big boulders, anthills or where murder or burial has taken place and those with loose or filled -up earth should be avoided.

**Directional Alignment-** The directional axis of the plot should be properly aligned with the axis of the earth's magnetic field.

Boundaries AC & BD should be parallel to a north-south axis. While boundaries AB & CD should be in an East-West alignment.

For otherwise, such land will remain averse to overall growth, peace & happiness of those that shall inhabit it.

The geometrical axis of the plot should be properly aligned with the axis of the earth's magnetic field. i.e. one set of boundaries should be parallel to the north south axis and the other to the east -west axis as shown in the figure (a) and (b).

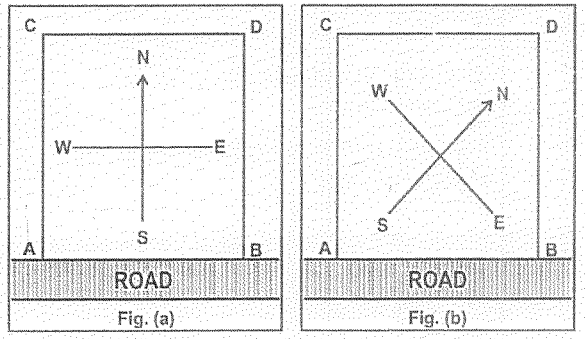



**Figure (a) shows directional alignment**

**Figure b) shows a non directionally aligned plot**

### Shape of the Site

Symmetrical shapes like square or rectangular, circular & hexagonal promote overall growth, increases mental capabilities and generates prosperity.

Asymmetrical shapes like oval, triangular, parallelogram, star & trident are deemed inauspicious

### Slope of the Land Surface

The surface should be elevated towards the southern and western sides and should

be lower in northern and eastern sides for overall growth and prosperity.

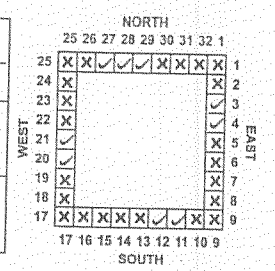
The Land should be elevated towards south and west sides and it should be lower in **North** and **East** sides for overall growth and happiness.

If the land is—

High in north or east
Low in south-east
Low in south-west
Low in north-west
Impact of Gates at Various Locations
Eastern Side: The third and fourth gate promote prosperity.
Southern Side: The twelfth gate enhances growth.
Western Side: The twentieth and twenty-first gates stimulate financial growth.

Northern Side: The twenty-seventh, twenty-eighth and twenty-ninth gates promote happiness, financial growth and overall gain respectively. Of all the positions of the gates depicted in the figure, the positions that are favorable are in the

| | |
|---|---|
| **Eastern side** | Prosperity, Govt. favour. |
| **South side** | Meanness, Prosperity, human growth |
| **West side** | Financial and human growth, Financial and human growth |
| **North side** | Happiness, Financial and human growth, All types of gains |




All the other placements of the gates (marked Cross) prove to be unfavorable.

**Brahmasthana (Central Zone of the Building)**-Should be free from any obstruction in the form of a wall, pillar and beam. There should not be any fixture, toilet, lift or staircase etc. in this area as shown in the Figures (a) and (b)

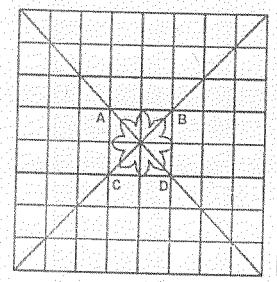


Fig. (a)

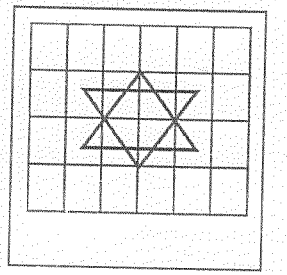


Fig. (b)



For Figure (a) Jurisdiction of Brahmsthana in a square building as shown by the central square ABCD. For Figure (b) Jurisdiction of Brahmsthana in a rectangular building is shown by a central "STAR"

**The Staircase**

Should be in the western or northern side of the building.

Turnings should be in the clockwise direction.

On reaching the upper floor, the facing should be towards south or east.

**Inner Planning of a House**

The oven should ideally be in the south-east zone.

Toilets should not be in the north-eastern, central and south-western zones.

The most south-western location is the ideal position for your master bedroom.

Position the boy's room in the northern or eastern side while the girl's and guest room are to be in the north-western parts.

| NW | N | | | NE |
|---|---|---|---|---|
| Store | Conjugated Living | Treasure | Medical Room | Pooja |
| Place for Mourning | | | | Multi-Purpose Room |
| Dinning | | Centre (Free From obstruction) | | Bathroom |
| Study | | | | Curd Curning |
| Armoury or Maternity Room | Toilet | Sleeping | Shee Store | Cooking Fire |
| SW | S | | | SE |

W E

Place the beds in southerly or easterly direction.

The provisions shown in the side diagram are as per the living style in the ancient times. However considering the requirements of the modern days it can be rearranged based on the following guide lines.

1. Kitchen fire should be in the South -East and should never be at the North-East, Centre and the south west zones.
2. Toilets should not be provided at the North-East, Center and the South-West zones.
3. Master bedroom should be in or nearest to the South-west Zones.
4. Boys' Rooms should be in the North and/or East Zones.
5. Girls and Guest rooms should be in the North - West zones.
6. Head Seat of the Bed should be in the South or the East Direction.
7. Facing of the W/C should be towards the north or West Direction

**Inner Planning of an Office**

- The shape of the cabin should be a regular square or a perfect rectangle.

- The opening for the door should be free from any obstacle.
- Doors should open inwards while entering a cabin.
- The master chamber should either be in the south-west or nearest to south- west direction.
- Chambers of directors / managers / senior staff should be in the southern & western zones.

| NW | N | NE |
|---|---|---|
| Field Staff Visitors Store Room Pantry/Utilities | Reception Visitors Junior Staff | No Pantry/No Toilet Junior Staff Reception Visitors Pooja Cashier |
| Directors OR Managers OR Senior Staff | Lounge Free From Fixtures & Obstacles | Junior Staff Computer Room Pantry/Utilities |
| Master Chamber No Pantry/No Toilet | Directors OR Managers OR Senior Staff | Reception Visitors A/c's Deptt. Computer Room Engg. Section Pantry/Utilities |

W E

SW S SE

- While that of the junior staff should be in the north-west, north, north-east, east and south-east.
- Pantry and toilets must be in north-eastern, central & south-western sections.

While making the interior of an office the following guidelines have to kept in mind

1. The shape of the cabin should be regular i.e. Square, or Perfect rectangle etc.
2. There should not be any obstacle in front of the door opening.
3. The door leaves should pushed inside while entering into the cabin.
4. The master chamber should be in the south west or nearest to the south west zone.
5. The directors/managers/senior staff should be in the south & west zones.
6. The junior staff and other activities should be in the North-West, North, North-East, East and South East Zones.
7. The facing of the Directors/Managers/Officers should be towards East or North.
8. Pantry and Toilets should not be in North-East, Center & South-west Zones

**Internal Planning of any Industrial Building**

- Heavy plant and machinery should be installed in the south-western, southern & western parts.
- Light weight and auxillary machines should be in the northern & eastern zones.
- Install boiler, AC panels, generator, heater, dryer, oven, furnace etc. in the north-west & East sections.
- Toilets should be placed in the north-east, centre or south-west.
- Make sure not to place spare parts stores in the north-west, centre & south-east.

**Rest rooms for labour should be in the northern & eastern zones.**

1. Heavy plant machinery should be installed in the South-West, South and West Zones.
2. Light Weight and Auxiliary machines should be installed in North and East Zones.



3. Boiler/AC Panels/ Generator/Heater/Dyer/Oven/Furnace etc are best in the South East but can also be installed in the North-West and East Zones.
4. Toilets or Fire/Power installations should not be provided in the North-East, Center and South-West zones.

## Land Pollution

Land pollution is the degradation of earth's land surfaces often caused by human activities and its misuse. Haphazard disposal of urban and industrial wastes, exploitation of minerals, and improper use of soil by inadequate agricultural practices are a few of the contributing factors. Also, increasing urbanization, industrialization, and other demands on the environment and its resources is of great consequence to many countries.

**Causes of Land Pollution**

1. **Deforestation and soil erosion:** Deforestation carried out to create dry lands is one of the major concerns. Land that is once converted into a dry or barren land can never be made fertile again, whatever the magnitude of measures to redeem it is. Land conversion, meaning the alteration or modification of the original properties of the land to make it use-worthy for a specific purpose is another major cause. This hampers the land immensely. Also there is a constant waste of land. Unused available land over the years turns barren; this land then cannot be used. So in search of more land, potent land is hunted and its indigenous state is compromised with.
2. **Agricultural activities:** With growing human population, demand for food has increased considerably. Farmers often use highly toxic fertilizers and pesticides to get rid of insects, fungi and bacteria from their crops. However with the overuse of these chemicals, they result in contamination and poisoning of soil.
3. **Mining activities:** During extraction and mining activities, several land spaces are created beneath the surface. We constant hear about land caving in; this is nothing but nature's way of filling the spaces left out after mining or extraction activity.
4. **Overcrowded landfills :** Each household produces tonnes of garbage each year. Garbage like aluminium, plastic, paper, cloth, wood is collected and sent to the local recycling unit. Items that cannot be recycled become a part of the landfills that hampers the beauty of the city and cause land pollution.
5. **Industrialization :** Due to increase in demand for food, shelter and house, more goods are produced. This resulted in creation of more waste that needs to be disposed of. To meet the demand of the growing population, more industries were developed which led to deforestation. Research and development paved the way for modern fertilizers and chemicals that were highly toxic and led to soil contamination.
6. **Construction activities :** Due to urbanization, large amount of construction activities

are taking place which has resulted in large waste articles like wood, metal, bricks, plastic that can be seen by naked eyes outside any building or office which is under construction.

7. **Nuclear waste:** Nuclear plants can produce huge amount of energy through nuclear fission and fusion. The left over radioactive material contains harmful and toxic chemicals that can affect human health. They are dumped beneath the earth to avoid any casualty.
8. **Sewage treatment :** Large amount of solid waste is leftover once the sewage has been treated. The leftover material is sent to landfill site which end up in polluting the environment.

### Effects of Land Pollution

1. **Soil pollution:** Soil pollution is another form of land pollution, where the upperlayer of the soil is damaged. This is caused by the overuse of chemical fertilizers, soil erosion caused by running water and other pest control measures; this leads to loss of fertile land for agriculture, forest cover, fodder patches for grazing etc:
2. **Change in climate patterns:** The effects of land pollution are very hazardous and can lead to the loss of ecosystems. When land is polluted, it directly or indirectly affects the climate patterns.
3. **Environmental Impact:** When deforestation is committed, the tree cover is compromised on. This leads to a steep imbalance in the rain cycle. A disturbed rain cycle affects a lot of factors. To begin with, the green cover is reduced. Trees and plants help balance the atmosphere, without them we are subjected to various concerns like Global warming, the greenhouse effect, irregular rainfall and flash floods among other imbalances.
4. **Effect on human health:** The land when contaminated with toxic chemicals and pesticides lead to problem of skin cancer and human respiratory system. The toxic chemicals can reach our body through foods and vegetables that we eat as they are grown in polluted soil.
5. **Cause Air pollution:** Landfills across the city keep on growing due to increase in waste and are later burned which leads to air pollution. They become home for rodents, mice etc. which in turn transmit diseases.
6. **Distraction for Tourist:** The city loses its attraction as tourist destination as landfills do not look good when you move around the city. It leads to loss of revenue for the state government.
7. **Effect on wildlife:** The animal kingdom has suffered mostly in the past decades. They face a serious threat with regards to loss of habitat and natural environment. The constant human activity on land is leaving it polluted; forcing these species to move further away and adapt to new regions or die trying to adjust. Several species are pushed to the verge of extinction, due to no homeland.



The discharge of chemicals on land makes it dangerous for the ecosystem too. These chemicals are consumed by the animals and plants and thereby make their way in the ecosystem. This process is called bio magnification and is a serious threat to the ecology.

### Control of Land Pollution

1. Make people aware about the concept of Reduce, Recycle and Reuse.
2. Reduce the use of pesticides and fertilizers in agricultural activities.
3. Avoid buying packages items as they will lead to garbage and end up in landfill site.
4. Proper disposal of garbage.
5. Buy biodegradable products.
6. Do Organic gardening and eat organic food that will be grown without the use of pesticides.
7. Create dumping ground away from residential areas.

### Bhumi Shodhana

भुशुद्धिर्मार्जनाद्दाहात्कालातगोक्रमणाततथा । सेकादुल्लेखनाल्लेपातगृहमार्जनलेपनात ॥ (याज्ञवल्कल)

Cleaning, burning by standing, grazing of cows, sprinkles of water, scraping and covering lands be purified, house can be purified by wiping, washing and paint white colour.

### Housing

Housing in the modern concept included not only the 'physical structure' providing shelter, but also the immediate surroundings, and the related community services and facilities. It has become part of the concept of "human settlement", which is defined as "all places in which a group of people reside and pursue their life goals; the size of the settlement may vary from a single family to millions of people".

A WHO expert group on public health aspects of housing prefers to use the term" residential environment" which is defined as the physical structure that man uses and the environs of the structure including all necessary services, facilities, equipment and devices needed or desired for the physical and mental health and social well-being of the family and the individual.

### Social goals of housing

The generally accepted goals of housing are :

1. **Shelter-** house should provide a sanitary shelter which is a basic need.

2. **Family life-** house should provide adequate space for family life and related activities viz. preparation and storage of food, meeting, sleeping, individual activities and other activities.
3. **Accesses to community facilities-** a third element of housing is accessibility to community services and facilities such as health service, schools, shopping areas, places of worship etc.
4. **Family participation in community life-** family is a part of the wider community. Community is important to family in many ways-it can offer help in times of need; it is an important source of friends. Communities are able to pool their efforts and improve their living conditions.
5. **Economic stability-** housing is a form of investment of personal savings. It provides for economic stability and wellbeing of the family.

The implementation of social goals in housing requires that government should

a) Introduce social housing schemes
b) Establish both minimum and maximum standards
c) Create financial and fiscal institutions geared to helping low income people obtain credit for building or improving their houses.

**Criteria for healthful housing**

1. Healthful housing provides physical protection and shelter.
2. Provides adequately for cooking, eating, washing, and excretory functions.
3. Housing is designed, constructed, maintained and used in a manner such as to prevent the spread of communicable disease.
4. Provides for protection from hazard of exposure to noise and pollution
5. Housing is free unsafe physical arrangements due to construction or maintenance, and from toxic or harmful materials and
6. Encourage personal and community development, promotes social relationships, reflects a regard for ecological principles, and by these means promotes mental health.

**Housing Standards**

Minimum standard are still maintained by building regulations, the aom being improvement of housing and environmental condition for the majority of families within the limits set by available resources and objectives. Recommended by EHC housing standard-

**Site Selection**

a) The site should be elevated from its surroundings so that it is not subject flooding during rains.



b) The site should have an independent access to a street of adequate width.
c) It should be away from the breeding places of mosquitoes and files.
d) It should be away from nuisances such as dust, smoke, smell, excessive noise and traffic.
e) It should be in pleasing surroundings.
f) The soil should be dry and safe for founding the structure and should be well drained. "Made soil", i.e. ground that is leveled by dumping refuse is very unsatisfactory for building purpose for at least 20-25 years. The subsoil water should be below 10 feet.

**Foundation -** This must always be solid and substantial. The foundation is laid with a bed of cement concrete over the stones to cover the trench. The object is to prevent subsidence of the building. The width of the foundation should never be less than 25 inches.

**Set back -** for proper lighting and ventilation, there should be an open space all-round the house- this is called "setback". In rural areas it is recommended that the built-up areas should not exceed one third of the total area; in urban areas where land is costly, the built-up areas may be up to two thirds. The setback should be such that three is no obstruction to lighting and ventilation.

**Floor -** The floor should be Pucca and satisfy the following criteria,

a) It should be impermeable so that it can be easily washed and kept clean and dry. Mud floors tend to break up and cause dust; they are not recommended.
b) The floor must be smooth and free from cracks and crevices to prevent the breeding of insects and harborage of dust.
c) The floor should be damp-proof.
d) The height of the plinth should be 2 to 3 feet.

**Walls-**

a) Reasonably strong.
b) Should have a low heat capacity i.e. should be absorb heat and conduct the same.
c) Weather resistant.
d) Unsuitable for harborage of rats and vermin.
e) Not easily damaged.
f) Smooth.

These standard cab be attained by 9 inch brick wall plasters smooth and coloured cream or white.

**Roof-** The height of roof should be less than 10 feet in the absence of air-

conditioning for comfort. The roof should have a low heat transmittance coefficient.

**Rooms**- The number of living rooms should be less than two, at least one of which can be closed for security. The other may be open on side if that side is a private courtyard. The number and area of rooms should be increased according to size of family, so that the recommended floor space per person may be made available.

**Floor area**- The floor area of living room should be at least 120 sq.ft. for occupancy by more than one person and least 100 sq. ft. for occupancy by a single person. The floor area available in living rooms per person should not less than 50 sq.ft. The optimum is 100sq. ft.

**Cubic Space**- Unless means are provided for mechanical replacement of air the height of rooms should be such as to give an air space of at least 500 cubic feet per capita, preferably 1000 cubic feet's.

**Windows**

a) Unless mechanical ventilation and artificial lighting are provided, every living room should be provided with at least 2 windows and at least one of them should open directly on to an open space.

b) The windows should be placed at a height of not more than 3 feet above the ground in living rooms.

c) Window area should be 1/5$^{th}$ of the floor area. Doors and windows combined should have 2.5$^{th}$ the floor area.

**Lighting** -The day light factor should exceed 1 per cent over half the floor area.

**Mahanasa (Kitchen) Standards**

Every dwelling house must have a separate kitchen. The kitchen must be protected against duet and smoke; adequately lighted; provide with arrangement for storing food, fuel and provisions; provided with water supply; provided with a sink for washing utensils and fitted with arrangement for proper drainage. The floor of the kitchen must be impervious.

**Privy** - A sanitary privy is a must in every house, belonging exclusively to it and readily accessible. In the more developed areas of the world, the majority of dwelling units are equipped with water carriage systems.

**Garbage and Refuse** - These should be removed from the dwelling at least daily and disposed of in a sanitary manner.

**Bathing and Washing** - The house should be have facilities for bathing and washing belonging exclusively to it and providing proper privacy.



**Water Supply** - The house should be having a safe and adequate water supply available at all times.

**Rural Housing**

In rural areas, the "approved" standards may be lower than in towns. Minimum standards :

1. There should be at least two living rooms.
2. Ample verandah space may be provided.
3. The built-up area should not exceed one-third of the total area.
4. There should be a separate kitchen with a paved sink or platform for washing utensils.
5. The house should be provided with a sanitary latrine.
6. The windows area should be at least 10 per cent of floor area.
7. There should be a sanitary well or a tube well within a quarter of mile from the house.
8. It is insanitary to keep cattle and livestock in dwelling houses. A cattle shed should be open on all sides; an area 8 ft. X 4 ft. is sufficient for each head of cattle.
9. There should be adequate arrangement for the disposal of waste water, refuse and garbage.

**Housing and Health**

Housing is part of the total environment of man and being a part, it is to some extent responsible for the status of man's health and wellbeing. It is difficult, however, to demonstrate the specific cause and effect relationships because housing embraces so many facets of environment. Poor housing causes :

1. Respiratory infections- common cold, tuberculosis, influenza, diphtheria, bronchitis, measles, whooping cough etc.
2. Skin infection- scabies, ringworm, impetigo and Leprosy.
3. Rat infestation- plague
4. Arthropods- houseflies, mosquitoes, fleas and bugs.
5. Accidents- a substantial proportion of house accidents are caused by some defect in the home and its environment.
6. Morbidity and mortality- high morbidity and mortality rates are observed where housing conditions are sub-standard.
7. Psychosocial effects- these effects must not be overlooked. The sense of isolation felt by persons living in the upper floor of high buildings is now well known to have harmful effects. Often, also, people living in densely populated urban areas feel a similar sense of isolation which may lead to neurosis and behavior disorder.

### Overcrowding

Overcrowding refers to the situation in which more people are living within a single dwelling than there is space for, so that movement is restricted. Privacy secluded, hygiene impossible, rest and sleep difficult. In general the risks as regards physical health are clear enough- infectious diseases spread rapidly under conditions of overcrowding. The effects on psychosocial health are not so clear-out, viz irritability, frustration, lack of sleep, anxiety, violence and mental a psychosocial stress, leading to unhappiness and very probably to psychosomatic and mental disorders.

Overcrowding is a health problem in human dwellings. It may promote the spread of respiratory infections such as tuberculosis, influenza and diphtheria. High morbidity and mortality rates are observed where housing conditions are substandard. The accepted standards with respect to overcrowding are as below;

1. Persons Per Room
   1 room - 2 persons
   2 rooms - 3 persons
   3 rooms - 5 persons
   4 rooms - 7 persons
   5 or more rooms - 10 persons (additional 2 for each further room)
2. Floor Space
   110 sq. ft. - 2 persons
   90-100 sq. ft. - 1 ½ persons
   70-90- sq. ft. - 1 person
   50-7- sq. ft. - ½ person

Under 50 sq. ft.-Nil (A baby under 12 month is not counted; children between 1 to 10 years counted as half a unit).

**Sex Separation-** Overcrowding is considered to exist if 2 persons over 9 years of age, not husband and wife, of opposite sexes are obliged to sleep in the same room.

# CHAPTER 5 Prakasha (Lighting)

Light is an essential subject to see, read and understand everything. Requirement of good lighting is possible by arranging some factors that helps effectively to reading process. If lighting is not in a good pattern its lead to headache, stress and other fatigue etc. requirement of good lighting is surely needed to run our daily workout without losing efficiency. Some requirements of good lighting are:

1. **Sufficiency illumination :** The first point is sufficiency of lighting. Light need to be sufficient to see objects properly. Insufficient lighting cause to eye strain. About an illumination that comes out from a 15-20 candles are enough as sufficient light.
2. **Uniform Distribution :** The efficient vision without any eye stress is occurs by uniformity in light distribution. Light distribution should be proper by establishing the source of light from the left side without the production of shadows is therefore necessary for efficient vision.
3. **Absence of glare :** Glare is high contrast of light. There should be excessive light and high intensity of light cause to glare. For example; automobile headlights at night, same lights during daylight wound not cause glare owing to absence of high contrast. Glare may be direct glare from a light source or reflected glare from source such as table tops and polished furniture. Glare causes annoyance. The eye cannot tolerate glare because it cause acute discomfort and reduces critical vision.
4. **Absences of sharp shadows :** Slight shadows are inevitable, but sharp and contrasting shadows are disturbing. Like Glare, shadows cause confusion to the eye and therefore should not be present in field of vision.
5. **Steadiness of source of light :** Light must be constant with constant contrast and constant intensity. Flickering lights are creating eyestrain and headache.
6. **White Color of light :** The color of light is not very important so long as intensity of these lights are high than normal light. Day light is the sufficient illumination needed by eye to fulfill reading process. Artificial lights should as far as possible approximate the day light color.
7. **Contrast Surroundings :** The term refers to background field of vision. As a requirement to good lighting background has a major role. The walls in your rooms and ceilings are creates reflection and its essential to accumulation of light. If you use

glass walls or black backgrounds the efficiency of light should lost. Because glass walls emit the light outside and black background absorbs the light and don't possible reflection. So, surrounding should be in a normal condition by using proper materials cause to reflection.

8. **Angle of light-** Light source should be established in a proper way that lead to effective lighting by reflection. If the light is established in an improper condition there should not reflection and the efficiency will lost. For effective reading light source is better to establish in left side wall than ceiling and other sides.

### Measurement of light

Visual light is electromagnetic radiation of wave length band 380-780 nm. There are four measures of importance. For each of these four measures again there are number of term and also great variety of names :

| Description | Quantity Measures Name | Recommended Unit | Other Units |
|---|---|---|---|
| Brightness of point source | Luminous intensity | Candela | Candle power |
| Flow of light | Luminous flux | Lumen | Foot candle |
| Amount of light reaching surface | Illumination Illuminance | Lux | Lumen/ $cm^2$ |
| Amount of light re-emitted by surface | Bright luminance | Lambert | Footlambert candle/$cm^2$ |

### Natural lighting

Natural lighting is derived partly from the visible sky and partly from reflection. Light comes to the rooms by reflection from light colour objects. Efficient utilization of natural light calls for careful design, location and orientation of building and relationship between building (town planning). Natural lighting also depends upon the time of the Day, season, weather and atmospheric pollution.

### Suggestion for improving daylight illumination

1. **Orientation-**The brightness of the sky is not constant on the east and west and therefore the illumination is subject to variation in buildings facing east and west. The direct penetration of sunlight from east or west may heat up the rooms especially during summer.



2. **Removal of obstructions-** Removal of obstruction item either wholly or partially is likely to give the most effective single improvement in lighting.
3. **Windows-** Windows should be properly planned as the natural lighting within any room is influenced by the amount of visible sky, the size, shape and arrangement of window openings. The rule that window area should not be less than 10 per cent of the floor area.
4. **Interior of the rooms-** The full benefits of the natural illumination, the celling should be white, the upper portion of walls light-tinted, and lower portions somewhat darker so as to give comfortable contrast to the eyes.

### Measurement of day light

$$\text{Daylight factors (D.F.)} = \frac{\text{Instantaneous illumination INDOORS}}{\text{Simultaneously occurring illumination OUTDOORS}} \times 100$$

### Artificial lighting

Daylight may not meet the requirements of illumination during all hours, and especially during cloudy days. It should be supplemented by artificial illumination for adequate illumination. Artificial lighting should be as close as possible to daylight in composition. There are five systems of artificial lighting

1. **Direct lighting-** in direct lighting, 99 to 100 per cent of the light is projected directly towards the working area. Direct lighting is efficient, economical, but tends to cast sharp shadows. It should not fall into the eyes.
2. **Semi- direct-** in this 10 to 40 per cent of light is project upward and light reflected back on the object by ceiling.
3. **Indirect-** light does not strike a surface directly because 90-100 per cent of the light is projected toward the ceiling and walls. This gives total illumination of the room.
4. **Semi- Indirect-** here 60 to 90 per cent of light is in upward direct and rest downwards.
5. **Direct and Indirect lighting-** light is distributed equally, no one system can recommended to exclusion of others.

### Methods of Artificial Illumination

1. **Filament lamps-** They are widely used. The electric current heated up the tungsten filament and the light emitted depended upon the temperature. The hotter filaments produce the bluer light. Accumulation of dust on the bulbs reduces illumination by 30-40 per cent. The bulbs and shades should be cleaned frequently.

2. **Fluorescent lamps-** They are economical in the use of electric current, they are cool and efficient, and the light emitted stimulates natural light. The lamp consists of a glass tube filled with mercury vapor and electrode fitted at each end. The inside of the tube is coated with fluorescent chemicals, which absorb practically all ultraviolet radiation and remit the radiation in the visible range.

**Lighting standards**

Eye responds to range of illumination ranging from 0.1lux (full moonlight night) to 1,00,000 lux (bright sunshine).

| Visual task | Illumination (Lux) |
|---|---|
| Casual reading | 100 |
| General office work | 400 |
| Fine assembly | 900 |
| Very severe tasks | 1,300-2,000 |
| Watch making | 2,000- 3,000 |

**Biological effects of lighting**

Considerable attention has been focused on the biological effects of light. The observation that daylight could cause the in vitro degradation of bilirubin is now being used as a therapeutic measure in premature infants with hyperbilibrubnemia. Other biologic effects of light include effect on biological rhythms of body temperature, physical activity, and the stimulation of melanin synthesis, the activation of precursors of vitamin D, adrenocortical secretion and food consumption.

# CHAPTER 6 Dhwani Pradooshana (Noise Pollution)

Noise is an unwanted sound, causing disturbance or annoyance to the hearer. Most of us are very used to the sounds we hear in everyday life. Loud music, the television, people talking on their phone, the traffic and even pets barking in the middle of the night. All of these have become a part of the urban culture and rarely disturb us. However, when the sound of the television keeps you from sleeping all night or the traffic starts to give you a headache, it stops becoming just noise and start turning into noise pollution. For many of us, the concept of pollution is limited to nature and resources. However, noise that tends to disrupt the natural rhythm of life makes for one solid pollutant.

By definition, noise pollution takes place when there is either excessive amount of noise or an unpleasant sound that causes temporary disruption in the natural balance. This definition is usually applicable to sounds or noises that are unnatural in either their volume or their production. Our environment is such that it has become difficult to escape noise. Even electrical appliances at home have a constant hum or beeping sound. By and large, lack of urban planning increases the exposure to unwanted sounds. This is why understanding noise pollution is necessary to curb it in time.

**Causes of Noise Pollution**

1. **Industrialization:** Most of the industries use big machines which are capable of producing large amount of noise. Apart from that, various equipments like compressors, generators, exhaust fans, grinding mills also participate in producing big noise. Therefore, you must have seen workers in these factories and industries wearing ear plugs to minimize the effect of noise.
2. **Poor Urban Planning:** In most of the developing countries, poor urban planning also plays a vital role. Congested houses, large families sharing small space, fight over parking, frequent fights over basic amenities leads to noise pollution which may disrupt the environment of society.
3. **Social Events:** Noise is at its peak in most of the social events. Whether it is marriage, parties, pub, disc or place of worship, people normally flout rules set by the local administration and create nuisance in the area. People play songs on full volume and dance till midnight which makes the condition of people living nearby pretty worse. In

markets, you can see people selling clothes via making loud noise to attract the attention of people.

4. **Transportation:** Large number of vehicles on roads, aero planes flying over houses, underground trains produce heavy noise and people get it difficult to get accustomed to that. The high noise leads to a situation where in normal people lose the ability to hear properly.
5. **Construction Activities:** Under construction activities like mining, construction of bridges, dams, buildings, stations, roads, flyovers take place in almost every part of the world. These construction activities take place every day as we need more buildings, bridges to accommodate more people and to reduce traffic congestion. The down point is that this construction equipment's are too noisy.
6. **Household Chores:** We people are surrounded by gadgets and use them extensively in our daily life. Gadgets like TV, mobile, mixer grinder, pressure cooker, vacuum cleaners, washing machine and dryer, cooler, air conditioners are minor contributors to the amount of noise that is produced but it affects the quality of life of your neighborhood in a bad way.

While this form of pollution may seem harmless, it in fact has far reaching consequences. The adverse effects on the health of the environment are quite severe. Not only is the local wildlife affected by the pollution, humans also faceas number of problems due to it.

**Loudness**- Normal conversation produces a noise of 60-85 dB. A daily exposure up to 85 dB is about the limit people can tolerate without substantial damage to their hearing.

**Effects of Noise Pollution**

1. Auditory effects
2. Non Auditory effects

**1. Auditory effects-**

a) **Auditory fatigue**- It appears in the 90dB region and greatest at 400Hz. It may be associated with side effects such as whistling and buzzing in the ears.

b) **Deafness**- The most serious pathological effects are deafness or hearing loss. The victim is generally unaware of it in early stages. The hearing loss may be temporary or permanent. Temporary hearing loss results from a specific exposure to noise; the disability disappears after a period of time up to 24 hours following the noise exposure. It occurs in frequency range between 4000 to 6000Hz. Repeated or continuous exposure to noise around 100 dB may result in permanent hearing loss. Exposure to noise above 160dB may rapture the tympanic membranes and cause permanent loss of hearing.



**2. Non Auditory effects-**

a) **Interference with speech**- Noise interferers with speech communication. In everyday life, the frequencies causing most disturbances to speech communication lie in the 300- 55 Hz range. Noise produce by road and air traffics.

b) **Annoyance**- this is primarily a psychological response. Neurotic people are more sensitive to noise than balanced people.

c) **Efficiency**- mental concentration is to be undertaken; a low level of noise is always desired. Reduction in noise has been found to increase work output.

d) **Physiological changes**- A number of temporary physiological changes occur in human body .These are a rise blood pressure, a rise in an intracranial pressure, an increase in heart rate and breathing and increases in sweating. General symptoms such as giddiness, nausea and fatigue may also occur. Noise interference with sleep, noise is also said to cause for visual disturbance.

e) Besides affecting health, noise is also a significant factor in economic losses.

**Control of Noise**

1. **Careful planning of cities-**

a. Division of the city zones with separation of areas concerned with industry and transport.

b. The separation of residential areas from the main streets by means of wide green belts.

c. Widening of main thickly planet with trees and bushes.

2. **Control of vehicles**- Heavy vehicles should not be routed into narrow streets. Vehicular traffic on residential streets should be reduced. Indiscriminate blowing of the horn and use of pressure horn should be prohibited.
3. **To improve acoustic insulation of building**- From the acoustic standpoint, the best arrangement is construction of detached building rather than a single large building or one that is continuous. Installation that produce noise or disturb the occupants within dwelling should be prohibited.
4. **Industries and railways**- Control of noise at source is possible in industries. Special areas must be earmarked, outside residential areas, for industries for railways, marshaling yards and similar installations.

5. **Protection of exposed persons-** Hearing protection is recommended for all workers who are consistently exposed to noise louder than 85 decibels in the frequency bands above 150 Hz.
6. **Legislation-** Many states are adopted legislation providing for controls which are applicable to a wide variety of sources. Worker have right to claim compensation if they have suffered a loss of ability to understand speech.
7. **Education-** No noise abatement programme can succeed without people's participation. Education through all available media is needed to highlight the importance of noise as a community hazard.

# CHAPTER 7 Vikirana (Radiation)

Radiation is the process by which radiant energy is transferred from one place to another in the form of electro-magnetic waves. He various types of radiation differ from one another by their frequency or wavelength. Higher the frequency or lower the wave-length of a radiation, higher will be its energy. Again, higher the energy of the radiation, it will cause higher damage to the living organisms.

**Source of radiation exposure**

| Natural | Man- made |
|---|---|
| 1) Cosmic rays | 1) Medical and dental - X- ray, radioisotopes |
| 2) Environmental<br>a) Terrestrial<br>b) Atmospheric | 2) Occupational exposure<br>3) Nuclear - radioactive fall-out |
| 3) Internal-<br>Potassium- 40<br>Carbon-14 | 4) Miscellaneous-<br>Television sets, radio-active dial, watches, Isotope tagged products, luminous marker. |

1. **Natural sources-** Man is exposed to natural radiation from time immemorial. Natural background radiation arises from three sources.

a) Cosmic rays- The cosmic rays which originate in outer space are weakened as they pass through the atmosphere. At ordinary living altitudes, their impact is about 35 mrad a year. At altitudes above 20 km cosmic radiation becomes important. It has been calculated that a commercial jet pilot receives about 300 mrad per year from cosmic radiation.

b) Environmental –Terrestrial radiation- radioactive elements such as thorium, uranium, radium and an isotope of potassium ($K_{40}$) are present in man's environment, e.g. soil, rocks, buildings.

c) Atmospheric radiation- the external radiation dose from the radioactive gases randon and thoron in the atmosphere is rather small.

d) Internal radiation- man is also subjected to internal radiation i.e. from radioactive matter stored in the body tissues. These radioactive materials include minute quantities of uranium, thorium, and related substances, and isotopes of potassium, strontium, and carbon.

**2. Man-made sources-**

a) X-rays- the greatest man-made source of radiation exposure to the general population at the present time is medical and dental X-rays. Two distinct group are involved.

1) patients

2) radiologists and medical technicians

b) Radioactive fallout- nuclear explosions release a tremendous amount of energy in the form of heat, light, ionizing radiation and many radioactive substances, the important being the isotopes of carbon, iodine, cesium and strontium.

c) Miscellaneous – some every day appliances T.V. sets, luminous wrist watches are radioactive. But radiation from source at present is too small to be important.

**Type of Radiation**

Ionizing radiation is applied to radiation which has the ability to penetrate tissues and deposit its energy within them. Ionizing radiation may be classified into two main groups.

1. Electromagnetic radiation- X-ray and gamma rays
2. Corpuscular radiation- alpha particles, beta particles and photons.

Alpha particles are 10 times as harmful as X-rays, beta particles or gamma rays. Alpha particles, luckily, have little penetrating force.

**Radiation units**

The activity of a radioactive material is the number of nuclear disintegration per unit of time. The unit of activity is a Becquerel (Bq); 1Bq is equal to 1 disintegration per second.

**The potency of radiation is measured in three ways**

1. **Roentgen**-It is the unit of exposure. It is the amount of radiation absorbed in air at a given point, i.e. number of ions produced in 1 ml air.
2. **Rad**- Rad is a unit of absorbed dose. It is the amount of radioactive energy absorbed per gram of tissue or any material. 1 mrad= 0.001 rad.
3. **Rem**- Rem is the product of the absorbed dose of potential danger to health. The radiation to which the average citizen is exposed is made up almost of the fast moving, highly penetrating X-rays and gamma rays, where Rem and Rad are equal.

**Biological Effects of Radiation**

The biologic effects of ionizing radiation may divided into two separate groups

1. **Somatic effects**- A dose of 400 to 500 roentgens on the whole body is fatal in about



50 per cent cases, and 600-700 in practically every case. A dose of 25-50 roentgens to the whole body was found to affect the white blood corpuscles and to produce mild lassitude and softening of the muscles. The delayed effects take time to develop: the latent period may vary from a few weeks to year. It is now fairly well established that delayed effects are mainly of three kinds: leukemia, malignant tumors and shortening of life.

2. **Genetic effects**- While somatic effects are recognized within the life span of irradiated person, genetic effects would be manifest in the more or less remote offspring. Genetic affects results from injury to chromosomes – chromosomes mutations and point mutations. Chromosome mutation is associated with sterility. Point mutation affects the genes.

**Radiation Protection and Control**

The amount of radiation received from outer space and background radiation has been estimated to be 0.1 Rad a year. Apparently, this does not at present constitute a hazard. The additional permissible dose from man–made sources should not exceed 5 rad a year. Of the man-made sources, the X-rays constitute the greatest hazard.

Preventive measures should be followed to control radioactive pollution.

1. Leakage of radioactive materials from nuclear reactors, industries and laboratories using them should be totally stopped.
2. Radioactive wastes disposal must be safe. They should be changed into harmless form or stored in safe places so that they can decay in a harmless manner. Radioactive wastes only with very low radiation should be discharged into sewerage.
3. Preventive measures should be taken so that natural radiation level does not rise above the permissible limits.
4. Appropriate steps should be taken against occupational exposure.
5. Safety measures should be taken against accidents in nuclear power plants.

# CHAPTER 8 Apadravya Nirmulana (Disposal of Solid Waste)

**Solid Waste-** The term solid waste includes garbage (food waste), rubbish (paper, plastics, wood, metal throw away containers, glasses) demolition products (bricks, masonry, pipes) sewage treatment residue, dead animals, manure and other discarded materials. It should not contain night soil. The output of daily waste depends upon the dietary habits, lifestyle, living standards and the degree of urbanization and industrialization. The per capita daily solid waste produced ranges between 0.25 to 2.5 kg in different countries.

**Types of wastes**

1. **Dry refuse or solid waste-** This includes all unwanted (or) discarded waste material arising from houses & streets & from commercial, industrial &agricultural activities of man.

It includes public & domestic refuse

1. Garbage, kitchen waste, leftover food.
2. Rubbish, waste paper, broken glass, bottles and tins, bits of metal, plastic and rags.
3. Ashes from burning wood, charcoal and cow dung fuel.
4. Animal dung.
5. Street sweepings
6. Fallen leaves
7. Dead animals

2. Wet refuse (or) liquid waste (sullage water) in a rural community consists of:
   a. Waste water from houses; after bathing, washing clothes, utensils, vegetables etc.
   b. Waste from public wells & washing places.
   c. Waste from cattle sheds & market places
   d. Waste from cottage industries such as dyeing and weaving.
3. **Excreta:** It implies faeces. The sullage water containing night soil is called sewage.

**Waste and health**

1. Hazards of refuse left lying around are:





- Breeding of flies & other insects and rats.
- Encouraging of dogs & crows.
- Growth of bacteria, and spread of infection by means of flies, dust & contamination of water supply.
- Unpleasant sights & smells.
- Danger of falls (e.g.) due to fruit skins on paths.
- Piles of refuse may be a fire hazard.

2. Hazards of liquid waste left as pools of stagnant water are:
- Mosquito breeding
- Risk of polluting water supplies
- Dampness of houses, and danger to foundations of buildings
- Bad smells

3. Improper disposal of human excreta lead to spread of disease in the following ways:
- Flies can convey germs & worm ova from faeces to food.
- Drinking water may be contaminated by infected faeces.
- Food may be contaminated by inadequate hand-washing after defecation.
- Vegetable & fruits may be contaminated with worm ova in soil or manure, and eaten raw without being washed or cooked.
- Wounds or cracks in the skin may get infected with tetanus from the faeces of man or animals in soil.

a. Bacterial diseases: Cholera, Typhoid and Paratyphoid fevers, Bacillary Dysentery.
b. Parasitic diseases: Amoebiasis, intestinal worms such as hookworm, round worm & tapeworm.
c. Virus diseases: poliomyelitis & infections hepatitis.

**Sources of refuse**

1. From street cleansing service or scavenging is called street refuse, usually contains leaves, straw, paper, animal droppings and litter of all kinds.
2. Refuse that is collected from markets called market refuse and contains large proportion of putrefied vegetables and animal matter.
3. Refuse collected from stables called stable litter and contains mainly animal droppings and left over animal feeds.
4. Industrial refuse comprises a wide variety of wastes ranging from inert materials to highly toxic and explosive compounds.

5. The domestic refuse contains ash, rubbish and garbage.

Ash- it is the residue from fire used for cooking and heating.

Rubbish-contains paper, clothing, bids of woods, metal, glass, dust and dirt

Garbage- consists of waste foods, vegetable peelings and other organic matter

**Storage**

The first consideration should be given to the proper storage of refuse while waiting for collection. A galvanized steel dustbin with closed fitting cover is suitable receptacle for storing refuse. The capacity of a bin depends upon on the number of users and frequency of collection. A recent innovation in the western countries is the paper sack. Refuse store in the paper sack and the sack is removed with the contents for disposal and the new sack is substituted. Public bins cater a larger number of people they are kept on a concrete platform raised 2 to 3 inches above the ground level to prevent flood water entering the bins.

**Collection**

The method of collection depends on funds available. House to house collection is the best method of collection the refuse. People are expected to dump the refuse in the nearest public bin in places where house to house collection is not available and usually which is not done.

**Method of Disposal**

There is no single method of disposal which is equally suitable in all circumstances. The choice of a particular method is governed by local factors such as cost on availability of land and labour. The principle methods of refuse disposal are

1. Dumping
2. Controlled tipping or sanitary land field
3. Incineration
4. Composting
5. Manure pits
6. Burial

A. **Dumping :** Refuse is dumped in low lying areas partly as a method of reclamation of land but mainly as an easy method of disposal of dry refuse. As a result of bacterial action refuse decreases in volume and converted into humus.

**Disadvantages**

1. Refuse is exposed to flies and rodents.



2. Source of nuisance from the smell and unsightly appearance
3. Loose refuse is dispersed by the action of wind.
4. Drainage from dumps contributes to the pollution of surface and ground water.

B. **Controlled tipping :** Controlled tipping or sanitary land field is the most satisfactory method of refuse disposal where suitable land is available. There are three methods are used in this operation

1. The trench method
2. The ramp method
3. The area method

1. **The trench method-** a long trench is dug out 2m to 3m deep and 4m to 12m depending upon local conditions. The refuse is compacted and covered excavated earth. Where compacted refuse is placed in the field to a depth o f2m, it is estimated that one acre of land per year will be required for 10,000 populations.
2. **The ramp method-** This method is well suited where the terrain is moderately sloping. Some excavation is done to secure the covering material.
3. **The area method-** This method is used it for filling land depressions, disused quarries and clay pits. The refuse is deposited, packed and consolidated in uniform layers up to 2 to 2.5 m deep. Each layer is sealed on its exposed surface with a mud cover at least 30 cm thick.

Chemical, bacteriological and physical changes occur in buried refuse. The temperature rises to over 60deg.C within 7days and kills all pathogens and hastens the decomposition process. Then it takes 2 to 3 weeks to cool down. Normally it takes 4 to 6 months for complete decomposition of organic matter into an innocuous mass.

C. **Incineration :** Refuse can be disposed of hygienically by burning or incineration. It is the method of choice where suitable land is not available. Hospital refuse which is particularly dangerous is best disposed of by incineration. Disposal of refuse by burning is a loss to the community in terms of the much needed manure.

D. **Composting :** It is the method of combine disposal of refuse and night soil or sludge. Its process of nature whereby organic matter breaks down under bacterial action resulting in the formation of relatively stable humus like material called the compost which has a considerable manurial value for the soil. The byproducts are Carbon dioxide, water and heat. The methods of composting are

1. Bangalore method (anaerobic method)
2. Mechanical method ( aerobic method)

1. Bangalore method : Trenches are dug 90cm deep, 1.5 to 2.5 m broad and 4.5 to 10m long depending upon the amount of refuse and night soil to be disposed of. The pits should be located not less than 800m from city limits. First layer of refuse about 15cm thick is spread on the bottom of the trench. Over this, night soil is added corresponding to a thickness of 5cm. Then alternate layers of refuse and night soil are added respectively till the heap rises to 30cm above the ground level. Within 7 days as a result of bacterial action heat is generated on the compost mass. This heat (over 60 deg. C) persists 2 to 3 weeks serves to decomposed the refuse and night soil and destroy all pathogenic and parasitic organisms. At the end 4 to 6 months, decomposition is complete and the resulting manure is well decomposed, odourless, innocuous material of high manorial value ready for application to the land.
2. Mechanical composting : The refuse is first cleared of salvageable materials such as rags, bones, metal, glass and items which are likely to interfere with the grinding operation. It is then pulverized in pulverizing equipment in order to reduce the size of particles to less than 2 inches. The pulverized refuse is then mixed with sewage, sludge or night soil in a rotating machine and incubated. The entire process of composting is complete in 4 to 6 weeks.

**E. Manure pits :** The garbage, cattle dung, straw and leaves should be dumped into the manure pits and cover with earth after each days dumping. To such pits will be needed, when one is closed, the other will be in use. In 5 to 6 months time, the refuse is converted into manure which can be returned to the field. This method of refuse disposal is effective and relatively simple in rural communities where there is no system for collection and disposal of refuse.

**F. Burial :** This method is suitable for small camps. A trench 1.5m wide and 2 m deep is excavated, and at the end of each day the refuse is covered with 20 to 30 cm earth. When the level in the trench is 40 cm from ground level, the trench is filled with earth and compacted, and new trench is dug out. The contents may be taken out after 4 to 6 months and used on the fields. 1 m length trench will be filled in about 1 week for every 200 person.

## Bio-Medical Waste Management

Biomedical waste is highly potential for infection and injury than any other type of waste. It is essential to have safe and reliable method for its handling. It may also include waste associated with the generation of biomedical waste that visually appears to be of medical or laboratory origin. (e.g. packaging, unused bandages, infusion kits, etc.) Research laboratory waste containing biomolecules or organisms that is restricted from



environmental release.

Discarded sharps are considered biomedical waste whether they are contaminated or not, due to the possibility of being contaminated with blood and their propensity to cause injury when not properly contained and disposed of.

Waste sharps include potentially contaminated used (and unused discarded) needles, scalpels, lancets and other devices capable of penetrating skin.

It may be solid or liquid. Examples of infectious waste include discarded blood, sharps, unwanted microbiological cultures and stocks, identifiable body parts, other human or animal tissue, used bandages and dressings, discarded gloves, other medical supplies that may have been in contact with blood and body fluids, and laboratory waste.

Biomedical waste is generated from biological and medical sources and activities, such as the diagnosis, prevention, or treatment of diseases. Common generators (or producers) of biomedical waste include hospitals, health clinics, nursing homes, medical research laboratories, offices of physicians, dentists and veterinarians, home health care, and funeral homes.

Any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological and including categories as mentioned in schedule 1

**Definition**- According to Bio-Medical Waste (Management & Handling) Rules, 1998 of India, Bio Medical Waste means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals, or in research activities pertaining there to or in the production or testing of biological, and including categories.as mentioned in schedule I in table.

| Option | Waste category | Treatment and disposal |
|---|---|---|
| Category 1 | Human anatomical waste (human tissues, organ, body parts) | Incineration burial |
| Category 2 | Animal waste (animal tissues, organs, body parts, carcasses, bleeding parts, fluids) | Incineration burial |
| Category 3 | Microbiology and biotechnology waste (waste from laboratory cultures, stocks or specimens of micro-organism, live or attenuated vaccines) | Local autoclaving microwaving incineration |

| | | |
|---|---|---|
| Category 4 | Waste sharps (needles, syringes, scalpels, blades, glass, etc. that may cause puncture and cuts) | Disinfection (chemical treatment/ autoclaving/ Microwaving and mutilation shredding) |
| Category 5 | Discarded medicines and cytotoxic drugs (waste comprising of out-dates contaminated and discarded medicines) | Incineration/ drug disposal in secured landfills |
| Category 6 | Solid waste (items contaminated with blood, fluids including cotton, dressing solid plaster casts, linens, beddings) | Incineration/autoclaving/ Microwaving |
| Category 7 | Solid waste (waste generated from disposable items other than the waste sharps such as tubing, cath-eters, intra venous sets etc.) | Disinfection by chemical treat-ment/autoclaving/ microwaving/ mutilation/shredding |
| Category 8 | Liquid waste (waste generated from laboratory and washing, cleaning, housekeeping and disinfecting activities) | Disinfection by chemical treatment (discharge into drains) |
| Category 9 | Incineration ash (ash from incin-eration of any biomedical waste) | Disposal in municipal landfill |
| Category 10 | Chemical used in production of biological, chemical used in disin-fection, as insecticides etc. | Chemical treatment/ discharge in to drains for liquid and secure landfills for solids |

**Sources of health care waste**

The institutions involved in generation of bio medical waste are:

1. Government hospitals
2. Private hospitals
3. Nursing homes
4. Physician's clinic
5. Dentist's clinic
6. Dispensaries
7. PHC
8. Medical research centers
9. Mortuaries
10. Blood banks and collection centers
11. Animal house
12. Slaughter house
13. Laboratories
14. Research organization
15. Vaccinating centers
16. Bio technology institutions



**Health hazards of health care waste**

Exposure to health care waste can result in disease or injury due to one or more of the following characteristics,

1. Contains infectious agents
2. Contains toxic or hazardous chemicals or pharmaceuticals
3. Contains sharps
4. It is genotoxic
5. It is radio active

**The main group at risk are :**

1. Medical doctors, nurses, health care auxiliaries and hospital maintenance personnel.
2. Patients in health care establishment.
3. Visitors to health care establishment.
4. Workers in support service allied to health care establishment such as laundries, waste handling and transportation;
5. Workers in waste disposal facilities such as landfills or incinerators including scavengers.

**A. Hazards from infectious waste and sharps :** Pathogens in infectious waste may enter the human body through a puncture, abrasion or cut in skin, through mucous membrane by inhalation or by ingestion.

**B. Hazards from chemical and pharmaceutical waste :** Many of the chemicals and pharmaceuticals used in health care establishment are toxic, genotoxic, corrosive, flammable, reactive, explosive or shock sensitive. Although present in small quantity they may cause intoxication, either by acute or chronic exposure, and injuries, including burns.

**C. Hazards from genotoxic waste :** The severity of the hazards for health care worker responsible for handling or disposal of genotoxic waste is governed by a combination of the substance toxicity itself and the extant and duration of exposure.

**D. Hazards from radioactive waste :** The type of disease caused by radioactive waste is determined by the type and extant of exposure. It can range from headache, dizziness and vomiting to many serious problems. Because it is genotoxic, it may also affect genetic material.

**E. Public sensitivity :** Apart from health hazards, the general public is very sensitive to visual impact of health care waste particularly anatomical waste.

### Treatment and disposal technologies for health care waste

**Incineration:** Incineration is a high temperature dry oxidation process that reduces organic and combustible waste to inorganic incombustible matter and results in a very significant reduction of waste-volume and weight. The process is usually selected to treat waste that cannot be recycled, reused or disposed off in a land fill site.

### Types of incinerators

Three basic kinds of incineration technology are of interest for treating health care waste.

1. Double chamber pyrolytic incinerators which may be especially designed to burn infectious health care waste.
2. Single chamber furnaces with a static grate, which should be used only if pyrolytic incinerators are not affordable.
3. Rotary kilns operating at temperatures, capable of causing decomposition of genotoxic substances and heat resistant chemicals.

### Chemical disinfection

Chemicals are added to waste to kill or inactivate the pathogens it contains, this treatment usually results in disinfection rather than sterilization. Chemical disinfection is most suitable for treating liquid waste such as blood, urine, stools or hospital sewage.

### Wet and dry thermal treatment

Wet thermal treatment: Wet thermal treatment or steam disinfection is based on exposure of shredded infectious waste to high temperature, high pressure steam, and is similar to the autoclave sterilization process.

Screw feed technology: It is the basis of a non-burn, dry thermal disinfection process in which waste is shredded and heated in a rotating auger. The waste is reduced by 80% in volume and by 20 – 35 % by weight.

### Microwave irradiation

Most microorganisms are destroyed by the action of microwave of a frequency of about 2450MHz and a wave length of 12.24 nm. The water content within the waste is rapidly heated by the microwaves and the infectious components are destroyed by heat conduction.

**Land disposal-** There are 2 types of land disposal: open dumps and sanitary landfills. Health care waste should not be deposited on or around open dumps.

Sanitary landfills are designed to have at least 4 advantages over open dumps.



Geological isolation waste from the environment, appropriate engineering preparation before the sight is ready accepting the waste, staff present on site control operation, organized deposit and daily coverage of waste.

### Inertization

The process of inertization involves mixing of waste with cement and other substances before disposal, in order to minimize the risk of toxic substances contained in the waste migrating into surface or ground water. A typical proportion of mixture is 65% medical waste, 15% lime, 15% cement and 5% water.

### Advantages & disadvantages of various treatment and disposal options

| Treatment method | Advantages | Disadvantages |
|---|---|---|
| Rotary kiln Incineration | Adequate for all infectious waste, most chemical waste, and pharmaceutical waste. | High investment and operating costs. |
| | Significant reduction of weight and volume of waste. | Concern about air emissions. |
| Controlled air Incineration | Very high disinfection efficiency. | Incomplete destruction of cytotoxics. |
| | Adequate for all infectious waste and most pharmaceutical and chemical waste. | Relatively high investment and operating costs.<br>Concern about air emissions. |
| Multiple hearth Incineration | Good disinfection efficiency. | Significant emissions of Atmospheric pollutants. |
| | Significant reduction of weight and volume of waste. | Need for periodic removal of slag and soot. |
| | The residues may be disposed of in landfills | Inefficiency in destroying thermally resistant chemicals, and drugs such as cytotoxics. |
| | No need for highly trained operators<br>Relatively low investment and operating costs. | |
| Chemical Disinfection | Highly efficient disinfection under good operating conditions. | Requires highly qualified technicians for operation of the process. |

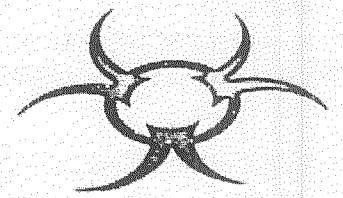
| | | |
|---|---|---|
| | Some chemical disinfectants are relatively inexpensive. | Uses hazardous substances that require comprehensive safety measures and safe disposal. |
| | Reduction in waste volume. | Inadequate for pharmaceutical, chemical and some types of infectious waste. |
| Wet thermal Treatment | Environmentally sound. | Shredders are subject to frequent breakdowns and poor functioning. |
| | Drastic reduction in waste volume. | Operation requires qualified technicians. |
| | Relatively low investment and operating costs. | Inadequate for anatomical, pharmaceutical, chemical waste and waste that is not readily steam-permeable. |
| Microwave Irradiation | Good disinfection efficiency under appropriate operating conditions.<br>Drastic reduction in waste volume. | Relatively high investment and operating costs.<br>Potential operation and maintenance problems. |
| | Environmentally sound. | |
| Chemical Disinfection | Highly efficient disinfection under good operating conditions. | Requires highly qualified technicians for operation of the process. |
| | Some chemical disinfectants are relatively inexpensive. | Uses hazardous substances that require comprehensive safety measures and safe disposal. |
| | Reduction in waste volume. | Inadequate for pharmaceutical, chemical and some types of infectious waste. |



**Colour coding and type of container for disposal of biomedical waste**

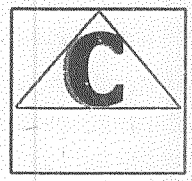
| Color Coding | Type of Containers | Waste Category | Treatment Options as per Schedule 1 |
|---|---|---|---|
| Yellow | Plastic bag | 1,2,3,6 | Incineration or deep burial |
| Red | Disinfected Container or Plastic bag | 3,6,7 | Autoclaving or Micro waving or Chemical Treatment |
| Blue or White translucent | Plastic bag or puncture proof container | 4,7 | Autoclaving or Micro waving or chemical treatment and destruction or shredding |
| Black | Plastic bag | 5,9,10 (Solid) | Disposal in secured landfill |
| Color Coding | Type of Containers | Waste Category | Treatment Options as per Schedule 1 |

**Bio-hazard Symbol**



**Bio-hazard**

**Cytotoxic Hazard Symbol**




**Cytotoxic**

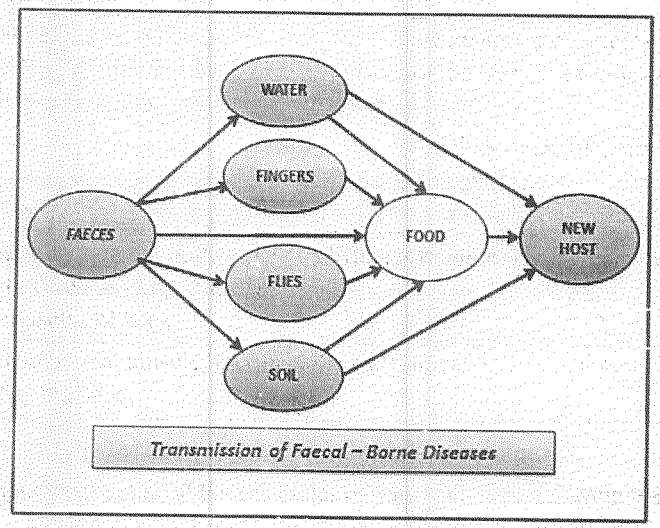
# CHAPTER 9 Mala Nishkasana Vyavastha (Excreta Disposal)

Human excreta are a source of infection. Improper excreta disposal has various health hazards, soil pollution, water pollution, contamination of foods, propagation of files and Environmental pollution, diseases spread by faecal- oral route. Disposal of human excreta assumes greater importance.

Diseases are typhoid and paratyphoid fever, dysenteries, diarrhoeas, cholera, hookworm disease, ascariasis, viral hepatitis and similar other intestinal infection and parasitic infestations. These diseases are not only burden on the community in terms of sickness, mortality and a low expectation of life, but a basic deterrent to social and economic fundamental environment health services without which there cannot be any improvement in the state of community health.

**How disease is carried from excreta-**

The human excreta of sick person or a carrier of disease is the main focus of infection. It contains the disease agent which is transmitted to a new host through various channels- 1) water, 2) fingers, 3) flies, 4) soil and 5) food.








**Methods of excreta disposal-** There are a number of excreta disposal. Some are applicable to unsewered areas, and some to sewerd areas.

**I. Unsewered Areas**

1. Service type latrines (Conservancy System)
2. Non service type (Sanitary latrines)
   a. Bore hole latrine
   b. Dug well or Pit latrine
   c. Water seal type of latrines (PRAI, RCA, Sulabh Shauchalaya)
   d. Septic tank
   e. Aqua privy
3. Latrine suitable for camps and temporary use
   a. Shallow trench latrine
   b. Deep trench latrine
   c. Pit latrine
   d. Bore hole latrine

**II. Sewered areas**

Water carriage system and Sewage Treatment

a) Primary treatment
   - Screening
   - Removal of grit
   - Palin sedimentation

b) Secondary treatment
   - Tricking filters
   - Activated sludge process

c) Other methods
   - Sea outfall
   - River outfall,
   - Sewage farming
   - Oxidation pond

**Excreta Disposal in Unsewered Areas**

1. **Service type latrines (Conservancy System) :** Night soil is removed by a human agency using a bucket or pail is called as service type or conservancy system. Night soil is transported in buckets on the head or in night soil carts manually to a disposal site. Disposal may be done through dumping, composting or burial by shallow trenching.

Night soil lying at home awaiting disposal stinks and attracts flies. The collection, transport and disposal of night soil, all perpetuate the infection cycle. Absence of manpower for this job the entire machinery collapses with dire consequences to public health. The Environmental Hygiene Committee, in 1949, that service areas must be replaced by sanitary latrines which require no service, and in which excreta can be disposed off at the site of latrine in a hygienic manner.

**2. Non service type (Sanitary latrines)**

A sanitary latrine is one which fulfils the following criteria

a) Excreta should not contaminate the ground or surface water.

b) Excreta should not pollute the soil.

c) Excreta should not be accessible to flies, rodents, animals (pigs, dogs, cattle, etc.) and other vehicles of transmission.

d) Excreta should be not creating a nuisance due to odour or unsightly appearance.

**Borehole latrines**

Borehole latrines have an auger hole instead of a dug pit and may be sunk to a depth of 10 meter or more, although a depth of 4-6 m is usual. Auger holes, 300-500 mm in diameter, may be dug quickly by hand or machine in areas where the soil is firm, stable and free from rocks or large stones. While a small diameter is easier to bore, the life of the pit is very short. For example a 300 mm hole 5 m deep will serve a family of five people for about two years.

The small diameter of the hole increases the likelihood of blockage, and the depth of the auger hole increases the danger of groundwater contamination. Even if the hole does not become blocked, the sides of the hole become soiled near the top, making fly infestation probable. However, borehole latrines are convenient for emergency or short-term use, because they can be prepared rapidly in great numbers, and light portable slabs may be used.

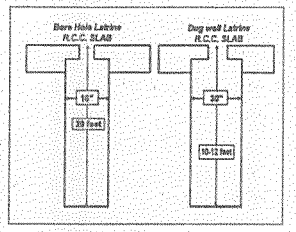
The holes should be lined for at least the top half-metre or so with an impervious material such as concrete or baked clay. Because of the small diameter and short life, the full depth is not usually lined.

**Dug well or Pit latrine**

Dug well latrine or pit latrine was first introduced in singur, west Bengal in 1949-1950. It is an improvement over the bore hole latrine. A circular pit about 75 cm. in diameter and 3 to 3.5 m deep is dug into the ground for the reception of the night soil. In sandy soil, the depth of the pit may be reduced to 1 to 1.5 m. the pit may be lined with



pottery rings, and as many rings as necessary to prevent caving in the soil may be used. A concrete squatting plate is placed on the top of the pit, and the latrine is enclosed with a superstructure.




**Advantages-**

1. It is to construct and no special equipment such as an auger is needed to dig the pit.
2. The pit has a longer life than the bore hole because of greater cubic capacity. A pit 75 cm diameter and 3 to 3.5 m deep will last for about 5 years for a family of 4 to 5 persons. When the pit of the dug well latrine is the same as bore hole latrine, i.e. anaerobic digestion.

**Water seal type of latrines (PRAI, RCA, Sulabh Shauchalaya)**

A further improvement in the designing of sanitary latrines for rural families is the hand-flashed "water seal" type of latrine. The squatting plate is fitted with a water seal. The water seal performs two important functions

1. It prevent access by files, night soil is sealed off from flies, by a small depth of water contained in bent pipe called the trap.
2. It prevents escape of odour and foul gases and thereby eliminates the nuisance from smell. Once the latrine is flushed, night soil is no longer visible. These merits have rendered the water seal type of latrine more acceptable to rural people than the bore hole latrine or pit privy without water seal. Several designs of water seal latrines have been tested in the field, and two types have gained recognition for wide use.

a. The P.R.A.I. type evolved by the Planning, Research and Action Institute, Luknow (Uttar Pradesh).

b. The RCA type, designed by the Research-cum-Action project in environment sanitation of the Ministry of Health, Government of India.

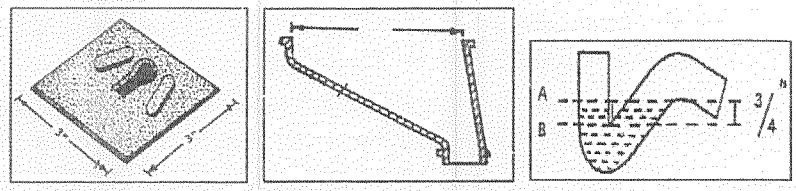
The parts of a water-seal latrine, whether RCA type or PRAI type, are essentially the same. The differences are in matter of minor engineering detail.

The essential features of a RCA latrine and its installation are described below-

**Rca Latrine**

**1. Location**-The safe distance between the latrine and a source of water supply will depend upon the porosity of the soil, level of ground water, its slope and direction of flow. In general, it may be stated, that latrines of any kind should not be located within 15 m

(50 feet) from a source of water supply, and should be a lower elevation to prevent the possibility of bacterial contamination of the water supply. Where possible, latrines should be located in areas usually subject to flooding.




Squatting Plate RCA Latrine Pan Trap

**2. Squatting Plate** - The squatting plate or slab is an important part of a latrine. It should be made of an impervious material so that it can be washed and kept clean and dry. If kept dry, it will not facilitate the survival of hookworm larvae. In recommending squatting plates, due consideration should be paid to the habits of Indian people who defecate in the squatting position and use water for anal washing. The slab of RCA latrine has been designed to meet the above needs. It is made of cement concrete with minimum dimension of 90 cm (3feet) square and 5 cm thickness at the outer edge. There is a slope ½ inch towards the pan. This allows drainage into the latrine of water used for ablution or cleansing purpose. A circular squatting plate of 90 cm diameter and 5 cm uniform thickness has also been found satisfactory. For the convenience of the users, raised footrests are included in squatting plate.

**3. Pan**- The pan receives the night soil, urine and washes water. The length of the pan is 42.5 cm. width of the front portion of the pan has a minimum of 12.5 cm and the width at its widest potion is 20 cm. there is a uniform slope from front to back of the pan. The pan is given a smooth finish.

**4. Trap**- The trap is a bent pipe, about 7.5 cm in diameter and it is connected with the pan. It holds water and provides the necessary water seal. The water seal is the distance between the level of water in trap and the lowest point in the concave upper surface of the trap. The depth of the water seal in RCA latrine is 2 cm. the water seal prevents the access by flies and suppresses the nuisance from smell.

**5. Connecting Pipe**- When the pit is dug, away from the squat plate, the trap is connected to the pit by a short length of connecting pipe 7.5 cm in diameter and at least 1meter in length with a bend at the end.

A latrine of the type is called the indirect type because the pit is sited away from the squatting plate. In the direct type there is no need for a connecting pipe. The direct type



is best suited for areas where the ground is hard and does not easily cave in. the direct type is cheaper and easier to construct and occupies less space.

An advantage with the indirect type is that when the pit fills up, a second pit can be put into operation by merely changing the direction of the connection pipe. Therefore, the indirect type is usually preferred.

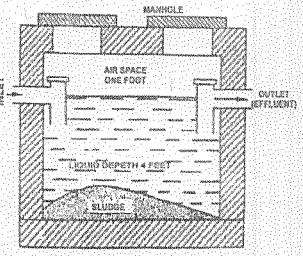
**6. Dug well**- The dug well or pit is usually 75 cm in diameter and 3 to 3.5 meter deep and is covered. In loose soil and where the water table is high a lining of earthenware rings or bamboo matting can be used to prevent caving in of the pit. When the pit fills up, second pit is dug nearby and the direction of the connecting pipe is changed into the second pit. When the second pit fills up the first one may be emptied and reused.

**7. Superstructure** - The desired type of superstructure may be provided for privacy and shelter. An attractive superstructure with a neat finish is desirable as this will be generally well maintained.

**8. Maintenance** - The life of a latrine will depend up on several factors such as care in usage and maintenance. The latrine should be used only for the purpose intended and not for disposal of refuse or other debris. The squatting plate should be washed frequently and kept clean and dry. People should learn to flush the pan after use with adequate quantity of water. One to two litres of water are sufficient to flush the RCA latrine. Proper maintenance involves health education of people which is very necessary for the success of any latrine programme.

## Septic Tank

The septic tank is water-tight masonry tank into which household sewage is admitted for treatment. It is a satisfactory means of disposing excreta and liquid waste from individual dwelling, small group of houses and institutions which have adequate water supplies but do not have access to a public sewage system.




Septic tank

## Design Features

There are various designs in tanks. Some are double chambered and some single chambered. A single chambered septic tank has been found satifactory for small installations. Tanks wit more than two compartments are expensive and have shown little advantages over the two or multiple chambered septic tank.

The main design features of a septic tank are as follows :

1. Capacity- the capacity of septic tank will depend upon the number of user. A capacity

of 20-30 gallon or 2 ½ -5 c. ft. per person is recommended for household septic tanks. The minimum capacity of a septic tank should be at least 500 gallons. Septic tanks are not recommended for large communities.

2. Length- The length is usually twice the breadth.
3. Depth- The depth of septic tank is from 1.5 to 2 m.
4. Liquid depth- The recommended liquid depth is only 1.2 m.
5. Air space- There should be a minimum air space of 30 cm between the level of liquid in the tank and undersurface of the cover.
6. Bottom- In some septic tanks, the bottom is sloping towards the inlet end. This facilities retention of solids.
7. Inlet and outlet- There is an inlet and outlet pipe, which are submerged.
8. Cover- The septic tank is covered by a concrete slab of suitable thickness and provided with a manhole.
9. Retention period- Septic tanks are designed in this country to allow a retention period of 24 hours. Too long a retention period will result in undue septicity of the effluent whereas too short a period gives insufficient treatment.

**Working of septic tank**

The solid settle down in the tank, to form "sludge", while the lighter solid including grease and fat rise to the surface to form "scum". The solid are attracted by the anaerobic bacteria and fungi and are broken down into simpler chemical compounds. This is the first stage of purification, called anaerobic digestion. The sludge is much reduced in volume as a result of anaerobic digestion, and is rendered stable and inoffensive. A portion of solids is transferred into liquids and gases which rises to the surface in the form of bubbles.

The liquid which passes out of the outlet pipe fromtime to time is called the "effluent". It contains numerous bacteriae, cysts, helminthic ova and orgaic matter in solution or fine suspension. The effluent is allowed to percolate into the sub-soil. It is dispersed by means of perforated or open-jointed pipes laid in treches 90 cm deep and the treanches are then covered with soil. The effluent percolates into the suurounding soil. There are millions of aerobic bacteria in the upeer layers of the soil, which attack the organic matter present in the effluent. As a result, the organic matter is oxidized into stable end-products, i.e. nitrates, carbon dioxide and water. This stgae of purification is called aerobic oxidation.

To sum up, two stages are involved in the purification of sewage. The first stage, anaerobic digestion takes place in the septic tank proper, and the second stage, aerobic oxidation takes place outside the septic tank, in the subsoil, together, these two stages complete the purification of sewage.



**Operation and Maintenance**

1. The use of soap water and disinfectants such as phenol should be avoided as they are injurious to the bacterial flora in the septic tank.
2. Undue accumulation of sludge reduces the capacity of the septic tank and interferes with proper working. Therefore, the contents of septic tank should be bailed out at least once a year. This operation is called "desludging". The bailed out sludge is disposed of by treaching.
3. Newly built septic tanks are first filled with water up to the outlet level and then seeded with ripe sludge drawn from another septic tank, to provide the right type of bacteria to carry out the decomposition process.

**Aqua Privy**

The aqua privy function like a septic tank and has been used in different regions in the country. The privy consists of a water-tight chamber filled with water. A short length of a drop pipe from the latrine floor dips into water. The shape of the tank may be circular or rectangular. The size of the tank depends upon the number of users. A capacity of one cubic metre is recommended for a small family, allowing 6 years or more for cleansing purpose. Aqua privies are designed for public use also.

Night soil undergoes purification by anaerobic digestion. Since there is evolution of gases, a vent should be provided for the escape of gases into the atmosphere, the vent be open above the roof of dwellings. The effluent is far from innocuous. It contains finely divided faecal matter in suspension and may carry parasitic and infective agents. It should be treated in the same manner as the effluent from a septic tank by sub-soil irrigation or absorption. The digestion sludge which accumulates in the tank should be removed at intervals.

**Sulbh Shauchalaya**

The "Sulabh Shauchalaya" model, the invention of a Patna-based firm, is a low cost pour-flush, water-seal type of latrine, which is now being used in many parts of India. Basically it is an improved version of the standard hand flush latrine (e.g. RCA type). It consists of a specially designed pan and water-seal trap. It is connected to a pit 3 feet square and as deep. Excreta undergo bacterial decomposition and are converted to manure. The method requires very little water. Sulabh international, the investors, not only build but also maintain the system of Sulabh community latrines. Their usual structure

is a lavatory block of several dozen seats, with a bathing block adjoining. The system is to charge Rs.2 per user. Recently Delhi has opted for this system in all its slums. This system has drawn parse from ecologists and planners.

**Chemical closet**

It has very limited use under Indian conditions. The closer consists of a metal tank containing a disinfectant fluid. The active ingredients of the fluid are formaldehyde and quaternary ammonium compounds. In addition, a harmless water dye and deodorizing substance are usually incorporated. A seat with cover is placed directly over the tank. Nothing except the toilet paper should be thrown into chemical closet.

**Shallow trench latrine-**

A simple improvement on open defecation fields is to provide shallow trenches in which people can defecate. This allows users to cover faeces and improves the overall hygiene and convenience of an open defecation system. The trench is 30 cm. wide and 90-150 cm deep. Its length depends on the number of users: 3-3.5 m are necessary for 100 people. Separate trench should provide for men and women. The earth from the trench should be piled up at the side. People should be instructed to cover feaces with earth each time they use the latrine.

These instructions may not be carried out, and it will be necessary to post sweeper in attendance to this work. Ablution water should be provided.

Advantages: Rapid to implement (one worker can dig 50m of trench per day); faeces can be covered easily with soil.

Constraints: Limited privacy; short life-span; considerable space required.

**Deep trench latrine**

Deep trench latrines are often constructed in the immediate stage of an emergency and will be appropriate if there are sufficient tools, materials and human resources available. The trench is 1.8 to 2.5 m deep and 75-90 cm wide. Depending upon the local customs, a seat or a squatting plate is provided. A superstructure is built for privacy and protection. Other requirements are the same as for shallow trench latrine.

**Water carriage system**

The water carriage system or sewage system implies collecting and transporting of human excreta and waste water from residential, commercial and industrial areas, by a network of underground pipes, called sewers to the place of ultimate disposal. It is the method of choice for collecting and transporting sewage from cities and towns where population density is high. There are two types in water carriage system. The combined sewer system and separate sewer system.



**Combined sewer system-** the sewer carries both the sewage and surface water.

**Separate sewer system-** surface water is not admitted into sewer. Separate system is considered the system of choice today. Although the first sewers were laid in 1867 in Calcutta, the Mudaliar Committee reported that not more than 15 per cent of urban population in India had the amenity of a sewerage system.

**Elements of water carriage system**

1. Household sanitary fitting(plumbing system of building)
2. House sewers
3. Street sewer or trunk sewers
4. Sewer appurtenances- manhole traps, etc.

**1. Household sanitary fitting-** Where sewers exist, every house is expected to be connected to the nearest sewer. The usual household sanitary fitting are, Water closet, urinal and wash basin.

**Water closets-** It may be broadly divided into two types- Indian squatting type and Western commode type. An ideal water closet is recommended that for efficient performance.

a. The water seal area should not be more than 7.5 cm.
b. There should not be any sharp corners in the tarp design.
c. The volume of water in trap should be as little as possible, preferably not exceeding 1.75 litres to maintain a minimum of 50 mm deep water seal.
d. Interior of the bowl should be vertical at least 50-75 mm just above the surface of water seal.

The water closets are provided with a flushing rim. Human excreta is directly received into the water in the closet without soiling the sides. The flushing removes all trace of excreta from the side and keeps the closet clean. The closet is connected to a small cistern by a pipe 2.5 to 3.75 cm. in diameter. The flushing cistern normally holds 15 litres of water and works by symphonic action the flushing cistern can be classified as high level, low level and integrated depending upon the height of location above the water closet bowl or pan. The Indian squatting type W.C. pans are used with high level flushing cisterns.

**House drain-** The house drain is usually 10 cm in diameter and is laid in the courtyard about 15 cm below the ground level on a bed of cement concrete with sufficient gradient towards the main drain. The house drain empties the sewage into the main sewer or public drain.

Public sewer- The trunk sewers are not less than 22.5 cm in diameter; bigger ones may be 2 to 3 m in diameter. They are laid on bed cement concrete, about 3 m below the ground level, with sufficient gradient to ensure what is known as "self- cleansing" velocity; this varies from 2 to 3 feet per second. The trunk sewers collect sewage from several houses and transport to the main outfall or place of final disposal.

**Sewer appurtenances**

These are manhole and traps which are installed in the sewerage system.

**Manholes-** manholes are opening built into the sewerage system. They are placed whenever there is a change in direction of sewers, at meeting point of two or more sewers, at distance of 100 meters in long straight runs. These opening permit a man to enter the sewer for inspection, repair and cleaning. Workers entering the manholes are liable to gas poisoning and asphyxiation. Due precautions should be taken to ensure their safety.

Traps are of various kinds, these are devices designed to prevent foul gases entering the houses and remove sand, grit and grease from sewage. Traps are are placed in three situation.

a) Under the basin of water closets,
b) Where the house drain join the public drain,
c) Where surface waste water enters the drains.

**Sewage**

Sewage is waste water from a community, containing solid and liquid excreta, derived from houses, street and yard washing, factories and industries. It resembles dirty water with an unpleasant smell. The term "sullage" is applied to waste water which does not contain human excreta, e.g. waste water from kitchens and bathrooms. The amount of sewage that flows from sewers depends upon.

a) Habits of the people- if people use more water, there will be more sewage.
b) Time of day- Sewage does not flow uniformly throughout the day.

It is subject to variations depending upon the time of the day and during different seasons. In the morning, when people tend to use more water there is greater quantity and flow; in mid-day the flow is less and again there is slight increase in evening. The average amount of sewage which flows through the sewerage system in 24 hours is calledthe "dry weather flow".

**Health aspects-** Sewage create environment problems,

a. Creation of nuisance, unsightliness and unpleasant odours.



b. Breeding of flies and mosquitoes.
c. Pollution of soil and water supplies.
d. Increase in the incidence of disease, especially enteric and helminthic diseases.

**Composition of Sewage**

Sewage contains 99.9 per cent of water. The solids which comprise barely 0.1 per cent are partly organic and partly inorganic. They are partly in suspension and partly in solution. The offensive nature of sewage is mainly due to the organic matter which it contains. The organic matter decomposes according to the laws of the nature during which process it gives off offensive odours. In addition, sewage is charged with numerous living organisms derived from faces, some of which may be agents to disease. It is estimated that one gram of faeces may contain about 1,000 millions of E.coli, 10 to 100 million of faecal streptococci, and 1 to 10 million spores of Cl. Perfringens besides several others. The average adult excretes daily some 100 grams of faeces.

**Aim of sewage purification**

Raw sewage or inadequately treated sewage should not be discharged into rivers, sea or other source of water supply. This is because, the oxygen in the water supply is used up by the numerous aerobic bacteria found in the sewage. Depletion of oxygen may lead to the death of the plant and animal life in water. Furthermore, the water may yield an offensive smell because of the release of hydrogen sulphide.

The aim of sewage treatment is to "stabilize" the organic matter so that it can disposed off safely; and convert the sewage water into an effluent of an acceptable standard of purity which can be disposed off in to land, rivers or sea. A standard test which is an indicator of the organic content of the sewage is biochemical oxygen demand (BOD).

**Biochemical oxygen demand (BOD)**

It is the most important test done on sewage. It is defined as the amount of oxygen absorbed by a sample of sewage during a specified period, generally 5 days, at a specified temperature, generally 20 deg. C for aerobic destruction or use of organic matter by living organism. BOD values range from about 1 mg per litre for natural waters to about 300 mg per litre for untreated domestic sewage. If BOD is 300 mg/L and above, sewage is said to be "strong"; if it is 100mg/L it is said to be "weak".

**Chemical oxygen demand (COD)**

The COD test measure the oxygen equivalent of that portion of the organic matter in a sample which is susceptible to oxidation by a strong chemical oxidiser. If wastes contain

toxic substances, this test may be the only practical method for determining the organic load.

**Suspended solids**

The suspended solids are yet another indicator of the "strength" of sewage. The amount of suspended solids in domestic sewage may vary from 100 to 500 p. p. m. (mg/L). If the amount of suspended solids is 100mg/L, the sewage is said to be weak if amount is 500mg/L the sewage is said to be strong.

**Decomposition of organic matter**

**Aerobic process-** it is the most efficient method of reducing the organic matter in sewage. The process requires a continuous supply of free dissolved oxygen. The organic matter is broken down into simple compounds namely $CO_2$, water, ammonia, nitrites and sulphates by the action of bacterial organisms including fungi and protozoa.

**Anaerobic process-** Where the sewage is highly concentrated and contains plenty of solids, the anaerobic process is highly effective. The end-product of decomposition are methane, ammonia, $CO_2$ and $H_2$. In anaerobic decomposition, the reaction are slower and the mechanism of decomposition extremely complex.

**Modern sewage treatment**

Modern sewage treatment plants are based on biological principles of sewage purification, where the purification is brought about by the action of anaerobic and aerobic bacteria. The treatment of sewage may divide into to stages, primary treatment and secondary treatment. Primary treatment, the solids are separated from the sewage to anaerobic digestion which is the first stage in purification; in secondary treatment, the effluent is subjected to aerobic oxidation, which is the second stage in purification.

**a) Primary treatment-**

**1. Screening-** Sewage arriving at a disposal work is first passed through a metal screen which intercepts large floating objects such as pieces of wood, rags, masses of garbage and dead animals. Their removal is necessary to prevent clogging of the treatment plant. The screen consists of vertical or inclined steel bars usually set 5 cm apart. In some plants, the screens are of the fixed type while in others, the screens are of the moving type. The screenings are removed from time to time either manually, and disposed off by trenching or burial.

**2. Grit chamber-** Sewage is then passed through a long narrow chamber called the grit chamber or detritus chamber. This chamber is approximately 10 to 20 metres in length; it is so designed as to maintain a constant velocity of about 1 foot per second, with



a detention period of 30 seconds to 1 minute. The function of the grit chamber is to allow the settlement of heavier solids such as sand and gravel, while permitting the organic matter to pass through. The grit which collects at the bottom of the chamber is removed periodically or continuously, and disposed off by plain dumping or trenching.

**3. Primary sedimentation-** Sewage is now admitted into a huge tank called the primary sedimentation tank. It is a very large tank, holding from ¼ to 1/3 the dry weather flow. There are commonest is the rectangular tank. Sewage is made to flow very slowly across the tank at velocity of 1-2 feet per minute. The sewage spends about 6-8 hours in the tank. During this long period of relatively still conditions in the tank, a very considerable amount of purification takes place mainly through sedimentation of suspended matter. Nearly 50-70 per cent of the solids settle down under the influence of gravity. A reduction of between 30 to 40 per cent in number of coli form organisms is obtained. The organic matters which settle down is called sludge and is removed by mechanically operated devices, without disturbing the operation in the tank. While this is going on a small amount of biological action also takes place in which the micro-organisms present in the sewage attack complex organic solids and break them down into simpler soluble substances and ammonia. A certain amount of aft and grease rise to the surface to form scum which removed from time to time and disposed of. When the sewage contains organic trade wastes, it is treated with chemical such as lime, aluminium sulphate and ferrous sulphate. Addition of one of these chemicals precipitates the animal protein material quickly.

**b) Secondary treatment-** The effluent from the primary sedimentation tank still contains a proportion of organic matter in solution or colloidal state, and numerous living organisms. It has a high demand for oxygen and can cause pollution of soil or water. It is subjected to further treatment, aerobic oxidation, by one of the following methods.

**1. Trickling filter method-** The trickling filter or percolating filter is a bed of crushed stones or cinker, 1 to 2 m deep and 2 to 30 m in diameter, depending upon the size of the population. The effluent from the primary sedimentation tank is sprinkled uniformly on the surface of the bed by a revolving device. The device consists of hollow pipes each of which have arrow of holes. The pipes keep rotating, sprinkling the effluent in thin film on the surface of the filter. Over the surface and down through the filter, a very complex biological growth consisting of algae, fungi, protozoa and bacteria of many kinds occurs. This is known as the "zoogleal layer". As the effluent percolates through the filter bed, it gets oxidized by bacterial flora in zoogleal layer. The action of the filter is thus purely a biological one and not one filtration as the name suggests. The term "filter" is a misnomer. The trickling filters are very efficient in purifying sewage. They do not need rest

pauses, because wind blow freely through the beds supplying the oxygen needed by the zoogleal flora. The biological growth or zoogleal layer lives grow and dies. The dead matter sloughs off, breaks away and is washed down the filter. It is a light green, flocculent material and is called "humus". The oxidized sewage is now led into the secondary sedimentation tank or humus tanks.

**2. Activated sludge process-** Activated sludge process is the modern method of purifying sewage, in place of the trickling filter. The "heart" of the activated sludge process is the aeration tank. The effluent from the primary sedimentation tank is mixed with sludge drawn from the final settling tank (also known as activated sludge or return sludge; this sludge is rich culture of aerobic bacteria). The proportion of activated sludge to the incoming effluent is of the order of 20 to 30 per cent. The mixture is subjected to aeration in the aeration chamber for 6 to 8 hours. The aeration is accomplished either by mechanical agitation or by forcing compresses air continuously from the bottom of aeration tank. This latter method, also as 'diffuse aeration' is considered a better method of aeration. During the process of aeration, the organic matter of the sewage gets oxidized into carbon dioxide, nitrates and water with the help of aerobic bacteria in activated sludge. The typhoid and cholera organisms are definitely destroyed, and the coli forms greatly reduced. Activated sludge plants occupy's less space, require skilled operations. One acre of activated sludge plant does the work of 10 acres of percolating filter. Activated sludge process is therefore, best suited for large cities and the percolating filter for smaller towns because they are cheaper to install and easier to operate.

**Secondary sedimentation**

The oxidized sewage from the trickling filter or aeration chamber is led into the secondary sedimentation tank where it is detained for 2-3 hours. The sludge that collects in the secondary sedimentation tank is called 'aerated sludge' or activated sludge, because it is fully aerated. It differs from the sludge in the primary sedimentation tank in that it is practically inoffensive and is rich in bacteria, nitrogen and phosphates. It is valuable manure, if dehydrated. Part of the activated sludge process and the rest pumped into the sludge digestion tanks for treatment and disposal.

**Sludge digestion**

One of the greatest problems associated with sewage treatment is the treatment and disposal of the resulting sludge. One million gallons of sewage produces 15-20 tons of sludge. The sludge is thick, black mass containing 95 per cent of water, and it has a revolting odour. There are a number of methods of sludge disposal

a) **Digestion-** Modern sewage treatment plants employ digestion of sludge as the



methods of treatment. If sludge is incubated under favorable conditions of temperature and pH, it undergoes anaerobic auto- digestion in which complex solids are broken down into water, carbon dioxide, methane and ammonia. The volume of sludge is also considerably reduced. It takes 3-4 weeks or longer for complete sludge digestion. The residue is in-offensive, sticky and tarry mud which will dry readily and form excellent manure. Sludge digestion is carried out in special tanks known as "sludge digestion tanks". Methane gas, which is a byproduct of sludge digestion, can use for heating and lighting purposes.

**b) Sea disposal-** Sea coast town and cities can dispose of sludge by pumping it into the sea.

c) Land Sludge can be disposed of by composing with town refuse.

**Disposal of effluent**

**1. Disposal by dilution-** Disposal into water courses such as rivers and streams is called 'disposal by dilution'. The effluent is diluted in the body of water and the impurities are oxidized by the dissolved oxygen in water. The diluting capacity of the river or the receiving body of water and its dissolved oxygen contents, are important considerations before discharging the effluent into a river or any body of water. Since people use river water for drinking purpose, the effluent must be rendered free from pathogenic organisms by adequate chlorination. The royal commission in England in fifth report in 1908 recommended that an effluent from a sewage treatment plant should be not have more than 30 mg/ litre of suspended solids and the 5 day B. O. D. of the effluent including the suspended matter. Should not exceed 20 mg/ litre. These standards assumed that the river or body of water into which the effluent passed would provide an 8:1 dilution. These standards have been the backbone of subsequent work on the purity of sewage effluent. During the past few years, industry has developed hundred of new chemicals which are released into the sewerage system. Some of these chemicals are not removed by biological treatment. Consequently, the effluent may contain substances toxic to man, or substances that can kill fish, damage agriculture or interfere with the normal functioning of a stream. In many places in the UK, effluent standards have been raised from the original royal commission values of 30 mg per litre of suspended solids and 20 mg per litre of B.O.D. to 10 mg per litre of each. The world health organization is seized with this problem, and is fostering research in "tertiary' methods of treatment or "polishing" the effluent further.

**2. Disposal on land-** if suitable land is available the effluent can be used for irrigation purposes.

**Other methods of sewage disposal**

a. Sea outfall
b. River outfall
c. Land treatment
d. Oxidation ponds
e. Oxidation ditches

**Sea out fall-** Sea coast town and cities may dispose of their sewage by discharging it into the sea. For instance, nearly two-thirds of untreated sewage of greater Mumbai is discharged every day into the Arabian Sea. Purification takes place by dilution in the large body of sea water, and the solids get slowly oxidized. The drawback of this that the offensive solid matter may be washed back to the shore and create public nuisance. In order to prevent this, the sewage outfall is designed to discharge the sewage into deep water at many points.

**River out fall -** Raw sewage should never be discharged into rivers. The present day practice is to purify the sewage before it is discharged into rivers. How far the sewage should be purified depend upon the dilution the river provides to carry on aeration and self- purification.

**Land treatment - (sewage farming)**

If sufficient and suitable land is available, sewage may be applied to the land grit removal, screening and a short period of settlement. This type of treatment is practiced in some Indian town and cities and is known as sewage farming or broad irrigation. An acre of land would be required to treatment to treat the sewage of 100-300 persons. The land is first laid into ridges and furrows. Sewage is fed into the furrow intermittently and crops are grown on the ridges. The crops that are found suitable to grow are those which do not come in contact with sewage and likely to be eaten raw. Fodder grass and potatoes seem to be the most paying crops fruit trees whose fruits are high above the ground can be grown. But sugar cane, coriander, cucumber, tomato, onion, etc. should not be possible to operate the sewage farms. Badly managed farms stink, a condition described as "sewage sickness" because of lack of sufficient aeration and rest pauses to the land. Alternate methods of disposal may have to be provided during thc rainy season.

**Oxidation Pond**

A cheap method of sewage treatment is the oxidation pond which has been referred to by many different names- waste stabilization pond, redox pond, sewage lagoons, etc. the term "waste stabilization pond" is more appropriate. The term waste includes both



sewage and industrial wastes. Although an old method of purifying sewage, oxidation pond has attracted the attention of public health engineers only recently,. Over 50 ponds are working at present in India. The first large scale installation was the one at Bhilai where it serves a population of 1 lakh.

The oxidation pond is an open, shallow pool 1 to 1.5 m. deep with an inlet and outlet. To qualify as an oxidation pond, there must be the presence of algae, certain types of bacteria which feed on decaying organic matter and sunlight.

The organic matter contained in the sewage is oxidized by bacteria to simple chemical compounds such as carbon dioxide, ammonia and water. The algae, with the help of sunlight, utilize the carbon dioxide, water and inorganic minerals for their growth, thus there is a mutually beneficial biological balance between the algae and bacteria in oxidation ponds. Oxygen that is the needed for oxidation is derived to small extent from the atmosphere but mostly from the algae which liberates oxygen under the influence of sunlight. Sunlight is an important factor in the proper function of oxidation ponds. Clouds weather definitely lower the efficiency of the process.

**Oxidation ditches**

Other methods recommended are oxidation and aerated lagoons. These methods make use of mechanical rotors for extended aeration. For treatment of the waste of a population between 5,000 to 20,000 an oxidation ditch requires an area of one acre as compared to 22 acre for an oxidation pond and 2.5 acres for an aerated lagoon. These are low-cost treatment methods for the purification of sewage.

# CHAPTER 10 Disposal of Dead Body

The need to properly dispose of a dead body has been a feature of human society for millennia. Everyone is afraid of dead bodies, all religions have viewed the dead as the transitory stage of a permanent life to begin, the life after which is eternity.

Disposal of dead body is the practice and process of dealing with the remains of a deceased human being. Several methods for disposal are practiced. In many cases, the manner of disposal is dominated by spiritual concerns and a desire to show respect for the dead, and may be highly ritualized. Many religions as well as legal jurisdictions have set rules regarding the disposal of corpses.

Disposal of dead is done by various methods :

1. Incineration
2. Burial
3. Water submersion
4. Cannibalism
5. Body donation
6. Body world display
7. Left to be eaten away by vultures/Ariel burial
8. Hydrolysis/dissolution
9. Freezing with liquid nitrogen

**The most common methods of disposal are :** Burial of the entire body in the earth, often within a coffin.

Cremation- which burns soft tissue and renders much of the skeleton to ash. The remains, known as "cremains" may contain larger pieces of bone which are ground in a machine to the consistency of ash. The ashes may be stored in an urn or scattered on land or water.

**Religious and other methods of disposal of dead**

**Buddhism** teach that the dead bodies should be burnt to release the soul which is bad with the hope that they will be reincarnated into a better one

**Christianity,** especially the Orthodox Church - Teaches that the human body will rise at the second coming of the Lord, to Attain the blessedness of the heavenly kingdom





together with soul or to suffer the result of rejecting God. Therefore we must respect the body even after death. Respect is shown burying the body and not, to burning it.

**In Hinduism-** The dead body is considered to be symbol of great impurity, hence minimal physical contact with the dead body is maintained, perhaps to avoid the spread of infections or germs. They burn the body after death. Believing that body is made up from five elements, Panchbhuta; fire, water, air, earth and sound/ether. After burning the remains are spread out in the rivers- water disposal.

**In Zoroastrians (Ariel burial)** -Fire is considered as god, which is pure. The dead body is impure; they don't want to mix the impure body with the fire. They leave their dead bodies on the top of their temples, to be eaten away by vultures. They believe it is meant for them and they were created for eating the human flesh. Ariel burial is done.

Zoroastrians (known in India as Parsis)-Regard sky burials, in which the bodies are exposed to natural elements including vultures in open-topped "Towers of Silence."

**Cannibalism-** It is prevalent in Brazil, Africa and parts of India. The dead body is eaten while burning; the Aghori sect in India eats human flesh.

**Disposal by water submersion-** Recently after the Abbottabad episode the body was disposed of by water submersion. It may happen when an aero plane crash occurs over the oceans; all bodies were washed out or eaten away by sharks or whales. The body decomposition occurs faster in water rather than during earth burial.

**Body donation** is another way of disposal of body. It is done for the learning and research of medical fraternity. It is a great service for humanity, during life the person is allowed to donate his/her body after their death to a nearby medical hospital or college/ research centre. The body is utilized for preparing future doctors/professionals, after being embalmed. RAKCOMS has a plan to start body donation program, another first mile stone to be laid down by RAKMHSU in U.A.E.

**Body world display** - It is also another way of disposal/ usage of dead. The dead body is preserved by means of plastination process of the entire body after performing desired dissection and attaining different positions and postures. It takes 1000 to 1500 human hours to prepare a body by plastination. The water content of the human body is removed by dehydration and replaced by plastiene substance which prevents decomposition and bacterial infection.

**Hydrolysis or dissolution-** Disposing of human bodies in a lye solution dissolves tissues into a sterile, syrupy substance that can be safely flushed down a drain. The process, known as alkaline hydrolysis is made use of in the disposal of cadavers. The University of Florida at Gainesville and the Mayo Clinic in Rochester, Minn. the hydrolysis is used to dispose of the cadavers.

**Freezing in liquid nitrogen-** It involves freezing the body, dipping it in liquid nitrogen and gently vibrating it to shatter it into powder. The technique was conceived by a Swedish biologist, Susanne Wiigh-Masak, who said: "Mulching was natures original plan for us, and that's what used to happen to us at the start of humanity - we went back into the soil.

**The most common forms of disposal are burial and cremation.**

**Burial-** Burial usually involves interring the remains in soil that is in a grave in cemetery or churchyard; the term can also refer to any method used to remove the dead body from sight. In earlier times, this may have involved placing the body in a cave or underground burial barrow designed for the purpose. In ancient societies, bodies, especially those of important members of society, might be buried in flamboyant tombs-the most famous of which are the pyramids of ancient Egypt. Other notable forms of burial are bodies interred in catacombs found particularly in Italy but also in other countries in Europe and South America. Catacombs are narrow underground tunnels with built in niches or shelves where the bodies are placed. The most famous catacombs are located in Rome.

In the old days of the Wild West in the United States, one was buried "6 feet under with his boots on." It is true that graves were 6 feet deep in earlier periods of U.S. history. Today graves less than 6 feet deep-typically 4 and 1/2 feet with 18 inches of soil above the top of the casket.

**Burning/ cremation**

Cremation is the burning of the human body until its soft parts are destroyed by fire. The skeletal remains and ash residue (cremains) often becomes the object of religious rites, one for the body and one for the bones.

Cremation is an ancient form of bodily disposal that has been used across the world for the last 20,000 years. Cremation uses heat to dispose of the corpses of the dead. In some culture and religious traditions, this is achieved by placing the body on a pyre (a flammable heap of wood and other materials) and setting fire to it. Western societies, cremation uses technology to burn the body in a furnace powered by gas or electricity and takes place in a building designed for purpose a crematorium.

**Electric Cremation-**

The concept of electric cremation is not new. It was commissioned in January 1989 as a part of the Ganga Action Plan. The basic idea was to serve the purpose of river friendly cremation. In order to tackle environmental pollution, electric crematoriums are



set up in various parts of the country, especially in the metro cities and are promoted by the Government, private NGOs and environmentalists. The electric system of cremation is used by certain sections of the society only.

**Advantages of Electric Cremation-**

The traditional funeral pyre requires around 500-600 kg of firewood, three litres of kerosene and some prefer ghee, and 300-400 cow dung cakes per dead body. The total costs turn around Rs. 2,000 – 3,000 in total. Mortal remains can be taken only after 24 hours. On the other hand, electric cremation is comparatively less expensive. Relatives can take the mortal remains within a few hours of cremation. In electric cremation, wood is not burned and there are no gas emissions. It is no doubt an unconventional way of cremation but it helps in saving resources like wood, kerosene, etc. It is the most economical option for funeral.

Electric cremation means saving valuable resources like trees and water and saving the environment.

# CHAPTER 11 Meteorology (Ritu evam Vatavaranajnanam)

Meteorology is the interdisciplinary scientific study of the atmosphere. The elements of Meteorological environments are atmospheric pressure, air temperature, humidity, rainfall, direction and speed of wind and movement of clouds and character of weather. The term climate is a geographical concept representing a summation of the whole range of meteorological phenomena.

**Atmosphere pressure**

The atmosphere pressure at earth's surface close to the sea level averages 760 mm of Hg. This called "one atmosphere of pressure". Man is physiologically adapted to live at 760 mm of Hg pressure or close it. The atmospheric pressure falls as attitude increases, and rises as altitude dresses. Thus at an altitude of 1 lakh feet above man sea level, the atmospheric pressure is less than 10 mm of Hg. The pressure increases at the rate "one atmosphere" for each 33 feet depth below sea level.

**Measurement-** The instruments used for measuring atmospheric pressure are known as barometers of which there are three well known kinds- Fortins Barometer, Kew Pattern Station Barometer and Barograph.

Kew pattern station Barometer is widely used by the Indian Meteorological Department for measuring the atmospheric pressure.

**Effects of atmospheric pressure on the health**

**High altitudes-** the air is less dense at higher altitudes, and consequently the partial pressure of oxygen is also less. Man cannot survive at altitude of 25,000 feet without breathing equipment. Man is exposed to low pressure; the physiological effects are increases in respiration, increase in the concentration of haemoglobin, increase in cardiac output. Two condition to sudden exposure to high altitude-

1. **Acute mountain sickness-** This is a relatively common, harmless and transient condition characterized by headache, insomnia, breathlessness, nausea, vomiting and impaired vision. It has not been conclusively proved whether all these symptoms are due to the effect of hypoxia or due to various intricate biological and hormonal disturbances in the body.



2. **High Altitude Pulmonary Oedema-** The symptoms generally appear on about the third day at high altitude and are indistinguishable from those of ordinary mountain sickness. But as pulmonary oedema develops, the patient develops a cough, and may Experience irregular or cheyne-strokes breathing, oliguria mental confusion and hallucination, stupor, seizures and coma. The condition is rare below 12, 000 feet. The condition does not respond to antibodies. The patient should be carried to lower altitudes as soon as possible.

**Low altitudes-** The atmosphere pressure increases by one atmosphere for every 33 feet depth below sea level. The greatest depths so far reached are the equivalent of 10 atmospheres. When man is exposed to high pressure, the gases in the air namely oxygen, carbon dioxide and nitrogen are dissolved in the blood and tissues proportionately to the partial pressure of these gases. Excess concentration of nitrogen excretes a narcotic action leading to loss of mental functions and consciousness; excess of carbon dioxide increases the narcotic action of nitrogen; excess of oxygen can lead to convulsions and death.

**Weather-**Weather is the condition of the atmosphere at a particular place over a short period of time. For example, on a particular day in India, the weather is warm in the afternoon. But later in the day, when there are clouds blocking Sun's rays, the weather would become cooler.

**Climate-**Climate refers to the weather pattern of a place over a long period, maybe 30 years or more, long enough to yield meaningful averages.

**Air Temperature-** The temperature of air varies in different parts of the day also in the different seasons. The factors which influence the temperature are latitude of the place, altitude, direction of the wind and proximity to sea. The temperature of the ground surface is always higher than that of the air.

**Measuremen-** Thermometers are instrument used for measuring temperature. Mercury thermometers are widely used, as mercury boils at a high temperature, has a regular expansion and its level can be easily seen. Alcohol has the advantage of not solidifying even at the lowest known temperature. The essential conditions for the use of the thermometers are that the air should have free access to the bulbs of the thermometers and the thermometer should be protecting against radiant heat.

**Effect of heat stress-** As many as 14 disorders resulting from exposure to heat have been recognises and documented.

1. **Heat stroke-** This is attributed to failure of the heat regulating mechanism. It is characterized by very high body temperature which may rise to $110^0$ F ($43.3^0$C) and

profound disturbance including delirium, convulsions and partial or complete loss of consciousness. The skin is dry and hot. Classically, sweating is absent or diminished, but many victims of clear-cut heat stroke perspire profusely. The outcome is often fatal, even when patients are brought quickly to medical attention; death/case ratios of 40 per cent or more have been reported. The treatment consists of rapidly cooling the body in ice water bath till the rectal temperature falls below 102$^0$F (38.9$^0$C). Further treatment is supportive and directed towards the many potential complication of hyperthermia, hypovolaemia, hyperkalaemia, rhabdomyolysis, hypocalcaemia and bleeding diathesis may require intensive supportive treatment.

2. **Heat hyperpyrexia-** This is attributed to impaired functioning of the heat-regulating mechanism but without characteristics feature of heat stroke. It is arbitrarily defined as a temperature above 106$^0$F. It may proceed to heat stroke.
3. **Heat exhaustion-** Unlike heat stroke, heat exhaustion is not because of failure of thermo-regulation. It is a milder illness than heat stroke and is caused primarily by the imbalance or inadequate replacement of water and salts lost in perspiration due to thermal stress. The symptoms, primarily dizziness, weakness and fatigue, are those of circularly distress. It may be severe enough to require hospitalization, especially in elderly patients. Treatment is directed toward normalizing fluid and electrolyte balance.
4. **Heat cramps-** Heat cramps occur in person who is doing heavy muscular work in high temperature and humidity. There are painful and spasmodic contractions of the skeletal muscles; the cause of heat cramps is loss of sodium and chloride in the blood.
5. **Heat syncope-** This is a common ill-effect of heat. In its milder form, the person standing in the sun becomes pale, his blood pressure falls and he collapse suddenly. The condition results from pooling of blood in lower limbs due to dilatation of blood vessels, with the result that amount of blood returning to the heart is reduced, which in turn is responsible for lowering of blood pressure and lack of blood supply to the brain. This condition is quite common among soldiers when they are standing for parades in the sun. Treatment is quite simple, patient made to lie in the shade with the head slight down and recovery usually comes within 5 to 10 minutes.

**Preventive Measures**

1. Replacement of water- persons working under conditions of high temperature and humidity should be encouraged to drink cool water.
2. Regulation of work- The duration of exposure to a hot environment should be cut down. There should be periods of rest in between intense work.
3. Clothing- the clothing worn should be light, loose and light colors.



4. Protection devices- protective goggles, shields and helmets are helpful.
5. Work environment- the temperature and humidity in the work environment maybe controlled by proper ventilation and air conditioning.

**Effects of cold stress-** Injury due to cold may be general or local. In general cold injury, the individual is said to be suffering from exposure to cold. This is characterised by numbness, loss of sensation, muscular weakness, desire for sleep, coma and death. Local cold injury may occur at temperatures above freezing as in immersion or trench foot. Frostbit is common at high altitudes. It is extremely important to dress for the temperature with which the part will be in contact. The affected part should be warmed using water at 44deg. C. Warming should last about 20 minutes at a time. Intake of hot fluids promotes general rewarming.

**Humidity** - Humidity is always present in the atmosphere. The amount of moisture which air can hold depends upon its temperature. If the air is cooled, the excessive moisture precipitates for the particular temperature. This called dew relative humidity.

**Absolute humidity** – It is the weight of water vapour in a unit volume of air.

**Relative humidity-** It is the percentage of moisture present in the air, complete saturation being taken as 100. The grater the relative humidity, nearer the air to saturation. Relative humidity is more commonly employed than absolute humidity to express the moisture content of air. There is no evidence that humidity has an effect on physical health although it definitely has effect on comfort.

**Wind direction-** The wind direction is observed by an instrument called the wind vane. There is an arrow which turns freely about a vertical axis. The wind vane is erected at a height of 10 m above ground level. If the arrow is motionless for 3 minutes, the wind is described as 'calm'.

Clouds and weather observation- in all meteorological stations, clouds are observed for their form, amount, direction and height. Such observations give as insight into the sequence of weather in the particular locality. Form the state of the sky and evolution of clouds, weather is described as fine weather, fair weather, unsettled weather, bad weather and thunderous sky. Meteorological picture taking to give an idea of the clouds. The satellites can also measure temperature and humidity in the atmosphere.

# CHAPTER 12 Disaster Management

Disaster can be defined as "any occurrence that causes damage, ecological disruption, loss of human life or deterioration of health and health services on health services on a scale sufficient to warrant an extraordinary response from outside the affected community or area".

Disasters and other emergencies often result in significant impacts on people's health, including the loss of many lives. Every new threat reveals the challenges for managing health risks and effects of emergencies and disasters. Deaths, injuries, diseases, disabilities, psychosocial problems and other health impacts can be avoided or reduced by disaster risk management measures involving health and other sectors.

Natural, biological, technological and societal hazards put the health of vulnerable populations at risk and the potential to cause significant harm to public health. Examples of these hazards are as follows:

Natural: earthquake, landslide, tsunami, cyclones, flood or drought.

Biological: epidemic disease, infestations of pests.

Technological: chemical substance, radiological agents, transports crashes.

Societal: conflict, stampedes, acts of terrorism.

Disasters, emergencies, and other crises may cause ill-health directly or through the disruption of health systems, facilities and services, leaving many without access to health care in times of emergency. They also affect basic infrastructure such as water supplies and safe shelter which are essential for health.

Natural Disasters Over a twenty year period, in excess of 8500 natural disasters occurred, affecting more than 2.6 billion people. The incidence of natural disasters has been increasing and the impact of climate change will be to increase the risk for millions of individuals, their homes, their communities, and the infrastructure that supports them.

Biological Disasters During the last few decades, biological emergencies have assumed an increasing importance: major outbreaks related to new and re-emerging infectious diseases such as SARS, influenza (H1N1 and H5N1) and cholera.

Technological disasters The International Federation of the Red Cross has estimated that between 1998 and 2007, there were nearly 3 200 technological disasters with approximately 100 000 people killed and nearly 2 million people affected.



Societal Disasters Complex emergencies, including conflict, continue to affect tens of millions of people, causing displacement of people both inside and across borders. In 2010 there were an estimated total of 27 million persons who remained internally displaced by armed conflict across the world.

The mitigation and preparedness phases occur as disaster management improvements are made in anticipation of a disaster event. Developmental considerations play a key role in contributing to the mitigation and preparation of a community to effectively confront a disaster. As a disaster occurs, disaster management actors, in particular humanitarian organizations become involved in the immediate response and long-term recovery phases. The four disaster management phases illustrated here do not always, or even generally, occur in isolation or in this precise order. Often phases of the cycle overlap and the length of each phase greatly depends on the severity of the disaster.

**Mitigation** - Minimizing the effects of disaster.

Examples: building codes and zoning; vulnerability analyses; public education.

**Preparedness** - Planning how to respond.

Examples: preparedness plans; emergency exercises/training; warning systems.

**Response** - Efforts to minimize the hazards created by a disaster.

Examples: search and rescue; emergency relief.

**Recovery** - Returning the community to normal.

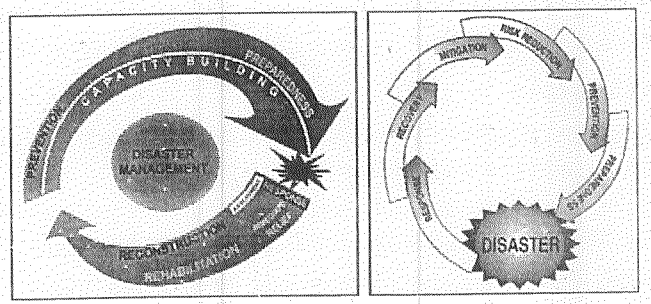
Examples: temporary housing; grants; medical care.

**Disaster management**

There are three fundamental aspects of disaster management:

a. disaster response
b. disaster preparedness
c. disaster mitigation

Disaster cycle-



## Disaster Impact and Response

Medical treatment for large number of casualties is likely to be needed only after certain types of disaster. Most injuries are sustained during the impact, and thus, the greatest need for emergency care occurs in the first few hours. the management of mass causalities can be further divided into search and rescue, first aid, triage and stabilization of victims, hospital treatment and redistribution of patients to other hospitals if necessary.

Search, rescue and first - aid - After a major disaster, the need for search, rescue and first aid is likely to be so great that organized services will be able to meet only a small fraction of the demand. Most immediate help comes from the uninjured survivors.

Field care- Most injured persons converge spontaneously to health facilities, using whatever transport is available, regardless of the facilities, operating status, providing proper care to casualties requires that the health service resources be redirected to this new priority. Bed availability and surgical services should be maximized. Provision should be made for food and shelter. a centre should be established to respond to injuries from patients relatives and friends. Priority should be given to victim's identification and adequate mortuary space should be provided.

Triage-When the quantity and severity of injuries overwhelm the operative capacity of health facilities; a different approach to medical treatment must be adopted. The principle of "first come, first treated", is not followed in mass emergencies. Triage consists of rapidly classifying the injured on the basis of the severity of their injuries and the like hood of their survival with prompt medical intervention. It must be adapted to locally available skills. Higher prognosis is granted to victims whose immediate or long term prognosis can be dramatically affected by simple intensive care. Triage is the only approach that can provide maximum benefits to the greatest number of injured a major disaster situation.

Tagging- All patients should be identified with tags stating their name, age, place of origin, triage category, diagnosis, and initial treatment.

Identification of dead- Taking care of the dead is an essential part of the disaster management. A large number of dead can also impede the efficient of the rescue activities at the site of the disaster. Care of the dead includes- removal of dead from the disaster scene, shifting to the mortuary, identification and reception of bereaved relatives. Proper respect for the dead is of great importance.

## Epidemiologic surveillance and disease control

Disaster can increase the transmission of communicable diseases through following mechanism :



1. Overcrowding and poor sanitation in temporary resettlements. This accounts in part, for the reported increase in acute respiratory infections.
2. Population displacement may lead to introduction of communicable diseases to which either the migrant or indigenous populations are susceptible.
3. Disruption and the contamination of water supply, damage to sewerage system and power systems are common in natural disasters.
4. Disruption of routine control programmes as funds and personnel are usually diverted to relief work.
5. Ecological changes may favour breeding of vectors and increases the vector population density.
6. Displacement of domestic and wild animals.
7. Provision of emergency food, water and shelter in disaster situation from different or new source may itself be source of infectious disease.

**Vaccination-** Health authorities are often under considerable public and political pressure to begin mass vaccination programmes, usually against typhoid, cholera and tetanus.

**Nutrition-** A natural disaster may affect the nutritional status of the population by affecting one or more components of food chain depending on the type, duration and extent of the disaster, as well as the food and nutritional conditions existing in the area before the catastrophe. Infants, children, pregnant, women, nursing mother and sick persons are more prone to national problems after prolonged drought or after certain types odd disasters.

**Rehabilitations-** The final phase in a disaster should be lead to restoration of the pre-disaster conditions. Rehabilitation starts from the very first moment of a disaster.

Water supply, food safety, basic sanitation and personal hygiene, vector control etc., comes in rehabilitation.

**Disaster mitigation in health sector-** Emergency prevention and mitigation involves measures designed either to prevent hazard from causing emergency or to lessen the likely effects of emergencies. These measures include flood mitigation works, appropriate land-use planning, improved building codes, and reduction or protection of vulnerable population and structures.

**Disaster preparedness-** Emergency preparedness is "a programme of long-term development activities whose goals are to strengthen the overall capacity of a country to manage efficient all types of emergency. It should bring about an orderly transition from relief through recovery, and back to sustained development".

**Man-Made Disaster-** A man-made disaster is a disaster resulting from human intent, negligence or error. Man- made disaster can be both intentional and unintentional. It results in huge loss of life and property. It further affects a person's mental, physical and social well-being.

D- Detection
I-Incident command
S- Safe and security
A-Assess hazards
S-Support
T-Triage and treatment
E-Evacuation
R- Recovery

**Reasons for man-made disaster-**

There are multiple factor that may relate to manmade disasters, ignorance, unawareness, illiteracy, carelessly handling danger, chemical and weapons.

Nuclear Disaster – nuclear disaster are the type of disaster that falls in this category is nuclear bomb. When this occurs it is often as result of intent and the end results are even more catastrophic with a large percentage of those involved losing their lives.

**Chemical disaster or industrial disaster-**

By the nature, the manufacture storage and transports of chemical are accidents waiting to happen. Chemical can be toxic and they may react often explosively. Sudden disaster also as Bhopal Gas Tragedy in India on 3rd December 1984 in which a leakage in the storage tank of Union Carbide Pesticide Plant released tons of methyl isocynate into the air. Insidious disaster, such as insidious chemical exposure and insidious radiation exposure, as in nuclear weapons production factories, research laboratory resulting in release of radioactive substances into the air.

**Fire Disaster**

Bush fires, forest fires and mine fires are generally stared by lighting, but also human negligence or arson. They can burn thousands of square kilometres.

# CHAPTER 13 Occupational Health

According to WHO occupational health should aim at the promotion and maintenance of highest degree of physical, mental and social wellbeing of workers in all occupations. The prevention among workers of departures from health, caused by their working conditions, the protection of workers in their employment risks resulting from factors adverse to health. The placing and maintenance of workers in an occupational environment adopted to his physiological and psychological equipment and to summarize the adoption of work to man and of each man to his job.

**Aims :**

1. To increase the efficiency
2. To increase the production
3. To decrease the accidents

**Objectives :**

1. To promote the health of the workers.
2. To maintain the highest degree of physical, mental and social well being of the workers.
3. To prevent the diseases by elimination of factors which are inimical to their health.

**Occupational Environment Conditions**

All the external conditions and influences, which is present at the work place and which influence the health of working personnel is occupational environment. Man interacts with physical, chemical and biological agent, machine and other men.

**Man and Physical, Chemical, and Biological agents**

**Physical:** The physical factors in the working environment which may be adverse to health are heat, cold, humidity, air, movement, heat radiation, light, vibrations, ionizing radiation etc. factors act in different ways singly and in different combination

**Chemical:** These include large number of chemicals, toxic dusts and gases which are hazardous to the health of workers.

**Biological:** Workers may come in contact to viral, rickettisal, bacterial and parasitic agents due to close contact with animals or their products, contaminated water, soil and food.

**Man and Machine**- The interaction between man and machine. In almost all the industries, the machines are driven by power. Poor installation of machines, the unguarded machines, protruding and moving parts, poor maintenance etc. result in accidents. Working for long hours result in fatigue, discomfort and diseased efficiency.

**Man and Man** - The interaction between the worker and his co-workers and the employer. This depends upon many psychosocial factors at work place like nature of the work, colleagues, communications, higher authority, system of payments, welfare conditions, work stability, degree of responsibility, service condition, job satisfaction, incentives etc.

### Occupational Hazards

An industrial worker is exposed to the following five types of hazards (Physical, chemical, biological, mechanical and psychosocial hazards), depending upon the nature of the occupation.

### 1. Physical Hazards

**Heat:** The effects are heat syncope, heat cramps, heat exhaustion, heat stroke, heat hyperpyrexia, prickly heat, burns etc.

**Cold:** Frost bite, Reynaud's disease, erythromelalgia, erythrocyanosis, chilblains, trench-foot, gangrene etc.

**Heat syncope**- It is fainting attack due to pooling of blood in lower limbs.

**Heat cramps**- It is painful and spasmodic contractions of muscles due to loss of sodium and chloride.

**Heat exhaustion**- It means loss of salt leading on to circulatory failure.

**Heat hyperpyrexia**- It is characterized by failure in heat regulating mechanism without the features of heat stroke. Temperature is about 106 °F. It may proceed to heat stroke.

**Heat stroke**- There will be failure in the heat regulating mechanism, resulting in high temperature of the body, delirium, convulsions, partial or total loss of consciousness.

**Frost bite**- Erythema and slight pain are features. In severe case painless, paraesthetic parts, result in deep seated destruction, gangrene and blistering may occur.

**Erythrocyanosis**- Limbs are swollen and red due to direct exposure to cold.

**Chilblains**- Erythema, itching, burning especially of dorsa of fingers, toes, heels, nose, ears on exposure to extreme cold. Lesions can be single or multiple and can become blistered and ulcerated.

**Light**- Effects occur either due to inadequate light or excessive light.



**Inadequate light**- Headache, eye strain, eye fatigue, eye pain.

**Excessive light**- Bright light results in glaring, visual fatigue, blurring of vision, discomfort and accidents.

### Noise

Auditory effects: Deafness (temporary or permanent), tinnitus (buzzing in the ears). Non-Auditory effects: Fatigue, irritability, nervousness, interference with speech and communication, hypertension, peptic ulcer, higher environmental stress.

### Vibration

Frequency range- Frequency range 10-500Hz, when working with tools like drill, hammers etc. vibration generally affects hands and arms.

After months and years of exposure, fine blood vessels of fingers may become increasingly sensitive to spasm, injuries to joints of fingers, hands, elbows and shoulders may occur.

### Exposure to Ultra-violet radiation

On the skin- Darkening of the skin, thickening of the skin, erythema, cancer of the skin. On the eyes (E.g.-Welding)- Photophobia, conjunctivitis, keratitis, corneal ulcer, blindness (Welder's fish), snow blindness.

### Exposure to Ionizing radiation

X-rays, radio-active isotopes like cobalt 60, phosphorus 32 produce genetic changes, malformations, cancer, leukemia, ulceration, sterility and death in extreme cases.

### Chemical Hazards

Chemical agents act in 3 ways: Local, Inhalation and Ingestion.

The ill effects depend on duration of exposure, amount and individual susceptibility.

1. **Local effects:** Dermatitis, eczema, ulcer and even cancer.
   - Dermatitis due to allergy- machine oils, rubber, X-ray, Caustic alkalies, lime etc.
   - Aromatic nitro and amino-compounds such as TNT and aniline are absorbed through skin and cause systemic effects.
2. **Inhalation:** Dusts, fumes and gases.
   - **Dusts**-Pneumoconioses
   - **Fumes**- Metal fume fever (This chemical intoxication results from inhalation of fumes of molten metals like arsenic, antimony, beryllium, cadmium, cobalt, lead, zinc, mercury etc.)

- **Gases-**
- Simple gases- $O_2$, $H_2$
- Asphyxiating gases- CO, $SO_2$, $Cl_2$, $H_2S$, methyl isocyanides gas etc.
- Anesthetic gases- Chloroform, ether, trichloroethylene

3. **Ingestion:** Toxic hazards occurring from the metals like lead, arsenic, mercury, cadmium, manganese, chromium etc.

**Biological Hazards**

These are from the animals and soil. These are common in agricultural industry.

- From the animals- they are called 'Zoonotic diseases'. Ex: Anthrax, rabies, plague, salmonellosis, bovine tuberculosis.
- From the soil- Tetanus, gag-gangrene, malignant edema, anthrax, mycetoma.

**Mechanical Hazards**

10% of accidents in the industry are due to mechanical causes.

**Psychological Hazards**

These are due to failure of the worker to develop a healthy relationship with his co-workers, employers, management, supervisors etc. They are divided into 2 groups.

1. Psychological changes: Such as hostility, aggressiveness, anxiety, depression, frustration, tardiness, alcoholism, drug addiction, sickness absenteeism etc.
2. Psychosomatic ill health: Such as neurosis, fatigue, propensity to peptic ulcer, hypertension, asthma etc.

**Occupational Diseases**

1. Diseases due to physical agents :
   a) Heat- Heat hyperpyrexia, heat exhaustion, heat syncope, heat cramps, burns and local effects such as prickly heat.
   b) Cold- Trench foot, frost bite, chilblains.
   c) Light- Occupational cataract, miner's nystagmus.
   d) Pressure- Caisson disease, air embolism, blast(explosion).
   e) Noise- Occupational deafness.
   f) Radiation- Cancer, leukemia, aplasticanemia, pancytopenia.
   g) Mechanical factors- Injuries, accidents.
   h) Electricity- Burns.
2. Diseases due to chemical agents



a) Gases- $CO_2$, CO, HCN, $CS_2$, $NH_3$, $N_2$, $H_2S$, HCl, $SO_2$ these cause gas poisoning.
b) Dusts (Pneumoconiosis)

I. Inorganic dusts
- Coal dust- Anthracosis
- Silica- Silicosis
- Asbestos- Asbestosis, cancer lung
- Iron- Siderosis

II. Organic (Vegetable) dusts
- Cane fiber- Bagassosis
- Cotton dust- Byssinosis
- Tobacco- Tobacossis
- Hay or grain dust- Farmer's lung

III. Metals and their compounds- Toxic hazards from lead, mercury, cadmium, manganese, beryllium, arsenic, chromium etc.

IV. Chemicals- Acids, alkalis, pesticides

V. Solvents- Carbon bisulphide, benzene, trichloroethylene, chloroform etc.

3. **Diseases due to biological agents-** Brucellosis, leptospirosis, anthrax, actinomycosis, hydatidosis, psittacosis, tetanus, encephalitis, fungal infections etc.
4. **Occupational cancers-** Cancer of skin, lungs, bladder.
5. **Occupational dermatitis-** Dermatitis, eczema.
6. **Diseases of psychological origin-** Industrial neurosis, hypertension, peptic ulcer etc.

**Occupational Dermatitis:**

Occupational dermatitis is a big health problem in many industries. The causes may be :

1. Physical- Heat, cold, moisture, friction, pressure, X-rays and other rays.
2. Chemical- acids, alkalies, dyes, solvents, grease, tar, pitch, chlorinated phenols.
3. Biological- living agents, such as viruses, bacteria, fungi, and other parasites.
4. Plant products- Leaves, vegetables, fruits, flower, vegetables, dust.

Dermatitis producing agents are further classified into :

1. Primary irritants
2. Sensitizing substance

Primary irritants (e.g. Acids, alkalies, dyes, solvents) cause dermatitis in workers exposed in sufficient concentration acid for a long enough period of time. On the other hand, allergic dermatitis occurs only in small percentage of cases due to sensitization of the skin.

**Prevention :** Occupational dermatitis is largely preventable if proper control measures are adopted.

Pre-selection- The workers should be medically examined before employment, and those with an established (or) suspected dermatitis.

Protection- The worker should be given adequate protection against direct contact by protective clothing, long leather gloves, aprons, and boots. The protective clothing should be frequently washed and kept in good order.

Personal Hygiene- There should be available a plentiful supply of warm water, soap and towels the worker should be encouraged and educated to make frequent use of these facilities.

**Byssinosis**

**Definition:** Byssinosis is a disease of the lungs brought on by breathing in cotton, dust or dusts from other vegetable fibres such as flax, hemp or jute while at work.

**Incidence:** In United States, more than 35000 textile workers have been disabled by Byssinosis and 183 died between 1979 and 1992. In India, among 35% of textile industry 7 to 8% of workers are affected with Byssinosis.

**Causes :**

- The most common cause is breathing in the dust produced by raw cotton.
- People who work in the textile industry
- Smoking increases the risk for this disease.

**Signs and Symptoms :**

- Chest tightness
- Progressive Dyspnoea
- Chronic Cough
- Tachypnea
- Wheezing
- Symptoms will get worse at the beginning of the work week and then improve while you are away from the work place, or late in the work week.

**Diagnosis :**

- History collection: Occupation and will ask many questions to try to find out whether your symptoms relate to certain exposure or times of exposure.



- Physical examination
- Chest X-ray
- Pulmonary function tests- Shows typical airflow obstruction and a reduction investigatory capacity, especially if measured at the start and end of the first work shift.

**Treatment**

- The most important treatment is to remove the source of exposure to the offending agent.
- Medications such as bronchodilators will usually improve symptoms.
- Corticosteroids may be prescribed in more severe cases.
- Stopping smoking is very important for people with this condition.
- Respiratory treatments including Nebulizers and postural drainage for chronic Conditions.
- Home oxygen therapy if low blood oxygen levels are detected.
- Physical exercise programs, breathing exercises and patient education programs are often very helpful for people with a chronic lung disease.

**Complications :** Chronic lung disease and Emphysema.

**Prevention :**

- Controlling dust to prevent the occurrence of disease.
- Using face masks prevent the dust entering the airway.
- Improving ventilation of the factory so that the dust is reduced.
- Reduction of dust levels by improving machinery.
- Stop smoking if you are a textile industry worker.
- Wetting procedures so that the dust will not concentrated in the air.

**Silicosis**

**Definition:** Silicosis, also known as Potter's rot is a form of occupational lung disease caused by inhalation of crystalline silica dust and is marked by inflammation and scarling in forms of nodular lesions in the upper lobes of the lungs. It is a type of pneumoconiosis, from pneumo (lung) and konis (dust).

**Causes:** Because of the wide presence of crystalline silica in nature in an undisturbed form, as in rocks and the earth's crust, people in occupations that disturb the natural state or those involved in collecting or refining the material are at risk of developing silicosis.

These occupations include the following: mining, quarying, drilling, crushing stones, chipping, grinding, sand blasting, grinding or polishing, in pottery and foundry work,

cement manufacturing, glass manufacturing, masonry, blast furnaces, coal mining, construction, cutting or manufacturing heat resistant bricks, dental laboratory technicians.

**Signs and Symptoms :**

- Dyspnea exacerbated by exertion
- Cough, often persistent and sometime severe
- Fatigue
- Tachypnea
- Loss of appetite and weight loss
- Chest
- Fever
- Gradual dark shallow rifts in nails eventually leading to crack as protein fibre within nails beds are destroyed.

**In advance cases :**

- Cyanosis
- Corpulmonale
- Respiratory insufficiency.

**Diagnosis :**

- History collection
- Physical examination
- Chest X-ray reveals findings consistent with silicosis
- Pulmonary function testing: may reveal airflow limitation, restrictive defects, reduced diffusion capacity, mixed defects or may be normal (in uncomplicated).

**Treatment :** Silicosis is an irreversible condition with no cure. Treatment options currently focus on alleviating the symptoms and preventing complications. These include:

- Stopping further exposure to silica and other lung irritants, including tobacco.
- Cough suppressants.
- Antibiotics for bacterial lung infection.
- TB prophylaxis for those with positive tuberculosis skin test.
- Chest physiotherapy to help the bronchial drainage of mucus.
- Oxygen administration to treat hypoxemia, if present Bronchodilators to facilitate breathing.
- Lung
- Transplantation.



**Prevention :**

- Rigorous dust control measures like wearing mask improving the ventilation of work place.
- Water spray is often used where dust emanates
- Dust can also be controlled by dry air filtering.

**Asbestosis**

**Definition:** Asbestosis is a chronic inflammatory and fibrotic medical condition affecting the parenchymal tissue of the lungs caused by the inhalation and retention of asbestos fibres.

**Causes:**

1. Exposure to asbestos fibers
2. Occupation like mining, manufacturing, handling or removal of asbestos are at risk of developing asbestosis.
3. Smoking increases the risk of developing asbestosis.

**Signs and symptoms:**

- Dyspnea especially on exertion
- Chest pain
- Cough, crackles present

**Possible additional symptoms include :**

1. Nail abnormalities
2. Clubbing of fingers

**Diagnosis:**

1. History collection about the occupation and will ask many questions to try to find out whether you relate to occupation
2. Physical examination
3. Chest X - ray shows lung changes
4. CT scan of the lungs shows the specific areas affected
5. Gallium lung scan shows the specific areas affected
6. Pulmonary function tests shows typical airway obstruction and a reduction in ventilator capacity.

**Treatment :**

1. There is no cure available

2. Stopping further exposure to asbestos is essential
3. To ease symptoms, postural drainage, chest percussion and vibration can help remove secretion from the lungs.
4. Nebulizers to thin secretions
5. Oxygen therapy by mask or by a plastic piece that fit the nostrils
6. Lung transplantation

**Complications:** Malignant mesothelioma AND Pleural effusion

**Prevention:**

1. In people who are exposed to asbestos, early screening by chest X-ray
2. Dust control measures like wearing mask, wetting procedures, ventilation should be improved in the work place
3. Frequent rest periods
4. Usage of sophisticated machines.

**Anthracosi**

**Definition:** Black lung disease, also known as Coal worker's pneumoncoriosis, is caused by long exposure to coal dust. It is a condition characterized by the accumulation of carbon in lungs.

**Causes:** Inhalation of coal dust.

**Risk Factors:** Smoking

**Signs & Symptoms:** No early symptoms, Cough, Chest pain, Breathing difficulty, Dyspnoea, Bronchitis, Cyanosis, Progressive lung stiffening, Shortness of breath, Impaired lung functions

**Diagnosis :**

- History collection
- Physical examination
- Chest X-ray
- Pulmonary function tests
- Chest CT Scan
- HRCT – High resolution CT Scan

**Treatment:** There is no cure for the black lung disease. Treatments are aimed at the symptoms and complicated.

**Prevention:**

- Dust control measures like wearing face mask



- Improving the ventilation of the factory
- Improving the machinery to reduce the dust
- Wetting procedures should be carried out so that the dust will not concentrated in air.

**Measures of Health Protection in Industrial units**

- Proper Nutrition
- Communicable disease control
- Environment sanitation
- Mental health promotion
- Health education
- Protective measures foe women and children
- Family planning

**Prevention of occupational hazards**

It can be prevented by 3 levels: Medical, Engineering and legislation

**1. Medical level**

- Prior placement examination
- Periodical check ups
- Medical and health-care facilities
- Notification and record maintenance
- Supervision of work environment and protective measures
- Health education and counseling

**2. Engineering level**

- Design of building
- Hygienic measures
- General ventilation, exhaust ventilation
- Mechanization to prevent contact with harmful chemicals
- Substitution for manufacture of less harmful substance
- Dust control by water spraying, hydro-blasting etc
- Enclosure by shielding with protective coverage's
- Isolation of some risky operations
- Protective devises like masks, shields, aprons etc to prevent damage
- Environment monitoring, toxic substances should be below maximum permissible limits

- Research- Longitudinal studies should be conducted about the health of the workers.

**Legislation and Acts**

- Factories act 1948
- Employees state insurance act 1948

**Factories act 1948**

It dates back to 1881 with latest amendment 1987

1. Scope-

a. 10 or more workers are working in a place where power is used is called as factory

b. 20 or more workers are working in a place where no power is used called as factory. There is no difference between perennial factory and seasonal factory

2. Health, safety and welfare-

a. Here cleanliness, lighting, ventilation are considered

b. Safety officer is appointed for every 1000 or more worker

c. Canteen should be present where 250 workers are working

3. Children below 14 years are prohibited- Adolescents: 15-18 years can work after surgeon certifies and he cannot do dangerous works

4. Work hours-
   - Man-48hrs/week
   - Man-9hrs/day
   - Rest of ½ hrs after 5hrs work
   - Adolescent- 4½ -5 hr/day

5. Leave with wages-
   - Adult- 1 day for 20 days of work, 30days (maximum)
   - Children- 1 day for 15days of work, 40days (maximum)

6. Occupational disease should be notified

7. Employment hazard should be considered

**The employees state insurance Act 1948**

ESI-1948(Amendment 1975, 1989). It provides both medical and sickness benefits along with maternal benefit, disablement benefit, rehabilitation allowance and funeral charges.



i. It includes facilities like OPD services, drug supply, immunization etc. with the help of Direct and Indirect pattern services

ii. Sickness benefit in the form of cash payment for 91 days or even more in sickness condition like TB, leprosy, AIDS etc.

iii. Maternity benefit in the form of cash in case of pregnancy and abortion is provided

iv. In case of injury or disability payment is given periodically

v. In case of death funeral expenses are borne by the agency

vi. On payment of Rs 10/month the member and his family get free treatment, even after retirement or disability.

# CHAPTER 14 Offensive Trades-Effects on Health and Precautionary Measures

### स्वास्थ्यनाशक विभिन्न व्यवसायएंवंप्रतिबंधकउपाय

Offensive trades are premises that are used for the production and/or processing of foods that may cause some kind of offence, generally in terms of odour, environmental pollution and in general posing public health risk. Establishments that are classified as Offensive Trades include pet meat production, fishmongers and poultry farming etc.

- Keep or cause to be kept in a clean and sanitary condition.
- Keep or cause to be kept in a good state of repair.
- Keep the premise free from unwholesome or offensive odour.
- Maintain a clean and tidy condition of all yards, footpaths, passageways, paved areas, stores and outbuildings.
- Provide impervious receptacles of sufficient capacity to receive all offensive material and trade refuse produced in any one day.
- Keep air-tight covers on all receptacles.

The occupation and trade which are injurious to the health of the worker and other people and offensive to sight, smell or hearing are called offensive trades.

- Blood or offal treating
- Bone boiling or crushing
- Collection and storage of used bottles for sale
- Dag crushing
- Fell mongering
- Fish cleaning
- Fish curing
- Flax pulping
- Flock manufacturing, or teasing of textile material for any purpose
- Gut scraping and treating
- Night soil collection and disposal
- Refuse collection and disposal



- Septic tank desludging and disposal of sludge
- Slaughtering of animals for any purpose other than human consumption
- Storage, drying or preserving of bones, hides, hooves or skins
- Tallow melting
- Tanning
- Wood pulping
- Wool scouring

Offensive trades affect on the health may be direct or indirect, immediate or late. The ill effects are due to dust, noise or obnoxious smell coming out of the manufacturing plant, offensive sight, effluent which on accumulation breeds insects like mosquitoes and files.

### Common offensive trades and their control methods

**Offensive Trades-** "Effluent" means any waste water which may be generated as a result of undertaking any scheduled use or an activity which is likely to cause a public health nuisance; "offensive trade" means any business listed below or business which involves an activity listed below:

1. Panel beating or spray painting;
2. Operating a waste recycling plant including oil and petroleum product recycling;
3. Scrap yard or scrap metal dealing;
4. Blood boiling, bone boiling, tallow melting, fat melting or fat extracting, soap boiling, tripe boiling or cleaning, skin storing, bone storing, hide boiling, skin curing, blood drying, gut scraping, leather dressing, tanning or glue or size making;
5. Charcoal burning, brick burning, lime burning;
6. Manure making or storing or compost making;
7. Parchment making;
8. Manufacturing malt or yeast;
9. Cement works, coke-ovens or salt glazing works;
10. Sintering of sulphurous materials;
11. Viscose works;
12. Ore or mineral smelting, calcining, puddling or rolling of iron or other metal, conversion of pig iron into cast iron, reheating, tempering, hardening, forging, conversion or compounding of carbon with iron or other metals;
13. Works for the production of carbon bisulpide, cellulose lacquer, cyan or its compounds, hot pitch or bitumen, pulverized fuel, peridine, liquid or gaseous sulphur dioxide or sulphur chlorides;

14. Works for the production of amyl acetate, aromatic ethers, butyric acid, caramel, enameled wire, glass, hexamine, lampblack, B-naphthol, resin products, salicylic acid, sulphated organic compounds, sulphurous paints, ultramarine, zinc chloride or zinc oxide;
15. The refining or processing of petrol, oil or their products; "offensive trader" means any person who owns, conducts or carries on an offensive trade.

**Permit requirement**

No person may conduct an offensive trade in or on any premises, except in terms of a permit authorizing such trade.

**Requirements for premises**

No person may conduct an offensive trade in or on any premises unless -

A. The floors of the premises are constructed of cement concrete or a similar impervious material, brought to a smooth finish;
B. The floors of the premises are adequately graded and drained for the disposal of effluent to an approved disposal system;
C. The inside walls, except where glazed or glass brick or glazed tiles are used, are plastered, brought to a smooth finish and painted with a light-coloured, washable paint;
D. The surface of any backyard or open space is paved with concrete or similar impervious material, brought to a smooth finish;
E. The premises are provided with adequate light and ventilation as prescribed in the National Building Regulations and Building Standards Act;
F. An adequate supply of running potable water is provided;
G. An adequate number of portable containers constructed of iron or another non-absorbent material, equipped with closely fitting lids, are provided for the removal of all waste and waste water from the premises;
H. Adequate means are provided for the disposal of all effluent arising from the manufacturing or other process performed on the premises;
I. Adequate accommodation is provided for the storage of all finished products, articles or materials which are used in the manufacturing or other process and which may – Discharge offensive or injurious effluent or liquid; or Decompose in the course of the work or trade;
J. Adequate means are provided to control the discharge in the open air of any noxious,



injurious or offensive gas, fume, vapour or dust produced during any handling, preparation, drying, melting, rendering, boiling or grinding process or storage of material;

K. Adequate sanitary fixtures are provided as prescribed in the National Building.

**Regulations and Building Standards Act**

1. A perimeter wall made of brick or some other impervious material, with a minimum height of 2 meters, is constructed around the premises;
2. All gates to the premises are of solid construction with a minimum height of 2 meters;
3. All perimeter walls and gates adequately screen activities on the premises from public view; and
4. All materials are stacked or stored on the premises below the height of the perimeter screening;
5. Adequate separate change-rooms for males and females, where five or more persons of the same sex are employed, must be provided containing –
   a. An adequate metal locker for every employee;
   b. A wash-hand basin provided with a supply of running hot and cold potable water; and
   c. An adequate supply of soap and disposable towels at every wash-hand basin;
6. If no change-room has been provided in terms of paragraph (p) –
   i. A wash hand basin with a supply of running hot and cold potable water, must be provided in an accessible position; and
   ii. An adequate metal locker must be provided for every employee in the work area.

**Duties of offensive traders**

Every offensive trader must -

A. Maintain the premises in a clean, hygienic and good condition at all times;
B. Maintain all walls and floors of the premises in a manner and condition that prevents the absorption of any waste or waste water;
C. Maintain all machinery, plant, apparatus, furniture, fittings, tools, implements, vessels, containers, receptacles and vehicles in a clean, hygienic and good condition at all times;
D. Prevent any waste accumulating on the premises; and
E. Prevent the emission of noxious, injurious or offensive gases, fumes, vapours or dust generated during any handling, preparation, drying, melting, rendering, boiling or

grinding process or storage of any material on the premises.

**Liquid refuse from bone and tripe boiling**

1. Every bone boiler and every tripe boiler must adequately cool all waste water before it is discharged into any sewer or other receptacle.
2. The cooling process referred to in subsection (1), must take place in a manner that prevents the generation of any noxious and injurious effluent.

**Liquids, tanks and tubs in leather making**

Every fell-monger, leather dresser or tanner must -

a. Renew and dispose of the liquid from every tank or other receptacle used on the premises to wash or soak any skin or hide, other than a lime pit, at adequate intervals and in an adequate manner;
b. Clean the entire tank or other receptacle every time it is emptied;
c. Clean every tub or other receptacle used to contain a solution of the material known as "puer".

**Storage of rags, bones and waste**

No trader in rags, bones or waste may place or store, or cause or permit to be stored, rags, bones or waste in any part of the premises concerned which is –

a. Inhabited by people; or
b. Not adequately ventilated.

**Every offensive trader must**

a. Maintain the premises in a clean, hygienic and good condition at all times;
b. Maintain all walls and floors of the premises in a manner and condition that prevents the absorption of any waste or waste water;
c. Maintain all machinery, plant, apparatus, furniture, fittings, tools, implements, vessels, containers, receptacles and vehicles in a clean, hygienic and good condition at all times;
d. Prevent any waste accumulating on the premises; and
e. Prevent the emission of noxious, injurious or offensive gases, fumes, vapours or dust generated during any handling, preparation, drying, melting, rendering, boiling or grinding process or storage of any material on the premises.

**Keeping animals**- this trade causes bad smell and sight due to stagnation of animal excreta. In addition, there is breeding of mosquitoes, files and insects. Animal keeping should be built at a distance of about 100 feet away from the residential area. The excreta



of the animal should be covered and should be washed and cleaned daily. Regular check of animal to prevent the diseases can spread to animal to human.

**Slaughter of animals**- Slaughter house are the places where animals, whose flesh is intended for human consumption, are killed. The hygiene of the slaughter house is of paramount importance to prevent the contamination of meat during the process of dressing. Meat should be stored in fly-proof and rat-proof rooms; for overnight storage, the temperature of the room shall be maintained below 5°C.Disposal of wastes Blood, offal, etc. should not be discharged into public sewers but should be collected separately.

**Blood boiling drying** - For obtaining albumin, red pigments and manure and refining sugar. The hydrogen sulphateproduced a very offensive smell.Blood should be collected and stored in clean and air tight vessel to prevent escape of offensive gases. The boiling should be done in a place where suitable arrangement is made foe discharge of gaseous products through a chimney.

**Bone boiling**- This is a trade which is at times productive of serious nuisance because stale and putrid bones stored. To prepare phosphate manure for tea gradersinvolves offensive smell and sight. Bone stock attracts files and animals. The premises should be cleaned daily. All refuse be collected and removed. The raw bones should be stored in suitable shed. Boiling should be done in steam, provided with a very high chimney for maintaining offensive gases. Wall and floor should be keep clean and dry always.

**Gut scarping**- The cleansing or separation of the peritoneal membrane, at the slaughter-house, is ordinarily performed at the conclusion of a putrid fermentation that constitutes one of the most repulsive details of this industry.The inner walls, to the height of about 6 ft., should be covered with some impervious material capable of being washed, such as smooth cement or sheet zinc. The floor should be paved with an impervious paving,preferably joint less, and it should be properly sloped to a duly trapped drain gully. There should be an unrestricted supply of water. Scrupulous cleanliness should be observed in the conduct of the business.The floor should be kept constantly sprinkled with some deodorant solution, such as of carbolic acid or chloride of lime.

A building specially erected or carefully adapted to the peculiarities of the trade, sufficiently spacious, and situated as far as practicable in a locality not closely built in. The chamber where any of the more offensive parts of the trade are conducted should have no direct communication with other rooms. It should be lighted either from the sides or roof with windows incapable of being opened, frequently swept up, and, together with

refuse matters and scrapings, should be deposited, with the addition of a deodorant, in appropriate vessels made of some impervious material, such as galvanised iron, and covered with covers of like material when not required to be open for use. At the close of each day's work, the floor and walls, to the height of the impervious portion, should be washed down with water containing some deodorant, and all tubs, tables, benches, and utensils that have been in use should be similarly cleansed. The inner walls and ceilings should be periodically lime-whited.

# CHAPTER 15 School Health Services

School health is an important branch of community health. School health service in a way is continuation of MCH service. It provides an excellent opportunity to detect the defects in children at a very early stage, and carry out the remedial measures promptly.

Objective of school health service-

1. The promotion of positive heath
2. The prevention of diseases
3. Early diagnosis, treatment and follow-up of defects
4. Awakening health consciousness in children.
5. The provision of healthful environment.

**Components :** The school health program has three major components health education, healthy environment and health services.

**Health teaching and health education :** This is the most important element of school health program. It does not merely imply inclusion of health lessons in the textbooks but also includes the following

a. Insisting on high standards of cleanliness in the school.
b. Improving water supplies and latrines and inculcating habits for their proper use.
c. Introducing healthy practical diets into school lunch program.
d. Demonstrating personal hygiene, such as cutting of nails, dressing of hair, bathing with soap and water etc.

**Healthful school living :** The school children spend most of their time in the school only, the environment must be healthy both inside and outside the school, so that the children should remain healthy, physically, mentally, socially, emotionally and culturally. School should be serving as model centre of good sanitation to the community.

The elements of healthful school living are-

1. School building with a playground and clean sanitation
2. Healthful teaching
3. Mid-day meal
4. Physical education procedures
5. Relation between the teacher and students among the students.

**School building-** Proper maintenance of the school building is even more important than the site and actual construction. The medical officer or sanitary inspector should be advice school authorities on different items of sanitation.

**Location-** School should be centrally located with proper approach roads and away from busy places, heavy traffic, factories, cinemas, market and railway tracks. It should have a compound. Preferably it should have ample space and good ventilation and a play-ground for games and physical exercises.

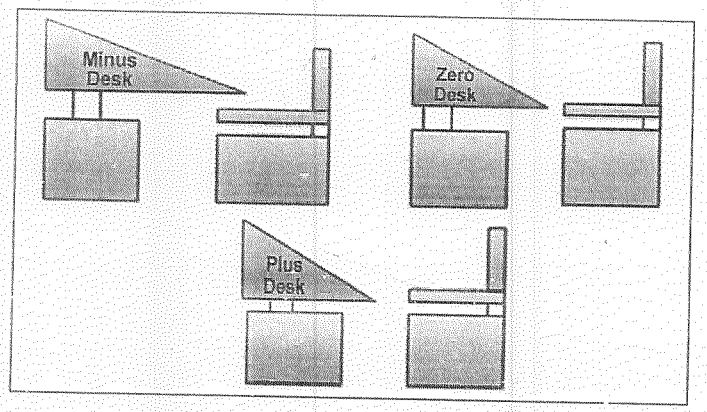
**Classrooms-** The classrooms should have verandas outside and be spacious inside. The minimum floor space per student should be 10-15 sq. feet. The height should be 12 feet. All classrooms should open into corridors 6-8 feet wide. The laboratories, if any, should have separate wing. There should be enough natural lighting, ventilating and sitting arrangements in all the class rooms. Black board should be such that there is no glaring.

**Lighting-** The class rooms should have sufficient natural light, preferably from the side and not front, because it will be dazzling to the eyes. If lighting id from behind, the students shadow falls on the desk.

**Ventilation-** The windows should be arranged in such a way that it should not only provide light evenly and sufficiently but also should facilitate cross ventilation in the room. Combined door and window area should be 40 per cent of the floor area. Improper ventilation facilitates transmission of diseases.

A good seat should be so adjusted in height that while sitting child's feet should be touch the ground with legs being vertical and thigh horizontal; about two-third of thigh beings on the seat. Back rest should be so curved as to be quite comfortable.

**Sitting arrangement-** If the desk-chair arrangement are improper, it results not only






in the development of orthopaedic, postural and myopic defects, but also in the loss of interest in writing and reading, thus interfering with the learning process.

**Zero Desk-** It is one wherein the vertical line from the margin of the desk, touches the edge of the chair.

**Plus Desk-** it is one wherein there is a space between the edge of chair and the vertical line from the desk.

**Minus desk-** it is one wherein the vertical line from the desk falls on the chair.

From the point of view of health, desks should be of minus type, so that the pupil should be able to read and write without leaning forward and will have a good back rest which will in turn prevents postural defects. A plus type of desk, predispose for the development of myopia, contractor of chest, and spinal deformities.

**Maintenance of healthy environment-**this should be includes not only the sanitation of the school premises but also the surrounding, which has moral, physical and mental effect on the school child. The site should be dry, on raised ground, situated at distance from the road so as to minimise the nuisance of dust and noise and too much traffic.

**Clean sanitation-**Outside the school building and within the compound, environment is kept sanitary by providing protected water supply, sanitary disposal o refuse.

**Water supply-** There must be provision to supply clean and safe water, preferably from the independent source like tube well and the supply should be continuous through taps. There must be a minimum of one drinking fountain for every 100 students.

**Latrines and Urinals-** There must be one urinal for every 50 students and one latrine for every 100 students, separate for boys and girls.

**Wash basin-** There should be provision for wash-basin near water closets for cleaning the hands.

**Refuse-**All the wastes of class-rooms, verandas, and other rubbish collected from the dust-bins and disposed of by burning. Here and there, there must be receptacles with carbonized saw duet sand placed for spitting.

**Healthful teaching-** the daily teaching routine in the class must be arranged in such a way the classes should be interspersed with rest pause, games and physical exercises. The teaching classes should not be didactic, depressing, discouraging and boring to students, monotony is advised.

**Play ground-** It is must for recreation and physical education.

**Mid-day meal-** since the school children are nutritionally vulnerable, development of malnutrition not only makes the child physically and mentally weak but also interferes with

learning process. Thus malnutrition is a serious obstacle to take full advantage of schooling. Mid-day meals are,

It is a supplement and not a substitute for the home diet.

It should be provide at least 1/3rd of daily calorie requirement and about half of daily protein requirement.

The cost of the meal should be reasonably low.

The meal should be involve complicated cooking process

The menu is changed frequently to avoid monotony.

**Physical education procedures-** .This is carried out under the supervision of physical education teacher. This physical education not only helps in the growth and development of the children, but also promotes a sense of team-work and discipline. Some of them become sports men and women.

**Pupil-pupil relation and pupil- teacher relation-** The healthy relation between the pupil and pupil not only helps in the development of behaviour pattern but also helps to retain the affection, throughout the rest of the life. Teacher can foster this relation better by encouraging group discussions, by handling the conflict situations, etc.

**Health education-** This is another important component of school health program. The objective of the health education is to bring about changes in their knowledge; attitude and practice that promotes effective healthful living both at home and in the community. The teacher is the key to impart health education. It is directed at the health needs and interests of children. There are some areas of health education-

1. Personal hygiene
2. Prevention of diseases
3. First-aid
4. Safety education
5. Mental health
6. Nutrition education
7. Improvement of environmental sanitation
8. Consumer health
9. Adult health education
10. Family life education

### Duties of School Medical Officers

The principal objective of the school medical officers is early detection and treatment



of defects in the children. To avoid the strain and practical difficulty of annul medical check –up the school health committee.

1. To organize preventive measure and mass inoculated in case of out breaking of epidemics.
2. To arrange for periodic immunization of children.
3. To isolate and recommend quarantine of the children suffering from contagious disease.
4. To guide about the site of school building, its ventilation, lighting, and hygienic cleanliness and sanitary upkeep. He should inspect the school periodically to ensure proper cleanliness and other measures.
5. To guide the teachers, in principles of healthful living of children, and importance of hygiene cleanliness and first-aid training. A certain number of teachers can be trained to work as health guides to reduce the work load of medical officer.
6. Medical checkup of school children and upkeep of their medical records e.g. height, weight, nutrition, vision, hearing, dental, condition, and immunization.

# CHAPTER 16 Epidemiology

Epidemiology is a scientific study of factors and conditions related to disease as they occur in people. The word epidemiology is derived from epi (in, on, upon); demos (people) and logos (science). Formerly, epidemiology was considered to be a science of epidemics and its application was limited to prevention and control of a few communicable diseases such as cholera, smallpox, plague, etc. which occurred in epidemic form. Gradually, the epidemiological method of studying a disease by devoting attention to its occurrence and distribution, etiology, prevention and control was extended to communicable diseases in general. During last few decades, the epidemiological approach has been used in the study of non-communicable diseases also, such as hypertension, coronary artery disease, diabetes, cancer, mental disorders and even accidents and burns. As a result, diseases are now broadly classified into two groups- communicable and non-communicable- for the purpose of epidemiological study.

**Definitions**

- It is an orderly study of incidence in human society of any morbid state (communicable and non-communicables disease, accidents, injuries and abnormalities of medical importance).
- It is a study of the role of the agent, host and environment in the natural history of disease.
- It is the study of relationship among various factors and conditions in the agent, host and environment that determine the frequency of occurrence and distribution of an infectious process; a disease or a physiological state in a population.
- According to Lilienfeld, "Epidemiology is the study of the distribution of a disease or a physiological condition in human populations and of the factors that influence this distribution".
- Oxford English dictionary - The branch of medical science which treats epidemics.
- Kuller LH: American J of Epidemiology- Epidemiology is the study of "epidemics" and their prevention.
- Anderson G. In: Rothman KJ: Modern Epidemiology- the study of the occurrence of illness.





- Branch of medical science which treats of epidemics. (Park in,1873)
- Study of the occurrence and distribution of health-related diseases or events in specified populations, including the study of the determinants influencing such states, and the application of this knowledge to control the health problem.(John M. Last in 1988).

**Uses of Epidemiology**

The study of diseases distribution and causation remains central to epidemiology; the techniques of epidemiology have a wider application covering many more important areas relating not only to diseases but also health and health services.

1. To study historically the rise and fall of diseases in population
2. To monitor continuously over a period of time the change of health in a community. (For example, the effects of a vaccination programme, health education, nutritional supplementation).
3. To make a community diagnosis. Epidemiology helps to identify and describe health problems in a community (for example, the prevalence of anaemia, or the nutrition status of children).
4. Planning and evaluation
5. Evaluation of individual's risks and chances
6. Syndrome identification
7. Completing the natural history of disease.
8. Searching for causes and risk factors

**Terminology**

**Infection:** The entry and development or multiplication of an infectious agent in the body of man or animals.

**Contamination :** The presence of infections agent on a body surface, also on or in clothes, beddings, toys, surgical instruments or dressings or other inanimate articles or substances including water, milk and food.

**Infestation:** For persons or animals the lodgment, development and reproduction or arthropods on the surface of the body or in the clothing (e.g) ice, itch mite.

**Host:** A person or other animal including birds and arthropods that affords subsistence or lodgment to an infectious agent under natural condition.

**Communicable diseases:** An illness due to specific infections agent or its toxic products capable of being directly or indirectly transmitted from man to man, animal to animal or from the environment to man or animal.

**Epidemic:** The unusual occurrence or sudden outbreak of disease in a community or region.

**Endemic:** It refers to the constant presence of a disease or infections agent within a given geographic area or population group.

**Sporadic:** The word sporadic means scattered about. The diseases are so few and separated widely in space.

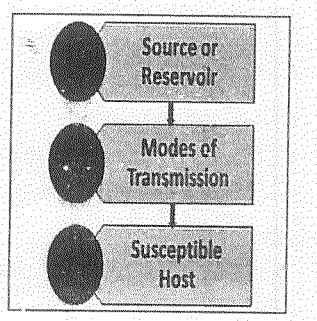
**Pandemic:** An epidemic usually affecting a large proportion of the population, occurring over a wide geographic area such as a section of a nation.

**Zoonosis:** An infection or infections disease transmissible under natural conditions from vertebrate animals to man.

**Eradication:** Termination of all transmission of infection by extermination of infections agent through surveillance and containment.

**Carriers:** A carrier is defined as "an infected person or animal that harbours a specific infections agent in the absence of clinical manifestation but potentially source of infection.

## Dynamics of Disease Transmission

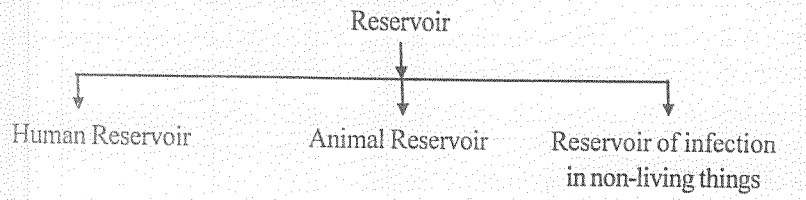



Communicable diseases are transmitted from the reservoir /source of infection to susceptible host. Basically there are three links in the chain of transmission, viz, the reservoir, modes of transmission and the susceptible host.

**Source and reservoir of infection :** The **Source** of infection is defined as "the person, animal, object or substance from which an infectious agent passes or is disseminated to the host".

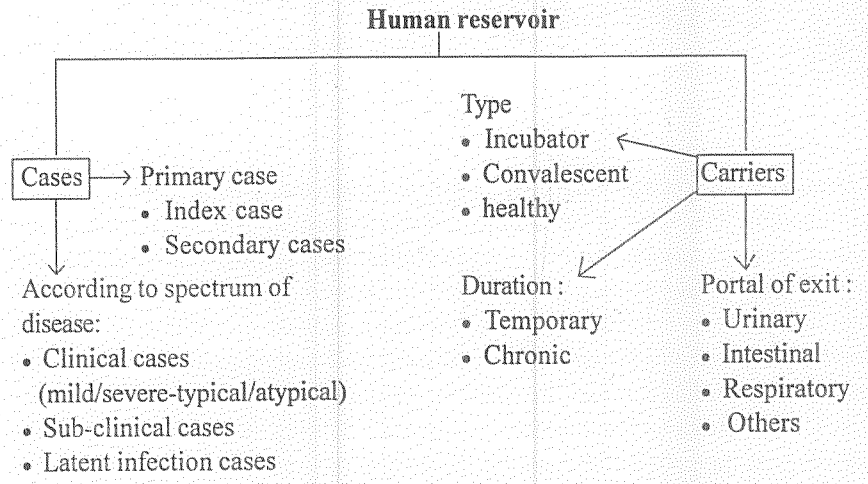
A **Reservoir** is defined as "any person, animal, arthropod, plant, soil, or substance in which it depends primarily for survival and where it reproduces itself in such manner that it can be transmitted to susceptible host".

## Types of Reservoir of Infection






## Human reservoir of infection




The most Important source and reservoir of infection for human is man himself he may a case or carrier.

**Cases** - It is defined as "a person in the population or study group identified as having the particular disease, health disorder, or condition under investigation".

Clinical illness may be mild or moderate, typical or atypical, severe or fatal depending upon the gradient of involvement. Subclinical cases are variously referred to as in apparent, convert, missed or abortive cases. They are equally important as source of infection. They play important role to maintain the chain of infection. In diseases like Rubella, mumps, polio, hepatitis A and B, Japanese encephalitis etc. subclinical cases are common.

Latent infection, the host does not shed the infection.

Primary case- it is refer to the first case of communicable disease introduced into population unit being studied.

Index case- the term index case is the first case to come to notice of the investigator.

Secondary cases- are those developing from contact with primary case.

## Infection Carrier

It occurs either due to inadequate treatment or immune response, the disease agent is not completely eliminated, leading to a carrier state.

It is "an infected person or animal that harbours a specific infectious agent in the

absence of discernible (visible) clinical disease and serves as a potential source of infection to others.

**Carrier may be classified as below**

A. Type-
   1. Incubatory –e.g. measles, mumps, polio etc.
   2. Convalescents e.g. Typhoid, cholera, diphtheria etc.
   3. Healthy e.g. poliomyelitis, cholera, diphtheria etc.

B. Duration-
   1. Temporary
   2. Chronic

C. Portal of exit-
   1. Urinary
   2. Intestinal
   3. Respiratory
   4. Others.

**A. Type-**

1. Incubatory-This usually occurs during the last few days of the incubation periods. e. g. measles, mumps, polio etc.
2. Convalescents-Who continues to shed the disease agent during the period of convalescence. e.g. Typhoid, cholera, diphtheria etc.
3. Healthy-Healthy carriers emerge from subclinical cases they are victims of subclinical infection who have developed carrier state without suffering from avert disease but shed causative agent. e.g. poliomyelitis, cholera, diphtheria etc.

**B. Duration-**

1. Temporary carrier- who shed the infection agent for short period. It included the incubatory, convalescent and healthy.
2. Chronic Carrier- It is one who excretes the infection agent for indefinite periods. e.g. typhoid fever, hepatitis, dysentery, malaria, gonorrhoea.

Portal of exit- in typhoid carrier- urinary carrier is more dangerous than intestinal carrier. Urinary carriers, intestinal carriers, respiratory carriers, nasal carriers etc.

**Animal reservoir of infection**

Zoonosis is an infection that is transmissible under natural conditions from vertebrate animals to man, e.g. rabies, plague, bovine tuberculosis, influenza etc.



There are over a 100 zoonotic diseases that can be conveyed from animal to man.

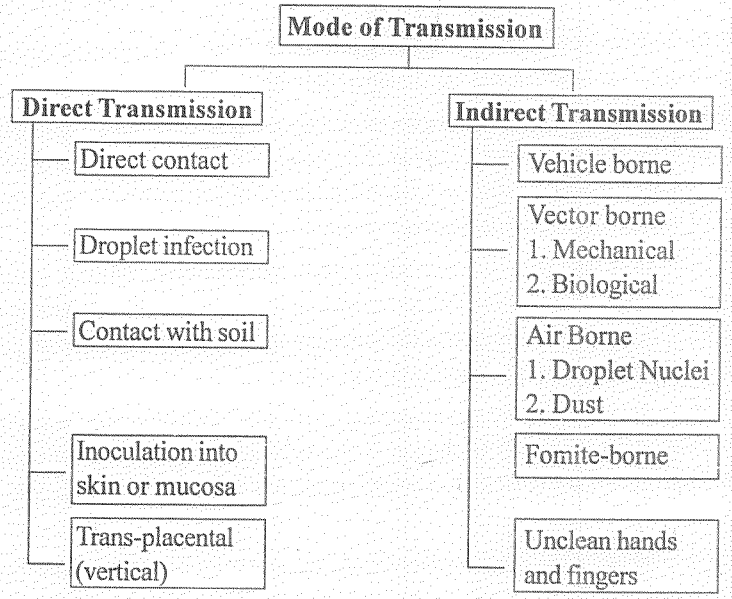
**Reservoir in non- living things**

Soil and inanimate matter can also act as reservoir of infection.

For example, soil may harbour agents that cause tetanus, anthrax.

**Mode of Transmission**

Communicable diseases may be transmitted from the reservoir to the susceptible host in many different ways.




**Direct transmission**

1. **Direct contact-** Infection may be transmitted by direct contact from skin to skin, mucosa to mucosa to skin of the same or another person e.g. skin to skin contact as touching, kissing, sexual intercourse - STD, AIDS, Leprosy, Skin and eye infection.
2. **Droplet infection-** This is direct projection of a spray of droplet, saliva and naso-pharyngeal secretion during coughing, sneezing, speaking, spitting into surrounding atmosphere. Disease transmitted by droplet spared includes may RTI, eruptive fever, common cold, diphtheria, tuberculosis etc.
3. **Contact with soil-** The disease agent may be inoculated directly into skin or mucosa e.g. rabies, dog bite, hepatitis B, virus through contaminated needle and syringes.

4. **Trans placental or vertical-** Infectious agents spread through placenta to the fetus e.g. Torch, Toxoplasma gandii, Rubella, Syphilis, Hepatitis B, HIV etc.

**Indirect transmission**

The spread mainly takes places by 5F's (flies, finger, fomites, food and fluid)

1. **Vehicle borne-** Infection is spread through vehicle like water, food (raw vegetables, fruits, milk and milk products), ice, blood, serum, plasma or other biological products such as tissues and organs. E.g. acute diarrheas, typhoid fever, cholera, polio, hepatitis A.
2. **Vector borne-** Vector is defined as an arthropod or any living carrier the infectious organisms. E.g. Malaria, filarial, dengue, mice etc.
3. **Air borne-** Droplet nuclei- Droplet uncles are a type of particles implicated in the spread of air borne infection. They are tiny particles (1-10microns) and dried residue of droplets, duet, larger droplets, expelled may settle down on floor and become a part of environment e.g. tuberculosis, pneumonia, Q-fever.

   Dust- some of the large droplets which are expelled during talking, coughing or sneezing, settle down by their sheer weight on the floor, carpets, furniture, clothes, bedding, linen and other objects in the immediate environment and become part of the dust. e.g. streptococci, viruses and fungal spores.
4. **Fomite borne-** Fomites are non-living articles or substance other than water and food contaminated by the infectious discharges from patient and transfer the infectious agent to a healthy person. e.g. clothes, towels, hand kerchiefs, cups, spoons, pencils, books etc.
5. **Unclean hands and fingers-** Hands are the most common medium by which pathogenic agents are transferred to food from the skin, nose, bowel etc. as well as from other foods e.g. staphylococcal,,streptococcal infections.

**Concept of Diseases**

Disease is easier to appreciate and less abstract than health. Whereas health denotes a perfect harmony of the different body systems, disease denotes an aberration of this harmony. This aberration may range from a biochemical disturbance to severe disability or death. Even a psychological dysfunction may be classified as disease. It is important to understand the difference between the terms disease and illness. Disease may be defined as the bio physiological phenomena which manifest themselves as changes in and malfunction of the human body. Illness, on the other hand, is the experience of being sick. Disease refers to occurrence of something, i.e. body changes and malfunction. Illness



refers to experience of something, i.e. being sick. Profound changes and malfunction may occur in the body without their being experienced by the patient.

A classical example is hypertension, labelled as "the silent killer". Blood pressure may be markedly increased, yet an individual may not have any symptoms. Such a person has hypertensive disease, but he does not feel he has any illness. Conversely, a person may feel ill without having a disease. For example, snake bite by a non-poisonous snake may result in palpitation, perspiration, fainting and even death. The reason is that strong emotion or belief, in this case about the snake being poisonous, can result in illness. Another example is that of a person fainting or going into trance or frenzy under the belief that he is possessed by a spirit. Thus people may feel ill in the absence of disease, just as they can have disease without feeling ill.

**Definition of disease**

Webster- "a condition in which body health is impaired, a departure from a state of health, an alteration of the human body interrupting the performance of vital functions".

Oxford English dictionary- "a condition of the body or some part or organ of the body in which its functions are disrupted or deranged".

WHO defined health but not disease. This is because disease has many shades ranging from in apparent cases to severe manifest illness.

Definition of disease Ecological Definition.: Maladjustment of the human organism to the environment Sociological: disease is a social phenomenon, occurring in all societies defined and fought in terms of particular cultural forces prevalent in the society.

**Types of diseases**

Acute - food poisoning

Insidious onset - mental illness, rheumatoid arthritis

Carrier state - outwardly healthy but capable of infecting others - typhoid fever

One organism causing multiple types of manifestations - streptococcus.

Same disease caused by multiple organisms - diarrhoea.

Disease with short or long course.

Disease - physiological/psychological dysfunction

Illness - subjective state of the person who feels aware of not being well

Sickness - state of social dysfunction; a role a person assumes when he/she is ill - sickness role.

Although many diseases are infectious, research in the twentieth century has revealed

other kinds of cause of disease: genetic, nutritional, immunological, metabolic, and cytological.

## Concept of Causation

Supernatural theory of disease

Germ Theory - Louis Pasteur, Robert Koch

Epidemiological Triad

Multi Factorial Theory – Web of disease causation, Wheel of causation

**Supernatural Theory of Disease:** In the early past, the disease was thought mainly due to either the curse of god or due to the evil force of the demons. Accordingly, people used to please the gods by prayers and offerings or used to resort to witchcraft to tame the devils.

**Germ Theory** (Robert Koch)-Microbes (germs) were found to be the cause for many known diseases. Pasteur, Henle, Koch were the strong proponents of microbial theory after they discovered the micro-organisms in the patients' secretions or excretions.

**Germ Theory of disease :** Germ Theory of disease Microbes as the cause of disease One to one relationship b/w causal agent and disease

Disease agent ⟶ Man ⟶ Disease

**Germ theory of disease-Koch's postulates:** Germ theory of disease – Koch's postulates Organisms must be constantly a/w the lesions of the disease Organism must be isolated from pure culture of the lesion Inoculation of the material of pure culture in suitable animal should produce the lesions of the disease It should be possible to isolate the organism in experimental animals from the culture material.

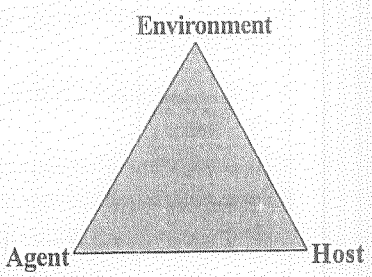
Disease rarely caused by a single agent alone Most of the disease are dose related, subclinical and w/o symptoms Number of factors contribute to the occurrence of disease-relating to host and environment Not everyone exposed to the Microbes develop the disease.

**Ecological Theory:** ecological theory around 463 BC, Hippocrates the first epidemiologist who advised to search the environment for the cause of the disease.

Environmental influence: environmental influence interactions among humans, other living creatures, plants, animals, microorganisms, ecosystems, and climate, geography, and topography.

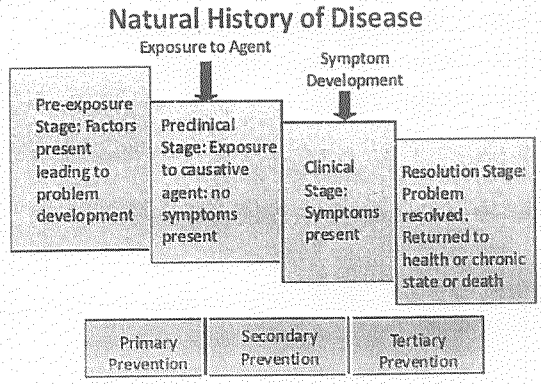


## Epidemiological Triad (Sankramakatraya)




The causative factor of disease may be classified as **Agent, Host** and **Environment**. These three factors are transferred as epidemiological triad. This presence of agent, host and favourable environment factors in the pre pathogenesis period is not sufficient to start the diseases in man. What is required is an interaction of these three factors to initiate the disease process in man. The combination of epidemiological triad denotes the distribution of disease, cause of diseases, and nature of disease or endemic or epidemic and risk factor of disease. Thus it helps in preventing the disease at primary level through health promotion, specific protection and at secondary level through early diagnosis and treatment. The knowledge of epidemiological triad is very much useful in prevention of communicable and non-communicable diseases.

## Natural History of Disease




**Agent Factors**-The disease "agent" is defined as a substance, living or non-living, or a force, tangible or intangible, the excessive presence or relative lack of which may initiate or perpetuate a diseases process.

Classification of agents :

1. Biological agents-

**Infectivity** refers to the proportion of exposed persons who become infected.

**Pathogenicity** refers to the proportion of infected persons who develop clinical disease.

**Virulence** refers to the proportion of persons with clinical disease who become severely ill or die.

These are living agents of disease i.e. viruses, bacteria, fungi, protozoa and metozoal etc.

2. Nutrient agents- These can be protein, fats, carbohydrates, vitamins, mineral and water. An excess or deficiency of the intake of nutritive element may result in nutritional disorders e. PEM, Anemia, Goiter etc.
3. Physical agents- Expose to excessive heat, cold, humidity, pressure, radiation, electricity, sound, etc may result in illness.
4. Chemical agents- Endogenous chemical may be produced in the body as a result of derangement of function e.g. urea, serum bilirubin, ketones, uric acid, etc.

   Exogenous-agents outside of human host e.g. allergens, metals, fumes, dust gases, insecticides, etc.
5. Mechanical agents- Expose to chronic friction and other mechanical forces may result in crushing, tearing, sprains, dislocations and even death.
6. Absence or insufficiency or excess of a factor necessary to health-

   These may be chemical factors- hormones, oestrogens, enzymes

   Nutrient factors- same as nutrient agents

   Lack of structure- e.g. thymus

   Lack of part of structure- e.g. cardiac defects

   Chromosomal factors- e.g. mongolism, Turner's syndrome

   Immunological factors- agammaglobulinaemia
7. Social agents- These are poverty, smoking, abuse of drug, and alcohol, unhealthy life style social isolation, maternal deprivation etc.

**Host Factors**

In epidemiological terminology, the human host is referred to as "soil" and the disease agent as "seed".A person or other living animal that affords subsistence or lodgment to an infectious agent under natural condition.

Host factors: Intrinsic factors that influence an individual's exposure, susceptibility, or response to a causative agent.

Demographic characteristic such as age, sex, ethnicity

Biological characteristic such as genetic, factors, biochemical levels of the blood, blood groups, enzymes etc.



Social and economic characteristics like education, Scio-economic status, occupation, stress mental status, housing etc.

**Environment Factors**

Physical environment- Nonliving things and physical factors(air, water, soil, housing, heat, light, etc.)

Biological environment- Microbial agents, insects, animals, plants and man himself.

Psychosocial environment- Lifestyle, poverty, urbanization, community life, income, education, stress etc.

**Disease Occurrence**

Different diseases, in different communities, show different patterns of expected occurrence:

Endemic: habitual presence of a disease within a given geographic area.

Hyper endemic: a persistently high level of occurrence.

Sporadic: an irregular pattern of occurrence, with occasional cases occurring at irregular intervals. (Prevalence is zero)

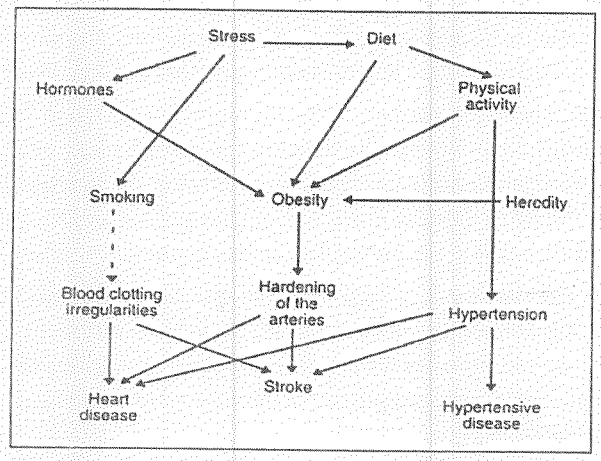
**The "Beings" Model of Disease Causation**

This concept postulates that human disease and its consequences are caused by a complex interplay of nine different factors

1. Biological factors innate in a human being,
2. Behavioral factors concerned with individual lifestyles,
3. Environmental factors as physical, chemical and biological aspects of environment,
4. Immunological factors,
5. Nutritional factors,
6. Genetic factors,
7. Social factors,
8. Spiritual factors and
9. Services factors, related to the various aspects of health care services.

**The Theory of "Web of Causation"**

The "epidemiological triad theory" was very effectively used by Leavel and Clark in explaining the natural history of disease and levels of prevention for obviating such departures from the state of health. But it could not explain the causation of non-communicable diseases like IHD or road accidents.




**Web of causation**

McMahon and Pugh forwarded the theory of "epidemiological web of causation", wherein the various factors (e.g. hypercholesterolemia, smoking, hypertension) are like an interacting web of a spider.

Each factor has its own relative importance in causing the final departure from the state of health, as well as interacts with others, modifying the effect of each other.

**Concept of control**

The term "disease control" describes operations aimed at reducing :

1. The incidence of disease
2. The duration of disease, and consequently the risk of transmission
3. The effect of infection, including both the physical and psychosocial complications
4. The financial burden to the community.

Control activities may focus on primary prevention or secondary prevention; most control programmes combine the two. The concept of tertiary prevention is comparatively less relevant to control efforts.

**Concept of prevention**

The goals of medicine are to promote health, to preserve health, to restore health when it is impaired, and to minimize suffering and distress. successful prevention depends upon a knowledge of causation, dynamics of transmission, identification of risk factors and risk groups, availability of prophylactic or early detection and treatment measures, an organisation for applying these measures to appropriate persons or groups. The



concept of prevention is best defined in the context of levels, traditionally called primary, secondary and tertiary prevention. A fourth level, called primordial prevention, was later added.

**Level of prevention**

Preventable Causes of Disease-

**Beings :**

- Biological factors and Behavioural Factors
- Environmental factors
- Immunologic factors
- Nutritional factors
- Genetic factors

Services, Social factors, and Spiritual factors :

1. Primordial prevention
2. Primary prevention
3. Secondary prevention
4. Tertiary prevention

**1. Primordial prevention**-Primordial prevention consists of actions and measures that inhibit the emergence of risk factors in the form of environmental, economic, social, and behavioural conditions and cultural patterns of living etc.

It is the prevention of the emergence or development of risk factors in countries or population groups in which they have not yet appeared.

For example, many adult health problems (e.g., obesity, hypertension) have their early origins in childhood, because this is the time when lifestyles are formed (for example, smoking, eating patterns, physical exercise).

In primordial prevention, efforts are directed towards discouraging children from adopting harmful lifestyles.

The main intervention in primordial prevention is through individual and mass education.

**2. Primary prevention**- Primary prevention can be defined as the action taken prior to the onset of disease, which removes the possibility that the disease will ever occur. It signifies intervention in the pre-pathogenesis phase of a disease or health problem. Primary prevention may be accomplished by measures of "Health promotion" and "specific protection".

It includes the concept of "positive health", a concept that encourages achievement and maintenance of "an acceptable level of health that will enable every individual to lead a socially and economically productive life".

Primary prevention may be accomplished by measures designed to promote general health and well-being, and quality of life of people or by specific protective measures.

Health promotion is "the process of enabling people to increase control over the determinants of health and thereby improve their health".

**Approaches for Primary Prevention-** The WHO has recommended the following approaches for the primary prevention of chronic diseases where the risk factors are established:

a. Population (mass) strategy
b. High -risk strategy

**Population (mass) strategy** -"Population strategy" is directed at the whole population irrespective of individual risk levels. For example, studies have shown that even a small reduction in the average blood pressure or serum cholesterol of a population would produce a large reduction in the incidence of cardiovascular disease. The population approach is directed towards socio-economic, behavioural and lifestyle changes.

The high -risk strategy aims to bring preventive care to individuals at special risk.

**High-risk strategy-** This requires detection of individuals at high risk by the optimum use of clinical methods.

**3. Secondary Prevention-**It is defined as "action which halts the progress of a disease at its incipient stage and prevents complications."

The specific interventions are: early diagnosis (e.g. screening tests, and case finding programs) and adequate treatment.

Secondary prevention attempts to arrest the disease process, restore health by seeking out unrecognized disease and treating it before irreversible pathological changes take place, and reverse communicability of infectious diseases.

It thus protects others from in the community from acquiring the infection and thus provides at once secondary prevention for the infected ones and primary prevention for their potential contacts.

Secondary prevention attempts to arrest the disease process, restore health by seeking out unrecognized disease and treating it before irreversible pathological changes take place, and reverse communicability of infectious diseases. It thus protects others



from in the community from acquiring the infection and thus provides at once secondary prevention for the infected ones and primary prevention for their potential contacts.

**Early diagnosis and treatment-**WHO Expert Committee in 1973 defined early detection of health disorders as "the detection of disturbances of homoeostatic and compensatory mechanism while biochemical, morphological and functional changes are still reversible." The earlier the disease is diagnosed and treated the better it is for prognosis of the case and in the prevention of the occurrence of other secondary cases.

**4. Tertiary Prevention-**It is used when the disease process has advanced beyond its early stages. It is defined as "all the measures available to reduce or limit impairments and disabilities, and to promote the patients' adjustment to irremediable conditions." Intervention that should be accomplished in the stage of tertiary prevention is disability limitation, and rehabilitation.

**Risks factor-**The concept of primary prevention is now being applied to prevention of chronic diseases such as coronary heart disease, hypertension and cancer based on elimination or modification of "risk factor" of the diseases.

**Modes of Intervention-** Intervention can be defined as any attempt to intervene or interrupt the usual sequence in the development of disease in man. This may be by the provision of treatment, education, help or social support.

5 methods of intervention :

1. Health promotion
2. Specific protection
3. Early diagnosis and prompt treatment
4. Disability limitation
5. Rehabilitation

**1. Health promotion-**"The process of enabling people to increase control over and to improve health". It is not directed against any particular disease, but is intended to strengthen the host through a variety of approaches (intervention).

In health promotion the Interventions include :

I. Health education:
II. Environmental modification
III. Nutritional interventions
IV. Lifestyle and behavioral changes

**Health education:** It is cost effective approach. Many diseases can be prevented

with little or no medical intervention if people are informed and encouraged to take necessary precautions against these diseases.

**Environmental modification :**

Provision of safe water supply
Sanitary latrines installation
Insect and rodent control
Improvement of housing

**Nutritional interventions:**

Food distribution and nutritional improvement of vulnerable groups.
Proper weaning practices / child feeding programme.
Food fortification.
Nutrition education-balanced diet.

**Life Style and behavioural changes :** Health education is the basic element of all health activity. It is of paramount importance in changing the views, behaviour and habits of people.

Encouraging physical activity, hygiene and healthy life styles
Discouraging smoking, physical inactivity, addiction
Modifying diet patterns.

**2. Specific protection-**To avoid disease altogether is ideal but this is possible only in a limited number of cases. Currently available interventions includes:

a) Immunization
b) Use of specific nutrients
c) Chemoprophylaxis
d) Protection against occupational hazards
e) Protection against accidents
f) Protection from carcinogens
g) Avoidance of allergens
h) Better environmental conditions e.g. control of air and noise pollution
i) Control of consumer product quality and safety of foods, drugs, cosmetics, etc.

**3. Early diagnosis and prompt treatment-**WHO expect committee defined it as "The detection of disturbances of homeostatic and compensatory mechanism while biochemical, morphological and functional changes are still reversible".

**Interventions:** Early diagnosis: better prognosis, better prevention of further occurrence of a disease / long term disability.



Screening
Contact Tracing
Individual exam (History, GPE, lab investigation)

**4. Disability limitation-**When a patient report late in the pathogenesis phase, the mode of intervention is disability limitation.

**Objective:** To halt the transition of the disease process from impairment to handicap.

Disease ⟶ Impairment ⟶ Disability ⟶ Handicap

Impairment is "any loss or abnormality of psychological, physiological or anatomical structure or function.

Disability is "any restriction or lack of ability to perform an activity in the manner or within the range considered normal for the human being."

Handicap is termed as "a disadvantage for a given individual, resulting from an impairment or disability that limits or prevents the fulfilment of a role in the community that is normal (depending on age, sex, and social and cultural factors) for that individual."

**5. Rehabilitation-**Rehabilitation is "the combined and coordinated use of medical, social, educational, and vocational measures for training and retraining the individual to the highest possible level of functional ability."

It includes all measures aimed at reducing the impact of disabling and handicapping conditions and at enabling the disabled and handicapped to achieve social integration (active participation of the disabled and handicapped people in the mainstream of community life.)

Medical rehabilitation: This is done through medical / surgical procedures to restore the anatomy, anatomical functions and physiological functions to as near normal as possible.

Vocational rehabilitation: It includes steps involving training and education so as to enable the person to earn a livelihood.

Social rehabilitation: This involves steps for restoration of the family and social relationships.

Emotional and Psychological rehabilitation: This involves steps to restore the confidence, personal dignity and confidence.

**Incidence and prevalence**

**INCIDENE** rate is defined as "the number of NEW cases occurring in a defined population during a specific period of time"

$$\text{Incidence} = \frac{\text{Number of new cases of specific disease duing a given time period}}{\text{Population at risk during that period}} \times 1000$$

**PREVALENCE** is as "the total number of all individuals who have an attribute or disease at a particular time dividd by the population at risk of having the attribute or disease at point in time or midway through the period"

**Susceptible host-** "A person or other animal including birds, arthropods, that gives shelter or place to a infectious agent under natural condition" is called as susceptible host.

**Incubation period-** "The time interval between the attack of an infectious agent and appearance of the first sign or symptom of the disease" is incubation period.

**Generation time-**"The interval of time between control of infection by a host and maximal infectivity of the host" is generation time.

**Communicable periods-** "The time during which an infectious agent may be transferred directly or indirectly from an infected person to another person, from an animal including arthropods".

**Secondary attack rate-**"The number of exposed persons developing the diseases within the range of the incubation period following exposure to the primary case".

**Host defences-**Host defences against infection are at once local and systemic, non-specific and specific, and humoral and cellular. It is difficult to identify any infectious agent that fails to stimulate multiple host defence mechanism.

**Immunity:** Protection against infections

**Immune system:** Molecules, cells and tissues that mediate responses to foreign substances

**Antigens:** Substances recognized by the cells and molecules of the immune system and to which the system responds. There is a phase of passive immunity transmitted to the baby from the mother across the placenta. Maternal antibody transmitted to infant is gradually lost a period of 6 months.

## Immunizing agents

The immunizing agents may be classified as vaccines, immunoglobulin's and antisera.

### Vaccines

It is an immuno-biological substance designed to produce specific protection against a given disease.



**Types-**

a. **Live Vaccine-** e.g. BCG and typhoid (bacteria), measles, oral polio, yellow fever, measles, rubella, mumps, chicken pox, influenza etc. (viral).

   Live vaccines are prepared from live organisms. These organisms have been passed repeatedly in the laboratory in tissue culture or chick embryos and have lost their capacity to induce full blown disease but potent their immunogenicity.

   Live vaccines should not be administered to person with immune deficiency diseases or to person whose immune response may be suppressed because of leukaemia, lymphoma, or malignancy or because of therapy with corticosteroids, antimetabolic agents, or radiation and pregnancy.

b. **Inactivated or Killed Vaccine-** e.g. cholera, pertussis, rabies, hepatitis B, Japanese encephalitis, KFD etc. (viral) Organisms killed by heat or chemical, when infected into the body stimulate active immunity.

c. **Toxoids- e.g Diptheria, Tetanus Bacilli (bacterial)-** Certain organisms produce exotoxins e.g. diphtheria and tetanus baciili. The toxin produced by these organisms are detoxicated and used in the preparation of vaccines. The antibodies produced neutralize the toxic moiety produced infection, rather than act upon the organisms.

d. **Cellular fractions-** Hepatitis B meningococcal - Vaccines prepared from extracted cellular fractions, e.g. meningococcal vaccine from the polysaccharide antigen of the cell wall, the pneumococcal vaccine.

e. **Combinations-** DPT, DP, DT, MMR etc.

If more than one kind of immunizing agents is included in the vaccine, it is called a mixed or combined vaccine.

### Immunoglobulin's

The human immunoglobulin system is compose of major classes (IgG, IgM, IgA, IgD, IgE) & sub classes with them.

**Two types-**

1. **Normal human immunoglobulin-** Normal human Ig is an antibody rich fraction, obtained from a pool of at least 1000 donors. It is used to prevent measles in highly susceptible individuals & to provide temporary protection up to 12 weeks.
2. **Specific human immunoglobulin-** The specific human Ig should contain at least 5 times the antibody potential of standard preparation per unit volume. The preparations are made from the plasma of patients who have recently recovered from an infection

or are obtained from individuals who have been immunized against a specific infection. E.g. chickenpox, rabies tetanus I/M injection

**Antisera or Antitoxins**

The term antiserum is applied to materials prepared in animals. Specific immunoglobulin's prepared from plasma of immunized animals(e.g. horses).

It is Cheap and less effective.

Immunity lasts for 2-3 weeks

**Examples** - ATS, ADS, ERIg(equine rabies immunization),Anti-Snake Venum and Anti-Gas-Gangrene Serumetc.

**The Cold chain**

Cold chain-the cold chain is a system of storage & transport of vaccine at low temp from the manufacturer to the actual vaccination site

**Cold chain equipments**

1. Walk in cold room-they are located at regional level to store vaccine up to 3 months & serve 4-5 districts.
2. Deep freezer (300ltr)- or ice lined refrigerators(300/240ltr)- supplied to all districts & WIC location to store vaccines. Deep freezers are used for making ice packs & to store OPV & measles.
3. Small deep freezer & ILR (140ltr)- one set is proved to PHC, urban family planning center.
4. Cold boxes- supplied to all peripheral centers used for transportation of vaccines
5. Vaccine carrier - carrier are used to carry small quantity of vaccines (16-20 vials)
6. Day carriers- are used to carry small quantities of vaccine to a nearby session.
7. Ice packs- contain water & no salt should be added to it.

The risk of cold chain failure is greatest at sub-center & village level. For this reason, vaccines are not stored at the sub-center level and must be supplied on the day of use.

**Disease Prevention and Control**

Every disease has certain weak points susceptible to attack. Identify these weak points and break the weakest links in the chain of transmission. This requires sound epidemiological knowledge of the disease Magnitude Distribution in time, Place and person Multifactorial causation Sources of infection Dynamics of transmission.

Three main measures are adopted for Prevention of infectious diseases :



1. Controlling the reservoir
2. Interruption of transmission
3. Immunizing the susceptible host

**1. Controlling the reservoir**- The general measures of reservoir control comprise- Early diagnosis, Notification, Epidemiological investigations, Isolation, treatment, Quarantine, surveillance and Disinfection.

1. Early diagnosis- Rapid identification of disease plays crucial role in the control of a communicable disease. Early diagnosis is needed for to treatment the patients For epidemiological investigations, e.g., to trace the source of infection from the known or index case to the unknown. To study the time, place and person distribution FOR the institution of prevention and control measures.
2. Notification- Once an infectious disease has been detected (or even suspected), it should be notified to the local health authority. Begin control measures, including the provision of medical care to patients. Diseases which are considered to be serious menaces to public health are included in the list of notifiable diseases. International Health regulations Cholera Plague and Yellow fever Diseases under surveillance by WHO Louse-borne typhus fever Relapsing fever Paralytic polio Malaria Viral influenza –A, SARS diseases, Small pox etc.
3. Epidemiological Investigations- The outbreak investigation helps to identify the source of infection the factors influencing its spread in the community. These may include geographical situation, climatic condition, social, cultural and behavioral patterns, THE character of the agent, reservoir, the vectors and vehicles, and the susceptible host populations.
4. Isolation- Separation for the period of communicability of infected persons or animals from others in such places and under such conditions, as to prevent or limit the direct or indirect transmission of the infectious agent from infected to susceptible.

Isolation has a distinctive value in the control of some infectious diseases. e.g., diphtheria, cholera, streptococcal respiratory disease, pneumonic plague, etc. If the diseases have large component of subclinical infection and carrier state even the most rigid isolation will not prevent the spread of the disease. e.g., polio, hepatitis A, and typhoid fever.

Duration of isolation the duration of isolation is determined by the duration of communicability of the disease and the effect of chemotherapy on infectivity. E.g. Chickenpox Until all lesions crusted; usually about 6 days after onset of rash. Measles From the onset of catarrhal stage through 3rd day of rash. Cholera and Diphtheria, 3 days after tetracycline started, until 48 hours of antibiotics.

**Types of Isolation-**

1. Standard isolation
2. Strict isolation
3. Protective isolation
4. High security isolation
5. Hospital isolation
6. home isolation
7. Ring immunization encircling of the persons.

5. Treatment- Many communicable diseases have been tamed by effective drugs. The objective of treatment is to kill the infectious agent when it is still in the reservoir before it is disseminated. Reduce the communicability of disease Cut short the duration of illness and Prevent development of secondary cases Limit the disability Individual treatment or mass treatment.

6. Quarantine- The limitation of freedom of movement

Absolute quarantine- well persons or domestic animals exposed to communicable disease for a period of time not longer than the longest usual incubation period of the disease.

Modified quarantine-a selective or partial limitation of freedom of movement, such as exclusion of children from school. Segregation the separation for special consideration, control of observation of some part of a group of persons (or domestic animals) from the others to facilitate control of a communicable disease. e.g. removal of susceptible children to homes of immune persons.

**2. Interruption of transmission:** This may mean changing some components of man's environment to prevent the infective agent from a patient or carrier from entering the body of susceptible person. E.g. water can be a medium for the transmission of many diseases such as typhoid, dysentery, hepatitis-A, cholera and gastroenteritis. Simple chlorination to complex treatment of water will eliminate these diseases.

Clean practices such as hand washing, adequate cooking, prompt refrigeration of prepared foods and withdrawal of contaminated foods will prevent most food borne illnesses. Vector control also includes destruction of stray dogs, control of cattle, pets and other animals to minimize spread of infection among them, and from them to man. Personal hygiene and proper handling of secretions and excretions.

**3. Susceptible Host** –This third link in the chain of transmission. They may be protected by one or more following point.



1. Active Immunization-Strengthening of the host defences is one of the ways to control the spread of infection. Active immunization is one of the most powerful and cost-effective weapons of modern medicine. There are some infectious diseases whose control is solely based on active immunization, e.g., polio, tetanus, diphtheria and measles. Vaccination against these diseases is given as a routine during infancy and early childhood with periodic boosters to maintain adequate levels of immunity.
2. Passive Immunization -Three types of preparations are available for passive immunity-Normal human immunoglobulin, Specific (hyperimmune)human immunoglobulin Antisera or anti-toxins. Passive immunity will provide immunity for 6 months.
3. Combined Passive and Active immunization
4. Chemoprophylaxis-Chemoprophylaxis implies the protection from, or prevention of disease. Causal prophylaxis implies the complete prevention of infection by the early elimination of the invading or migrating causal agent. For example, there is no causal prophylaxis available against malaria. Clinical prophylaxis implies the prevention of clinical symptoms; it does not necessarily mean elimination of infection.
5. Non-Specific Measures-Non-specific factors have played a dominant role in the decline of Diseases E.g., tuberculosis, cholera, leprosy and child mortality The industrialized world, declined these Diseases long before the introduction of specific control measures. Improvements in the quality of life e.g., better housing, water supply, sanitation, nutrition, education. Legislative measures to formulate integrated programme and effective implementation. Community involvement in disease surveillance, Disease control and other public health activities. Scarcity of funds, lack of an effective health infrastructure, public health laboratory facilities, equipment, supplies, trained personnel (e.g., epidemiologists). Public awareness needed for the investigation and control of communicable diseases.

**Investigation of Epidemic**

Importance of Outbreak Investigation-

- Stop the current outbreak from spreading
- Prevent future similar outbreaks
- Provide scientific explanation of the event
- Provide knowledge for the understanding of the disease process
- React to and calm public and political concerns
- Train epidemiologists
- Define **what** will be studied.

- Find out **where** the problem is " **Who** gets it " **When** it is occurring.
- Try to explain **why** the problem has such a distribution.,,
- Do specific studies to find out **how** the problem is occurring.

**Common Steps in the Epidemiologic Approach-**

The steps in the epidemiologic approach to study a problem of disease etiology are:

4. Perform an initial observation to confirm the outbreak
5. Define the disease–
6. Describe the disease by time, place, and person–
7. Create a hypothesis as to the possible etiologic factors–
8. Conduct analytic studies–
9. Summarize the findings–
10. Recommend and communicate the interventions or preventative programs

**Steps**

**Conduct field work–**

Perform initial observation

Establish the existence of an outbreak

Verify diagnosis "Collect data"

**Define disease–**

Establish case definition

Identify all cases

Identify the population at risk

**Describe disease by time, place, and person –**

Plot epidemic curve

Plot spot map

Tabulate data of exposure and other characteristics

Develop hypothesis

**Hypothesis:** exposure to X is associated with disease Y

Conduct analytic studies

Use appropriate analytic studies

Calculate measures of risk

Refine hypothesis

Conduct additional studies if needed



**Summarize findings**-Recommend and communicate interventions or preventative programs.

**Disinfection**

**Sterilization** is defined as the process where all the living microorganisms, including bacterial spores are killed. Sterilization can be achieved by physical, chemical and physiochemical means. Chemicals used as sterilizing agents are called chemisterilants.

**Disinfection** is the process of elimination of most pathogenic microorganisms (excluding bacterial spores) on inanimate objects. Disinfection can be achieved by physical or chemical methods. Chemicals used in disinfection are called disinfectants. Different disinfectants have different target ranges, not all disinfectants can kill all microorganisms. Some methods of disinfection such as filtration do not kill bacteria, they separate them out. Sterilization is an absolute condition while disinfection is not. The two are not synonymous.

**Decontamination** is the process of removal of contaminating pathogenic microorganisms from the articles by a process of sterilization or disinfection. It is the use of physical or chemical means to remove, inactivate, or destroy living organisms on a surface so that the organisms are no longer infectious.

**Sanitization** is the process of chemical or mechanical cleansing, applicable in public health systems. Usually used by the food industry. It reduces microbes on eating utensils to safe, acceptable levels for public health.

**Asepsis** is the employment of techniques (such as usage of gloves, air filters, UV rays etc.) to achieve microbe-free environment.

**Antisepsis** is the use of chemicals (antiseptics) to make skin or mucus membranes devoid of pathogenic microorganisms.

**Bacteriostasis** is a condition where the multiplication of the bacteria is inhibited without killing them.

**Bactericidal** is that chemical that can kill or inactivate bacteria. Such chemicals may be called variously depending on the spectrum of activity, such as bactericidal, virucidal, fungicidal, microbicidal, sporicidal, tuberculocidal or germicidal.

**Antibiotics** are substances produced by one microbe that inhibits or kills another microbe. Often the term is used more generally to include synthetic and semi-synthetic antimicrobial agents.

**Types of disinfection**

a) **Concurrent disinfection :** It is the application of disincentive measure as soon as possible after the discharge of infectious material from the body of an infected person, or after the soiling of articles with such infectious discharges.

b) **Terminal disinfection :** It is the application of disincentive measures after the patient has been removed by death or to a hospital or has ceased to be a source of infection or after other hospital isolation practices have been discontinued. Terminal disinfection is now scarcely practiced terminal cleaning is considered adequate, along with airing and sunning of rooms, furniture and bedding.

c) **Pre current disinfection :** Disinfection of water by chlorine, pasteurization of milk and hand washing may be cited as examples of precurrent disinfection.

**Natural agents**

1. **Sunlight :** The microbicidal activity of sunlight is mainly due to the presence of ultra violet rays in it. It is responsible for spontaneous sterilization in natural conditions. The sunlight is more effective in killing germs due to combination of ultraviolet rays and heat. By killing bacteria suspended in water, sunlight provides natural method of disinfection of water bodies such as tanks and lakes. Sunlight is not sporicidal, hence it does not sterilize.
2. **Heat :** Heat is considered to be most reliable method of sterilization of articles that can withstand heat. Heat acts by oxidative effects as well as denaturation and coagulation of proteins. Those articles that cannot withstand high temperatures can still be sterilized at lower temperature by prolonging the duration of exposure.
3. **Air:** exposure to open air acts by drying or evaporation of moisture which is lethal to most bacteria. In general, natural agents such as sunlight and air, because of their vagaries, cannot be totally depended upon for disinfection.

**Physical agents**

1. **Burning :** Burning or incineration is an excellent method of infection. Inexpensive articles such as contaminated dressing, rags and swabs can be disposed off by burning. Addition of sawdust, paper, kerosene or other combustible material aid in burning. Faeces can be disposed off by burning. Burning should not be done in open air; it is best done in an incinerator.
2. **Hot air :** Hot air is very useful for sterilizing articles such as glassware, syringes, swabs, dressing, French chalk, oils, Vaseline and sharp instruments. The drawback of hot air is that it has no penetrating power, and is therefore not suitable for disinfection of bulky articles such as mattresses. Hot air sterilization is usually done in a hot air oven. The temperature of the air in the oven should be maintained at 160-180 deg. C. for at least one hour to kill spores. Unfortunately, such elevated temperature destroys plastic, rubber and other delicate substances.



3. **Boiling :** Boiling is an effective method of disinfection. It provides an atmosphere of boiling and steam. Boiling for 5-10 minutes will kill bacteria, but not spores or viruses. Boilers provide temperature above 90 deg.C.in an atmosphere of steam, which is exposed to open air. To ensure destruction of spores, temperature above 100 deg. C. would be required which cannot be achieved in boilers. Boiling is suitable for disinfection of small instruments, tools which are not used for subcutaneous insertion, lien, and rubber goods such as gloves.
4. **Autoclaving :** Sterilizers which operate at high temperature and high pressure called autoclaves. They generate steam under pressure which is the most effective sterilizing agent. Autoclaves fall into two categories- those with inner and outer chambers and those with single chambers. Basically, the autoclave works on the same principle as the domestic pressure cooker. Autoclaving is widely used in hospital and laboratory practice. It destroys all forms of life, including spores. Steam attains a higher temperature under pressure, has greater power of penetration than ordinary steam.
5. **Radiation :** Ionizing radiation is being increasingly used for sterilization of bandages, dressing, catgut and surgical instruments. The objects to be sterilized are placed in plastic bags before radiation, and they will remain sterile until opened. Ionizing radiation has great penetrating powers with little or no heating effect. This method is most effective, but very costly. Commercial methods of sterilization are normally carried out by gamma radiation. This technique requires special packing and equipment. It is now one of the requires special packing and equipment. It is now one of the most viable, safe and economic methods used today.

**Chemical agents :** Articles which cannot be sterilized by boiling or autoclaving may be immersed in chemical disinfectants. Chemical agents may also be used for the disinfection of faeces, urine and other contaminated material.

**1. Phenol and related compounds**

**Phenol**-Pure phenol or carbolic acid is the best known member of this group. On exposure to air, the colourless crystals of phenol become pinkish, and on longer exposure, the colour deepens to dark-red. Pure phenol is not an effective disinfectant. It is used as a standard to compare the germicidal activity of disinfectants.

**Crude phenol**-The phenol that is commonly used for disinfection is crude phenol, which is a mixture of phenol and cresol. It is dark oily liquid. It is effective against gram positive and gram negative bacteria, but only slowly effective against certain viruses. Phenol disinfectants are not readily inactivated by organic matter. Its effect is greatly weakened by dilution. It should not be used in less than 10 percent strength for

disinfection of faeces. In 5 percent strength, it may be used for mopping floors and cleaning drains.

**Cresol-** Cresol is an excellent coal-tar disinfectant. It is 3-10 times as powerful as phenol. Cresol is best used in 5-10 percent strength for disinfectant of faeces and urine.

**Cresol emulsions-**Cresol emulsified with soap is known as 'saponified cresol'. Lysol, Izal and Cyllin are cresol emulsions.

**Chlorhexidine-** This is one of the most useful skin antiseptics. Highly active against vegetative gram positive organisms, and moderately active against gram positive microbes. It is soluble in water and alcohol. It is inactivated by soaps and detergents. 0.5 percent alcoholic solutions can be used as effective hand lotions. Creams and lotions containing 1 percent chlorhexidine are recommended for burns and hand disinfections.

**Hexachloephane-** This antiseptic is highly active against gram positive organisms, but less active against gram negative organisms.

**Dettol-** It is a relatively non-toxic antiseptic and can be used safely in high concentrations. It is more easily inactivated by organic matter than many other phenolic disinfectants. It is active against streptococci, but worthless against some gram negative bacteria. Dettol 5 percent is suitable for disinfection of instruments and plastic equipment a contact of at least 15 minutes will be required for disinfection.

**2. Quaternary ammonia compounds**

**Cetrimide-** It is manufactured under the trade name "cetavlon". It is actively bactericidal against vegetative gram positive organisms, but much less so against gram negative organisms. Cetavlon is soluble in water, it has soapy feel. It may be used in 1-2 percent strength.

**Savlon-** It is a combination of cetavlon and hibitine. Plastic appliances like lippes loop may be disinfected by keeping them in normal strength savlon for 20 minutes. Savlon 1 in 6 in spirit is more effective than savlon 1 in 20 aqueous solutions.

**3. Halogens and their compounds**

**Bleaching powder (chlorinated lime)-**It is white amorphous powder with a pungent smell of chlorine. A good sample of bleaching powder contains about 33 percent of "available chlorine". It kills most of the organisms when used the strength of 1-3 percent. Bleaching powder is widely used in public health practice in India for disinfection of water, faeces and urine and as a deodorant.

**Drawback-** Bleaching powder is unstable compound and loses its chlorine content storage.



**Sodium hypochlorite** –It acts in the same way as bleaching powder, but is stronger, containing 80,000 to 1,80,000 ppm of available chlorine. It corrodes metals.

**Halazone tablets (chlorine tablets)-**One tablet of halazone containing 4 mg halazone is sufficient to disinfect about 1 litre of water in about ½ to 1 hour.

**Iodine-**It is an alcoholic solution of 1-2 percent is still one of the most effective skin antiseptic available, but it stains the skin and may produce sensitivity reactions in some peoples. Plastic appliances like lippes loop may be sterilized by keeping in 1/2500 aqueous solution of iodine. Iodine is cheap, readily available and quick in action.

**Iodophors-** These are complexes of iodine and solubilizers, e.g. povidine-iodine(betadin), claimed to possess the same activity as iodine, but non-irritant, and do not stain the skin.

**4. Alcohols-** Ethyl and isopropyl alcohols are commonly used as antiseptic and disinfectants. Ethyl alcohol in the form of industrial methylated spirit is the alcohol most commonly used for skin disinfection and hand washing. Pure alcohol has no power of disinfection but when diluted to 70 percent strength, it is a good antiseptic.

**5. Formaldehyde-** More commonly known in solution as formalin formaldehyde is a highly toxic and irritant gas which precipitates and destroys protein. It is effective against vegetative bacteria, fungi and many viruses but only slowly effective against bacterial spores and acid fast bacteria. 2-3 percent solution for spraying rooms, walls and furniture. The gas may also be used for disinfection of blankets, beds, books, and other valuable articles which cannot be boiled.

**6. Miscellaneous -**

**Lime-** It is the cheapest of all disinfectants. It is used in the form of fresh quick lime or 10-20 percent aqueous suspension known as "milk of lime". Faeces and urine can be disinfected by mixing 10-20 percent aqueous suspension of lime and allowing the disinfectant to act for 2 hours. Lime also used for treating walls. As a deodorants, lime is sprinkled in cattle sheds and public places where urinals and latrines are located.

**Ethylene oxide-** Heat- sensitive articles may be sterilized at 55-60 deg. C by ethylene oxide which kills bacteria, spores and also viruses.

## Ayurvedic Concept of Vyadhikshamatva and Sankramakarogas

**Definition**

व्याधिक्षमत्वं नाम व्याधिबल निरोधकत्वम् । व्याध्युत्पादकप्रतिबंधकत्वमिति ॥ (च.सू. 26)

Immunity is the factor, which prevents the diseases or in certain cases severity of disease. In Ayurveda it is known by different synonyms like Ojas, Tejas, Prana, Bala etc. each emphasizing the importance of immune factor in the body.

**Importance of ojus**

ओजस्तु तेजो धतुनां । (अ.ह.सू. 11/37)

Ojus is the essence of seven Dhatus according to Shushruta it is one among the seats of Prana i.e. life.

प्राणायतनमुत्तमं । (सु.सू. 15/26)

Derangement of Ojus produce several diseases & even death.

**Nirutki**

ओजस्तु तेजो धतुनां शुक्रन्तानां परं स्मृतं । (अ.ह.सू. 11/37)

Ojus is the essence of seven Dhatu & it is responsible for the strength of an individual.

तत्र रसादीनां धातूनां यत्परं तेजस्तत् । खल्वोजस्तदेव बलमित्युच्यते स्वशास्त्रसिद्धन्तम् ।
(सु.सू. 15/25)

Ojus is the essence of Rasadi Dhatu that itself is synonym as Bala according to the principles mentioned in classics.

ओजस लक्षण

ओजः सोमाअत्मकं स्निग्धं शुक्लं शीत स्थिरम् सरम् । विविक्तं मृदु मृस्त्रं च प्राणायतनमुत्तमम् ॥
(सु.सू. 15/26)

Ojus is having mild quality like Snigdha, Shukla, Shita, Sthira, Sara, Viviktama, Mrudu, Mrustna & best among the seats of Prana i.e. Pranayatana.

हृदितिष्ठति यच्चुद्धं रक्तं ईषत् सपीतकम् । ओजः शरिरे संख्यातं तन्नाशात् विनश्यति ॥ (च.सू. 17/74)

Para Ojus which is Astha Bindu in quantity resides in heart. It has reddish yellow color, if it gets destroyed then there is destruction of whole body.

उत्पत्ति–

भ्रामरेः फलपुष्पेभ्यो यथा संभ्रीयते मधु । तद्वदोजः शरिरेभ्यो गुणेः संभ्रीयते नृणाम् ॥ (च.सू. 17/76)

As the bee collect honey from the essence of different flower in the same way ojus is essence of all the Dhatu from the human body.

प्रथमं जायते ध्योजः शरिरेस्मिन् शरीरीणां । सर्पि वर्ण मधुरसं लाजागन्धि प्रजायते ॥ (च.सू. 17/75)

Ojus is formed first during the formation of the body which is characterized by Ghruta, Varna,& smell of Laja & sweet in taste.

ओजस्तु तेजोधातुनां । (अ.ह.सू. 11/37)

Ojus is considered to be formed as the essence of seven Dhatus.



पर ओजस–

प्राणाश्रयस्यौजसोअष्टौ बिन्दवो हुद्याश्रयाः एतबिन्दुक परमोजो ज्ञेयम ।
अष्टबिन्दुकस्य अवयवनाशे अपि मृत्युर्भवतीति ॥

Para Ojus is the prime Ojus, where Prana the life resides. It is Ashta Bindu, present in heart, even a part of destruction of para Ojus leads to death.

अपर ओजस–

अर्धाञ्जलि परिमाणं तु यदोजस्तदप्रधानः यच्चारिरे वक्ष्यति–तावच्चैव श्लैष्मिकस्योजस्यः प्रमाणम् ॥
(शा.स. 7)

Apara Ojus is half Anjali in quantity. It is less important compared to Para Ojus. Even Shlaishmika Ojus is half Anjali in quantity. They circulate in the vessels connected with heart.

ओजवहस्त्रोतस–

तेन मूलेन महता महामूला मता दश । ओजोवहाः शरिरेस्मिन विद्याम्यन्ते समन्तत ॥ (च.सू. 30/8)

Ojus circulates throughout the body through Dasha Dhamani i.e. ten main blood vessels.

**Relation between Ojus & Bala**

प्राकृतस्तु बलं श्लेष्मा विकृतो मलमुच्यते । स चैवौजः स्मृतः कये ॥ (च.सू. 17/117)

Kapha in the normalcy gives strength to the body & known as Bala. In abnormal state it is like mala i.e. excreta, which should be expelled out of the body. This Bala itself considered as Ojus.

**Types of Bala**

1. Sahaja Bala (Natural)
2. Kalaj (Time factor)
3. Yuktikruta (by once intelligence)

सहज बल–

सहजं यच्छरिरे सत्वयोः प्रकृतं । प्रकृतमिति जन्मादि प्रावृत्तं धातु वृध्द्या ॥ (च.सू. 11/36)

Bala the strength, both mental & physical are present naturally by birth. Certain people are strong by birth due to their excellence of Dhatus this depends on healthiness of Shukra, excellence of time & place.

कालज बल–

कालकृतमृतुबीज भागजं वयः कृतं च । ऋतुविभागजं आदावन्ते च दौर्बल्य ॥ (च.सू. 11/36)

The strength due to favorable conditions like youth, season etc. the person naturally has less strength in childhood & old age strength increases during Visarga Kala i.e. period of nourishment.

युक्तिकृत बल–

युक्तिकृतं पुनस्तद्यदाहार चेष्टायोगजं ।

आहारस्य मांससर्पिरअहे चेष्टायाः उचित विश्रामा व्यायामदेर्योगः योगशब्देन रसायनादि योग ।

(चक्रपाणि)

strength acquired by the intake of diet such as flesh, ghee etc. which enhance strength, correct exercise, rest & Rasayana & strength enhancing drugs.

बल वृद्धिकर भावा–

बलवत देश–सैन्दवाः बलवन्ताः पुरुषाः ।

बलवत काल–हेमन्तु शिशिरे काले जातः

बीज, आर्तव, गर्भाशय–प्रशस्त निर्दोष

आहार संपत–सात्म्य संपत सात्म्य आहार, सात्म्य विहार

स्वभावसंसिद्धि–बलजनक कर्म सं सिद्धि व्यायाम संहर्ष,

शरिर वृद्धिकर भाव–

शरिर वृद्धिकरास्त्विमे भावा भवन्ति । तद्यता कालयोगः स्वभावसंसिद्धिः आहार सौष्ठवम अविघातश्च ॥ (च.शा. 6/12)

कालयोग– youthfulness

स्वभावसंसिद्धि– unknown factor (genetic factor)certain unseen factors favours the growth of the body naturally.

आहार सौष्ठवम– good nutritious, energy giving & Rasayanakari food.

अविघात– avoiding factors causing injury like excessive exercise, excessive sexual indulgence, mental trauma etc.

बलाधिष्ठान्मारोग्यं ।

Health is dependent on Bala.

### Functions of Ojus

Ojus is very useful to maintain the condition of the good health. It not only nourishes all the body constituents but also nourishes the mind. It controls or regulates all the physiological activities and immunity power of the body. In Ayurveda it is believed that life cannot exist without Oja in the body. Some of the functions are as follows



- Balen (strength bestows)
- Sthira Upachita Mamsata(stability and growth of muscles)
- Sarva Cheshta Swapratighatah(ability to per formal activities without any hindrance)
- Swara Varna Prasado(clarity of voice and brightness of color or complexion)
- Karana Nama Aatma Karya Pratipatti (ability of external and internal sense organs to perform their own functions.)



### Abnormalities of Ojus

Oja Visransa, Oja Vyapada and Oja Kshaya are the three stages of Oja Vikriti which may occur in various conditions and diseases ranging from physical and mental fatigue to a cute and chronic mild and severe types of diseases. According to ancient Ayurvedic view these conditions may arises are sult of metabolic abnormalities leading to diminished production of Ojas. They are as follows

1. Ojas Visransa
2. Ojas Vyapada
3. Ojas Kshaya

### Symptoms of Ojas Visransa (first stage)

- Sandhi Vishlesh (looseness of joints)
- Gatra Sada (weakness of the body)
- Dosha Chyavanam (provoked Tridoshas move away from their normal seats)
- Kriya Sannirodha (inability to perform normal functions)
- Shrama (lethargy in organs).
- Aprachuryam Kriyanam (It also results in the impairment of Kayika (physical), Vachika (vocal)and Mansika (mental) functions of the body.

### Symptoms of Ojas Vyapad (second stage)

- Stabha Gurugatrata (Stiffness and feeling heaviness in the body)
- Vata Shopha-(swelling caused by Vata Dosha impairment)
- Varna Bheda (change in complexion or discoloration)
- Glani (exhaustion)
- Tandra (drowsiness or stupor)
- Nidra (sleep)

### Symptoms of Ojas Kshaya (third stage)

- Murchha (unconsciousness or fainting)

- Mansakshaya (decrease of muscles)
- Moha (mental disturbance specially in judgment)
- Agyan (loss of sense)
- Pralap (delirium)
- Mrityu (death)

**According to Charak Samhita**

- Bibheti (person is constantly suffer from fear complex)
- Durbaloabhikshanam (physical and mental debility)
- Worries always without apparent reason
- Vyathita Indriya (feels discomfort in the sense organs)
- Duschhaya (developed impaired or loss of complexion of body)
- Durmana (feeble mental stamina)
- Ruksha (dryness or roughness)
- Shama (skin becomes black)
- Kashya (Emaciation of the body).

**Factor responsible for reduction of Ojas-** Various causes which are responsible for the decreases of Ojas have been mentioned in Ayurveda. They are as follows :

- Ativyayama (excessive physical exercise)
- Anashana (fasting for long period)
- Chinta (constant worry)
- Consumption off odd switch are dry(moisture less)in nature
- Pramitashana (consuming very less quantity of food)
- Vata-atapaseven (excessive exposure to heavy blows of wind and sun heat)
- Bhaya (fear)
- Shoka (grief and sorrow)
- Rukshapaan (drinking strong wines)
- Prajagar (keeping awake eat nights)
- Excessive limitation of Kapha, Shonita (blood), Shukra (semen) and mala (urine and faces).
- Kala (due to old age)
- Abhighata (mental and physical trauma or injury to Marma (vital parts)
- Ativyavaya (excessive sex)



**Specific defences-** Specific defences come into play, once microorganisms have breached local defence mechanisms. By virtue of these defences, the host is able to recognize, destroy and eliminates antigenic material e.g. bacteria, viruses, proteins etc. foreign to his own.

1. Active immunity
   a) Humoral immunity
   b) Cellular immunity
   c) Combination of the above
2. Passive immunity
   a) Normal human Ig
   b) Specific human Ig
   c) Animal antitoxins or antisera.

**1. Active immunity-** It is the immunity which an individual develops as a result of infection or by specific immunization and is usually associated with presence of antibodies or cells having a specific action on the microorganism concerned with a particular infectious disease or on its toxin. The active immunity depends upon the humoral and cellular responses of the host. Active immunity may be acquired in 3 ways-

a) Following clinical infection e.g. chickenpox, rubella and measles.
b) Following subclinical or in apparent e.g. polio and diphtheria.
c) Following immunization with an antigen which may be a killed vaccine, a live attenuated vaccine or toxoid.

**The immune response-**

**Primary Response-**

First Administration of Antigen

⇩

I) 2-3 Days Igm Antibody Rises Slowly

⇩

II) In Few Days Igg Appears Reaction Peak By 7-10 Days.

⇩

3-10 Days Of Latent Period Is Present Before Antibody Appears In The Blood.

**Secondary Response- (booster)**

Antigen—IgM——Brief production IgG antibody——Larger & prolonged production

**Humoral Immunity-** The B cells (bone marrow derived lymphocytes)Proliferate& manufacture specific antibodies, after presentation by macrophages & produce humoral immunity. Antibodies are present in immunoglobulin fractions of serum. IgG, IgM, IgA, Igd & IgE are 5 main classes. These circulate in the body & neutralize the microbes.

**Cellular immunity-** Even though humoral immunity work effectively, cellular immunity is essential in cases of some pathogens like M. laprae, M. tuberculosis S. typhoid. Which escape bactericidal action of leukocyte. The macrophages are stimulated bylymphocytes secreted by T- lymphocytes.

**Combination of the both-** In addition to the B & T lymphoid cells, the co-operate with macrophages & human K (killed) cells. Which constitute complex events of immunity. e.g. Helper T cells are essential for the proper production of antibodyto most antigens.

Suppresser T cells inhibits immunoglobulin synthesis cytotoxic cells recognize membrane viral antigens, through specific antibody natural killer cell act against non specific virus infected target cells.

**Advantages of active immunity-**

1. The duration of protection is usually long lasting
2. Excluding some exceptions sever reactions are rare.
3. The protective efficacy of active immunization is more than passive immunization. It is most 100% in some cases
4. Active immunization is cheaper than passive immunization.

**Passive immunization-**When the antibodies produced in one body (human or animal) are transferred to another, to induce protection against diseases is known as passive immunity.

1. Antibody containing preparation like Immunoglobulin or antiserum is given.
2. Antibodies passing across the placenta e.g. Human milk containing protective antibodies IgA transferred to body.
3. Passive cellular immunity induced by lymphocytea transfer is still under experiment.

**Advantages-** immunity gets established quickly.

Passive immunization is useful for individual who cannot form antibodies , or for normal host who takes time to develop antibodies following active immunization.

**Disadvantages-**

1. Immunity produced is established temporary & lasts for few days to mouths.



2. It is costlier than active immunization.

Both active & passive immunization can be consider under Yuktikruta Bala .

**Herd immunity-**The resistance of a community or group of people to a particular to the spread of disease in the human herd, if the disease is herd immunity. It acts an immunological barrier to the spread of disease in human herd. If the herd immunity is the high the occurrence of an epidemic is unlikely. It is achieved in case of diphtheria & poliomyelitis.

**Sankramakarogas-(Contagious Diseases)**

प्रसङ्गगात्रसंस्पर्शान्निश्वासात सहभोजनात । सहशय्यासनाच्चापि वस्त्रमाल्यानुलेपनात ॥
कुष्ठं ज्वरश्च शोषश्च नेत्राभिषन्द एव च । औपसर्गिकरोगाश्च संक्रामन्ति नरान्नरम ॥ (सु.नि.कुष्ठ निदान)

Certain group of diseases is spread from one person to another by direct or indirect contact and is termed as Sankramika Rogas. Sushruta has clearly mentioned that diseases (Aupasargikarogas) like Kushta (leprosy), Jwara (fever), Shosha (tuberculosis), Netrabhishyanda (conjunctivitis) etc. infectious diseases spread from one person to the other. The exposure or contact can be a simple association, touch, inhalation of other's expired air, eating together in one plate, sleeping & lying together and wearing other's clothes etc things. Even sexual contact with an infected woman is said to give rise so many sexual transmitted diseases. Vagbhata says all the diseases are transmitted like this only but skin diseases & diseases of the eyes have more communicability. It is also stated that Aganturoga can vitiation of Dosha which may leads to manifestation of a new Nijaroga and vice versa.

Even though the Ancient authors not clearly described about the various modes infectious diseases transmission, but we can understand from the above statement that the some infectious diseases will spread by direct skin contact or use of used articles of the patient (Kushta, Netrabhishyanda etc), some by direct droplet infection (Sosha, Yakshma etc), some by with oral ingestion (Jwara etc), some by sexual intercourse. (Upadamsa etc.)

## Epidemiology of Communicable Diseases

**Chicken Pox-(Varicella-Zoster Virus Infections)**

Chicken pox is caused by a virus called **varicella zoster.** People who get the virus often develop a rash of spots that looks like blisters all over their bodies. The blisters are small and sit on an area of red skin that can be anywhere from the size of a pencil, eraser to the size of a dime.

**Incubation Period-** 10 -21 days

**Source of infection-** Usually a case of chickenpox.

**Infectivity period-** Usually starts a day before appearance of rash and lasts for about seven days.

**Distribution-** is worldwide.

**Seasonal incidence-** more common during spring.

**Host Factors**

**Age-** Children under 10 years of age.

**Environmental factors-** During the first six month of the year.

**Transmission-** Person to person by droplet infection.

**Clinical Features**

**Pre-eruptive stage-** Onset is sudden with mild or moderate fever, pain in back, shivering and malaise. This stage is very brief, lasting about 24 hours.

**Eruptive stage-** rash is often the first sign. It comes on the day fever starts, rashes are symmetrical. It first appears on the trunk where it is abundant, and them come on the face, arms and legs.

The best known symptom of chickenpox is the itchy, red rash that breaks out on the face, scalp, chest, back, and sometimes arms and legs. The rash usually appears about 2 weeks after exposure to the virus and begins as superficial spots.

The spots quickly fill with a clear fluid, rupture, and turn crusty. The scabs then fall off in a week or two. The rash continues to break out for the first 1 to 5 days, so spots at various stages of development may be present at the same time. Chickenpox seldom lasts for more than 2 weeks, from the appearance of the first rash to the disappearance of the last one. A secondary infection of the ruptured rash by bacteria may cause high fever and skin scarring.

**Treatment-** Chickenpox is a virus, so doctors will not prescribe an antibiotic. Over time, the body's immune system will clear out the virus. Usually, those infected are asked to stay home, rest, cut their nails, and depending on the severity of the rash, wear gloves to prevent further infections. Anti-itch creams and staying in cooler temperatures will help with the rash.

**Prevention-** Varicella zoster immunoglobulin (VZIG) given within 72 hours of exposure has been recommended for prevention of chickenpox in exposed susceptible individuals particularly in immune suppressed persons.

**Control-** The usual control measures are notifications, isolation of cases for about 6 days after onset of rash and disinfection of articles soiled by nose and throat discharges.



**Difference between smallpox and chicken pox-**

| Small pox | Chickenpox |
|---|---|
| **1. Incubation** – about 12 days | About 15 days |
| **2. Prodormal symptoms-** severe | **Usually mild** |
| **3. Distribution of rash-** | |
| a. Centrifugal | a. Centripetal |
| b. Palm and sole frequently involved | b Seldom affected |
| c. Axilla usually free | c. Axilla affected |
| d. Rash predominant and bony prominences. | d. Rash mostly on flexor surfaces. |
| **4. Characteristics of The Rash-** | |
| a. Deep-Seated | a. Superficial |
| b. Vesicles multilocular and umbilicated appearance | b. Unilocular; dew-drop like |
| c. Only one stage of rash may seen at one time | c. Rash pleomorphic<br>d. An area of inflammation is seen around the vesicles. |
| **5. Evolution of rash-** | |
| a. Evolution of rash is slow, deliberation and majestic, passing through definite stages of macule, papule, vesicle and pustule. | a. Evolution of rash very rapid |
| b. Scabs begin to form 10-14 days after the rash appears | b. Scabs begin to form 4-7 days after the rash appears. |
| **6. Fever** -Fever subsides with the appearance of rash, but may rise again in the pustular stage | Temperature rises with each freah crop of rash. |

In Ayurveda Chicken pox compare with Sheetala.

**Sheetala Nidan**

देव्याः शीलतयाऽऽक्रान्ता मसूर्यव हि शीतला। ज्वर एव भूताधिष्ठतो विषमज्वर ॥ (भा.प्र.)

God Prakopa or vitiation of Bhuta which produce Jwara. This Jwara like Vishama Jwara, then small Pitika appearance called Sheetala.

**Treatment-** In Strava condition apply the Gomaya Bhasma.

Chichabeejadi Yoga- Chicha Beeja and Haridra kalka.

Mocharasadi Yoga- Kadali Rasa and Chanada choorna for Pana.etc

## Measles (Rubeola)

रोमकूपोन्नति समा रागिण्यः कफपित्तजाः । कासारोचकसंयुक्ता रोमान्त्यो ज्वरपूर्विकाः ॥

Small, red eruption at the roots of the hairs making slight elevations, associated with cough, loss of appetite and preceded by fever are known as Romantika and caused by increase Kapha and pitta Dosha.

Treatment adopted for Romantika like Visarpa and Kustha Chikitsa.

Measles also known as Rubeola and Red spot. Measles is an acute highly contagious viral disease caused by measles virus. It is characterized by fever,URT catarrhal inflammation, koplik's spots and maculopapules.

**Agent-** RNA virus (Paramyxo virus family, genus Morbillivirus )

**Source of infection-**cases of measles, but not carriers.No animal reservoir

**Infective material-** Nasal secretion,Respiratory tract&Throat

**Communicability-** Highly infectious during prodromal period and at the time of eruption. Secondary attack rate- > 80%

**Host factors-**

**Age-** 6 months to 3 years even up to 10 years

Incidence equal in both sexes

**Immunity-**lifelong immunity

**Nutrition-**Malnourished children are susceptible.

**Environmental factor-**Winter season, over crowding

**Transmission-**Droplet infection, 4 days before and 4 days after rash

**Incubation period-** 10 days

**Clinical Feature- There are three stages**

1. Prodromal stage: Begins 10 days after infection and lasts until day 14. It is characterized by fever, coryza with sneezing and nasal discharge, cough, redness of the eyes, lacrimation and often photophobia. There may be vomiting or diarrhoea. A day or two before the appearance of the rash koplik's spots appear on the buccal mucosa opposite the first and second upper molors. The koplik's spot are small bluish-white spots on a red base smaller than the head of a pin and they show the pathogenicity in measles.
2. Eruptive phase: This phase is characterized by a typical, dusky-red, macular or maculapopular rash which begins behind the ears and spreads rapidly in a few hours over the face and neck and extends down the body taking 2 to 3 days to progress to the lower extremities.
3. Post-measles stage: The child will have lost weight and will remain weak for a number of days. There may be failure to recover and a gradual deterioration into chronic illness due to increase susceptibility to other bacterial and viral infections, nutritional and metabolic effects and the tissue destructive effects of the virus. There may be growth retardation and diarrhea, cancrum oris, pyogenic infections, candidiasis, reactivation of pulmonary tuberculosis etc.



**Complications :** Measles-associated diarrhea, pneumonia and other respiratory complications and otitis media. The serious neurological complications like febrile convulsions, encephalitis and sub-acute sclerosing and pan-encephalitis.

**Treatment-**There is no specific antiviral therapy; treatment is entirely supportive. Antipyretics (acetaminophen or ibuprofen) for fever, bed rest maintenance of an adequate fluid intake are indicated.

Humidification may alleviate symptoms of laryngitis or an excessively irritating cough; it is best to keep the room comfortably warm rather than cool. Patients with photophobia should be protected from exposure to strong light. Bacterial complications of otitis media and bronchopneumonia require appropriate antimicrobial therapy.

**Prevention**

**Measles Vaccination-** It is now include in the universal immunization programme. This UIP administered a single dose of 0.5 ml subcutaneous injection at the age of 9-12 months without any boostered dose. Only live attenuated vaccines are recommended for use. Immunity develops 1-12 days after vaccination and standing probably for life long, one dose of vaccination provide 95% protection.

**Control measures-** Isolation for 7 days after onset of rash.

Immunization of contacts within 2 days of exposure.

Prompt immunization at the beginning of an epidemic is essential to limit the spread.

## Diphtheria

गलेऽनिलः पित्तकफौ च मूर्च्छितौ प्रदूष्य मांसं च तथैव शोणितम ।
गलोपसंरोधकरैस्तथाऽकुरै र्निहन्त्यसून व्याधिरय हि रोहिणी ॥ (सु.नि. 16)

Vata, Pitta and Kapha getting increased together invade Mamsa and Rakta and produce sprouts in the throat obstruction of the passage and death. This disease is called Rohini.

**Treatment-** Vamana, Dhumapana, Gandusha, Kaval and Nasya indicated.

Diphtheria is a bacterial infection in the upper respiratory tract. Typically it is characterized by sore throat, swollen neck glands, high temperature and breathing difficulties.

**Incubation period:** 2-6 days

**Agents' Factors**

**Causative organism-** Coryynebacterium Diphtheriagram positive organism

**Source of infection-** may be case and carrier.

**Infective material-** Nasophayngeal secretions, discharge from skin lesion, fomites and infected dust.

**Period of infectivity-** unless treated, the period of infectivity may vary from 14-28 days.

**Host Factors**

**Age-** children aged 1 to 5 years.

**Sex-** both sexes are affected.

**Immunity** – infants born of immune mother are relatively immune during the first few week or months of life.

**Environmental Factor-**Cases of diphtheria occur in all seasons.

**Mode of transmission-** the disease is spread mainly by droplet infection.

**Portal entry-**

Respiratory route – commonly the portal of entry is respiratory tract.

Non-respiratory routes- the portal of entry sometimes may be the skin where cuts, wounds and ulcers not properly attended to may get infected with diphtheria bacilli.

**Signs and Symptoms-** usually begin two to five days after a person becomes infected and may include:

- Respiratory tract forms of diphtheria consist of pharyngo tonsillar, laryngeo tracheal, nasal and combinations.
- Patients with pharyngo tonsillar diphtheria usually have a some throat, difficult in swallowing and low grade fever.
- Laryngeal diphtheria causes obstructive croup stridor and eventually asphyxia

**Treatment-** Specific treatment with antibiotics and an antidote to the toxin is available.



Diphtheria antitoxin should be given without delay IM or IV in doses ranging from 20,000 to 1,00,000 units or more, depending upon severity.

Active immunization in childhood with diphtheria toxoid yields antitoxin levels adequate until adulthood. Usually combined with tetanus toxoid and/or pertussis vaccine (DPT vaccine).

**Preventive Measures**

DPT vaccine should stored at 4-8 degree c. Potency of vaccine lasts upto 18 month if properly stored the vaccine should be frozen.

Dose- DPT vaccine is 0.5 ml.

Mode of administration – intramuscular only.

All children must receive an initial course of immunizations and boosters (5 injections at 2 months, 4 months, 6 months, 15-18 months, and at 4-6 years).

Regular booster (every 10 years) with Td (tetanus and diphtheria) toxoids are particularly important for adults who travel to developing countries.

**Control Measures**

1. Cases and carriers

a) Early detection: Carriers can be defected only by culture method. Swabs can be taken from both the nose and throat and examined by culture methods for diphtheria bacilli.

b) Isolation: Suspected cases and carriers should be promptly isolated, preferably in a hospital for at least 14 days.

c) Treatment: For Cases when diphtheria is suspected diphtheria antitoxin should be given without delay. Iron or IV in doses ranging from 20,000 to 1,00,000 units or more depending upon the severity of the case.

For Carriers: The carriers should be treated with 10 days course of oral erythromycin which is the most effective drugs for the treatment carriers.

2. Contacts: Contacts merit special attention. They should be throat swabbed and their immunity status determined. The bacteriological surveillance of close contact should be continued for several weeks.

3. Community: The only effective control is by active immunization with diphtheria toxoid. All children and are not previously immunized should be given a dose of 500 to 1000 IV diphtheria antitoxin.

**Complication**

- Neurological (Encephalitis encephalopathy)

- Prolonged convulsions
- Infantile spasms.

## Pertussis (Whooping Cough)

Pertussis, also known as whooping cough, is a highly contagious respiratory disease. It is caused by the bacterium Bordetella Pertussis. Pertussis is known for uncontrollable, violent coughing which often makes it hard to breathe.

**Agents Factor**

**Causative organism** - Bacterium Bordetella Pertussis.

**Source of infection**- B. Pertussis infects only man

**Host Factor**

**Age**- highest incidence is found below the age of 5 years.

**Sex**- incidence and fatality are observed to be more among female than male children's.

**Immunity**- recovery from whooping cough or adequate immunization is folled by immunity.

**Environmental factor**- Pertussis occurs throughout the year, but the disease shows a seasonal tread with more cases occurring during winter and spring months, due to overcrowding, socio- economic conditions.

**Mode of transmission**- Whooping cough is spread mainly by droplet infection and direct contact.

**Incubation period**- 7-14 days (not more than 3 week)

**Infectious period**- Most contagious during the catarrhal stage and the first 2 weeks after cough onset

Duration of illness :

Children : 6-10 weeks.

Adolescents : 10 weeks or longer

Spread occurs by direct contact or droplet infections during cough. Infants less than one year of age constitute 50-70% of diagnosed cases.

**Period of communicability**-The disease occurs 3-12 days after exposure to an infected individual. The coughing stage lasts for approximately six weeks before subsiding. In some countries, this disease is called the 100 days' cough or cough of 100 days because of its length.



**Symptoms of Pertussis**

The whoop sound occurs with the forceful inspiration after a coughing fit. This sound is uncommon in young infants and adults, but may be more common in children. The entire illness may last as long as 6 weeks. The illness occurs in 3 major stages (the catarrhal, paroxysmal, and convalescent stages) Infants and adults may not show the normal progression of stages Children (especially infants) may appear perfectly well in between episodes of coughing.

A complete blood count may show a high lymphocyte count. If the neutrophil count is high and/or fever is present, then other types of infection should be considered. A chest x-ray may be normal or show mild abnormalities. Bacterial culture of respiratory secretions is the best test.

**Clinical Manifestations** : The incubation period of pertussis has a mean of 7 and a range of 6-20 days. >Classically, divided into :

1. Catarrhal
2. Paroxysmal, and
3. Convalescent stages.

**Catarrhal Stage**-The term catarrh is derived from historic Middle English, meaning "to flow". That is, secretions from the nose and mucous membranes flow, causing nasal congestion and runny nose.

Nasal congestion,

Runny nose,

Mild fever,

Eye redness and

Excess eye watering.

**Paroxysmal Stage**- Severe series of coughs usually ending with a high-pitched whoop

The whoop starts 1 to 2 weeks after the cold symptoms and lasts 1 to 2 months

Thick, clear, sticky mucous may be coughed up at the end of the coughing spasm

Coughing spasms are more frequent at night

**Convalescent Stage**- Gradual disappearance of symptoms occurring over 2 to 4 weeks, however, coughing spells can last for weeks or months

Cough may become louder and may sound like it is getting worse as the person is getting better

Coughing may flare up again later in a cold or upper respiratory illness. This does not mean that the person has been re-infected with pertussis

**Complications**- occurs in 5-6 percentage t of cases

The chief complications of pertussis are bronchitis, bronchopneumonia and bronchiectasis.

Secondary infections- otitis media or pneumonia (either secondary to pertussis or other organisms)

**Treatment**- The newer macrolides (azithromycin and clarithromycin) have good in vitro activity against B Pertussis, and Clarithromycin (500 mg bid) used for 10-14 days and Azithromycin (500 mg/d) used for 5-7 days have been used with good results. Steroids may reduce the number and severity of cough paroxysms, but are generally only recommended for infants with serious disease.

**Prevention and Control**

1. Notification
2. Isolation
3. Washing hands with soap and warm water.
4. Teaching children to cover mouth and nose if coughing or sneezing and to wash hands after doing so.
5. Not sharing eating utensils and drinking glasses.
6. Minimizing the amount of contact you have with someone you know is infected or if you are infected, minimizing the amount of time you are around others.
7. Immunization

Active immunization in childhood with diphtheria toxoid yields antitoxin levels adequate until adulthood. Usually combined with tetanus toxoid and/or pertussis vaccine (DPT vaccine).

All children must receive an initial course of immunizations and boosters (5 injections at 2 months, 4 months, 6 months, 15-18 months, and at 4-6 years).

## Mumps

हनुसन्धौ समुभ्दूत शोकमल्परुजं स्थिरम । पाषाणगर्दभं विद्याब्दलासपवनात्मकम ॥ (सु.नि. 13/3)

Shopa at the root of the lower jaw, slightly painful, immovable, arising from Kapha and Vata is to be understood as Pashanagardabha.

**Treatment :** Pashanagardabha should be given swedana first and then applied with the paste of Manashila, Tala, Kushta, Devadaru. After ripening these should be cut open and treated like wound.



Mumps is an acute infectious viral disease usually affecting the salivary glands commonly the parotid gland. The name comes from the British word "to mump", that is grimace or grin.

The appearance of the patient as a result of parotid gland swelling seems to be in grin.

**Agents Factors**

**Causative organism-** Paramyxovirus paratoditis in a RNA virus of the Myxovirus family.

**Source of infection** – both clinical and subclinical cases.

**Period of communicability** – 4-6 days of onset of symptoms

**Distribution-** is worldwide.

**Secondary attack rate** – 86%

**Host factors**

**Age** -5-15 years

**Sex** -girls common

**Immunity** - life long

**Environmental factor** – winter and spring season favours

**Mode of transmission** – droplet infection

**Incubation periods** - 2 to 3 weeks (7-18 days)

**Clinical Features**

Tell-tale neck swelling, symptoms may include pain and discomfort from the swelling, fever, headache, feeling sick, dry mouth, joint aches and a general malaise.

**Prevention**

**Vaccination-** Highly attenuated vaccine is now available.

**Control-** The control of mumps is difficult because the disease is infections before a diagnosis can be made. The long and variable incubation period and the occurrence of subclinical cases make the control of spread difficult. Cases should be isolated till the clinical manifestations subside.

## Rubella

Rubella (German measles) is a disease caused by the rubella virus. Rubella is usually a mild illness. Most people who have had rubella or the vaccine are protected against the virus for the rest of their lives. Because of routine vaccination against rubella since 1970, rubella is now rarely reported.

**History of Rubella**-The Teratogenic property of the infection was documented by an Australian opthalmologist Greeg in 1941.

The rubella virus is transmitted by airborne droplets when infected people sneeze or cough. Humans are the only known host.

**Agent Factors**

**Causative agent :** Rubella virus RNA virus of the Togavirus Family.

**Source of infection :** Subclinical and Clinical, Congenital from infected pregnant women to fetus. There is no known carrier state.

**Period of communicability :** It probably extends from a week before symptoms to about a week after rash appears. Infectivity is greatest when the rash is erupting.

**Host Factors**

**Age**- Disease of childhood 3-10 yrs age group. Following widespread immunization campaigns persons older than 15 yrs account for 70% cases in developed countries.

**Immunity**-One attack results in lifelong immunity. Infants of immune mothers are protected for 4-6 months. In India, about 40% of child bearing age group women are susceptible to rubella.

**Environmental Factors** - Disease usually occurs in seasonal pattern, during the late winter & spring. Epidemics every 4-9 years.

**Mode of transmission** - Person to person- via respiratory route: Droplet from nose &throat Droplet nuclei (aerosols) Maintain in human population by chain transmission.

Acquired during pregnancy- vertical transmission:-Virus can enter via the Placenta & infect the foetus in uterus (Congenital Rubella Syndrome).

**Incubation period**- Between 14-21 days

**Symptoms**- In children, the disease is usually mild, with symptoms including a rash, low fever (<39°C), nausea and mild conjunctivitis. The rash, which occurs in 50–80% of cases, usually starts on the face and neck before progressing down the body, and lasts 1–3 days. Swollen lymph glands behind the ears and in the neck are the most characteristic clinical feature. Infected adults, more commonly women, may develop arthritis and painful joints that usually last from 3–10 days.

Once a person is infected, the virus spreads throughout the body in about 5-7 days. Symptoms usually appear 2 to 3 weeks after exposure. The most infectious period is usually 1–5 days after the appearance of the rash.

When a woman is infected with the rubella virus early in pregnancy, she has a 90% chance of passing the virus on to her foetus. This can cause miscarriage, stillbirth or severe birth defects known as CRS. Infants with CRS may excrete the virus for a year or more.



**Prevention of Rubella**

Immunization with the MMR vaccine is the most effective way to protect against rubella. It is a combined vaccine that protects children against all three conditions - measles, mumps and rubella. It contains the safest and most effective form of each vaccine. This is usually given to children between 12 and 15 months followed by a booster injection before entering school (usually between three to five years of age).

## Tuberculosis

Tuberculosis is an ancient disease described in Vedic Medicine as Yakshma. Belief based concept eventually entered reason based Ayurvedic treatises with a redefined name Rajayakshma. In western world it was known as phthisis. TB is caused by Mycobacterium tuberculosis, commonly known as "Koch's Bacillus" or tubercle bacillus or Acid Fast Bacillus (AFB)

**Global Burden of Disease**

In 2008 an estimated 9.4 million incident cases of TB globally with 11.1 million prevalent cases with 5.7 million notified cases of TB.

1.4 million cases of HIV associated with TB; and 1.8 million deaths including 0.52 million deaths in HIV +ve patients.

Using DOTS 36 million patients were cured between 1995-2008

**Burden of Disease - India**

Yearly 1.8 million persons (5000/day) develop TB out of which 0.8 million are new smear +ve cases and 0.13 million cases of multi drug resistance.

Mortality of 0.32 million cases each year.

Annual risk of being infected with TB is 1.5% and once infected 10% life time risk of developing TB.

2 out of every 5 Indians are infected with TB bacillus and patients with PTB can infect 10-15 persons in a year.

5% of TB patients are HIV +ve.

Direct and indirect cost of TB to India amount to Rs. 13,000 crore per year (US$ 3 billion)

**"Tuberculosis is defined as an infectious disease caused by a bacterium; that most commonly affects the lungs."** Currently, it kills "three million people" a year and could claim up to 30 million lives if not controlled.

**Agent Factors**

Mycobacterium tuberculosis which is carried by humans. Mycobacterium tuberculosis can present itself in the human body in different forms effecting anywhere from "the intestines, bones, joints, skin, and the genitourinary, lymphatic, and nervous system.

**Incubation period-** From infection to development of a positive TB skin test reaction (the incubation period) is approximately 2 to 12 weeks. The risk for developing active disease is the highest in the first two years after infection and development of a positive TB skin test reaction.

**Source of infection-**

1. Human source
2. Bovine source

**Communicability-**Infection as long as not treated communicability reduces by 90% within 48 hr's of treatment.

**Host factors-**

Age- 0-14 age group 2 percent
15-24 years- 20 percent

Sex- More prevalent in male than females.

**Nutrition-** Malnutrition is widely believed to predispose to tuberculosis.

**Immunity-** Man has no inherited immunity against tuberculosis.

Mode of transmission-

- Droplet infection
- Droplet nuclei

**Incubation period-** The time from receipt of infection to the development of a positive tuberculosis test ranges from 3- 6 weeks, and thereafter, the development of disease depends upon the closeness of the contact.

**Common Symptoms of TB Disease-**

1. Cough (2-3 weeks or more)
2. Coughing up blood



3. Chest pains
4. Evening raising Fever
5. Night sweats
6. Feeling weak and tired (general weakness)
7. Losing weight without trying
8. Decreased or no appetite
9. If you have TB outside the lungs, you may have other symptoms

**Prevention and Control Measures**

The control measures consist of a curative component namely case finding and treatment and a preventive component namely BCG vaccination.

**Medical interventions**

- Chemotherapy
- Immunoprophylaxis
- Chemoprophylaxis-isoniazid 5mg/kg body wt daily x 6 months
- Treatment of HIV-infected / AIDS cases
- Strategies for prevention of HIV infection as per NACO guidelines
- Silicosis : Screen patients with silicosis once in 6 months and treat for TB when necessary
- For extra pulmonary TB surgery sometimes required

## Swine Flu

Swine flu which is called pig flu. Swine flu and is caused by swine influenza virus.

**Causative organism:** It is caused by swine influenza virus subtypes H1N1, H1N2, H3N1 and H3H2.

**Mode of transmission:** Influenza virus can be directly transmitted from pigs to people .

**Incubation period:** Within 7 days.

**Clinical features-** Fever, Sore throat, Cough, Body ache, Fatigue, Nausea, Chills, Headache, and shortness of breath

**Prevention's control measures**

- Adequate amount of sleep and nutritious food.
- Consider taking multivitamins and vitamin C supplement.
- Regularly wash your hands with soap and water.

- Avoid close contact or stay away from sick people.
- Avoid sharing drinks or utensils.
- Avoid touching your face.
- Wear a face mask as direction by authorities.
- Stay updated and avoid travelling to affected areas.
- Treatment of infected person.
- Meat inspection.
- Health education.
- Adequate sewage treatment and disposal.
- Early detection and early treatment.
- Through cooking of beef and pork is the most effective method to prevent food borne infection.

**Treatment**

- Vaccination- Vaccination is the best protection against contracting the set vaccines as soon as possible.
- Antiviral drugs can be used for prevention or treatment of flu viruses.

## SARS-(Severe Acute Respiratory Syndrome)

Severe acute respiratory syndrome (SARS) is a communicable viral disease, caused by a new strain of coronavirus, which differ considerably in genetic structure from previously recognized coronavirus.

The most common symptoms in patients progressing to SARS include fever, malaise, chills, headache, myalgia, dizziness, cough, sore throat and running nose. In some cases there is rapid deterioration with low oxygen saturation and acute respiratory distress requiring ventilator support.

**Incubation Period-** 2 to 7 days, commonly 3 to 5 days.

**Mode of transmission-** The primary mode of transmission appears to be through direct or indirect contact of mucous membranes of eyes, nose, or mouth with respiratory droplets or fomites.

**Treatment**

No specific treatment for SARS.

Use of antibiotics.

Severe cases require intensive support.



Although a number of different agents including Ribavirin 400-600md per day, Lopinavir 400 mg. etc.

**Prevention**

As there is no vaccine against SARS, the preventive measures for SARS control are appropriate detection and protective measures

1. Effective isolation of SARS patients in hospitals.
2. Prompt identification of person with SARS, their movement and contacts.
3. Appropriate protection of medical staff treating these patients.
4. Comprehensive identification and isolation of suspected SARS cases.
5. Exit screening of international travellers.

## Influenza

Influenza is an acute respiratory tract infection caused by influenza virus, of which there are three types- A, B and C. All known pandemics were caused by influenza A strains. The disease is characterized by sudden onset of chills, malaise, fever, muscular pain and cough.

At present three types of influenza viruses are circulating in the world: A ($H_1N_1$), A ($H_3N_2$) and B virus.

**Agent Factors**

**Agent-** Influenza viruses are classified within family Orthomyxoviridae.

**Reservoir of infection-** major reservoir of influenza virus exits in animals, and birds.

**Source of infection-** Usually a case or subclinical case.

**Period of infectivity-** Virus is present in the nasopharynx from 1 to 2 days before and 1 to 2 days after onset of symptoms.

**Host Factors**

**Age-**all ages

**Sex-** both sexes

**Immunity-** Immunity to influenza is subtype specific, antibodies against HA and NA are important in immunity to influenza.

**Environmental Factors**

**Season-** Usually occurring in winter months.

**Mode of transmission-** influenza is spread mainly from person to person by droplet infection or droplet nuclei.

**Incubation period-** 18-72 hours

**Clinical Features**

Fever, chills, aches and pains, sore throat, coughing and generalised weakness.

**Prevention of Influenza**

All attempts to control influenza epidemics have so far met with little success and the prospects of achieving control remain poor.

Good ventilation of public building, the avoidance of crowded places during epidemics, encouraging suffers to cover their faces with a handkerchief when coughing and sneezing.

**Influenza vaccine-** killed vaccine 0.5 ml for adult and over 3 years. 0.25 fro 6 to 36 month child. 2 dose of vaccine interval 3 to 4 week.

**Pneumonia**

Pneumonia is an inflammation of the airspaces in the lung most commonly caused by infections. An infection of the lungs, which can be caused by a variety of microorganisms, including viruses, bacteria, and parasites.There are also few non-infectious types of pneumonia that are caused by inhaling or aspirating foreign matter or toxic substances into the drugs.

**Symptoms-** Fever, Chills, Cough, Unusually rapid breathing, Breathing with grunting or wheezing sounds, Labored breathing, Vomiting, Chest pain, Abdominal pain, Decreased activity.

**Pneumonia Diagnosis**

1. Physical exam: Your doctor will listen to your lungs with a stethoscope. If you have pneumonia, your lungs may make crackling, bubbling, and rumbling sounds when you inhale. You also may be wheezing, and it may be hard to hear sounds of breathing in some areas of your chest.
2. Chest x-ray (if your doctor suspects pneumonia)
3. CBC blood test to check white blood cell count
4. Arterial blood gases to see if enough oxygen is getting into your blood from the lungs
5. CT (or CAT) scan of the chest to see how the lungs are functioning
6. Sputum tests to look for the organism (that can detected by studying your spit) causing your symptoms
7. Pleural fluid culture if there is fluid in the space surrounding the lungs
8. Pulse oximetry to measure how much oxygen is moving through your bloodstream, done by simply attaching a small clip to your finger for a brief time



9. Bronchoscopy, a procedure used to look into the lungs' airways, which would be performed if you are hospitalized and antibiotics are not working well

**Treatments**

1. Antibiotics (bacterial)
2. Antiviral medications
3. Bed rest

**Prevention**

1. Vaccine
2. Don't share food or drink, or be around sick people
3. Washing your hands frequently and using alcohol rubs to kill germs
4. Quit smoking and avoid abusing alcohol
5. Covering your mouth and nose when sneezing or coughing.
6. Limiting your exposure to sick people and not exposing others when you are sick.

## Cholera

Cholera is an acute diarrhoeal disease caused Vibrio Cholerae due to the El tor biotype. Cholera is both an epidemic and endemic disease.

**Agent Factors**

**Agent-** Vibrio Cholerae

**Resistance-** V. Cholera is killed within 30 minutes by heating at 56 deg. C or within a few seconds by boiling.

**Reservoir of infection-** case and carrier

**Infective material-** stools and vomit of cases and carriers.

**Period of communicability-** a case of cholera is infectious period of 7-10 days.

**Host Factors**

**Age and sex-** cholera affects all ages and both sex.

**Economic status-** highest in low economic groups.

**Environment Factors**

Vibrio transmission is readily possible in a community with poor environment sanitation.

**Mode of transmission-**

Faecal contaminated water.

Contaminated food and drinks
Direct contact

**Incubation period**-few hours to 5 days. But commonly 1-2 days.

**Clinical Features**

Cholera shows 3 stages :

1. **Stage of evacuation**- the onset is abrupt with profuse, painless, watery diarrhoea followed by vomiting. The patient may pass as many as 40 stools in a day. The stool may have a "rice water" appearance.
2. **Stage of collapse**-the patient soon passes into a stage of collapse because of dehydration. The classical signs are- sunken eyes, hollow cheeks, scaphoid abdomen, sub-normal temperature, washerman's hands and feet, absent pulse, unrecordable, blood pressure, loss of skin elasticity, shallow and quick respirations. The output of urine decreases and may ultimate cease. The patient becomes restless, and complains of intense thirst and cramps in legs and abdomen. Death may occur at this stage due to dehydration and acidosis resulting from diarrhoea.
3. **Stage of** recovery- if death does not occur, the patient begins to show signs of clinical improvement. The blood pressure begins to rise, the temperature return to normal, and urine secretion is re-established.

**Treatment**- Treatment of the infected cases must be carried out. The infection is controlled by use of antibiotics and dehydration is accordingly looked after.

An oral rehydratiom mixture is recommended by WHO.
Sodium bicarbonate- 2.5 gm
Sodium chloride 3.5 gm
Potassium chloride 1.5 gm
Glucose- 20 gm.
It mixed with 1 litre of safe and potable water and consumed in 24 hours.

**Control of Cholera** - It is now considered that the best way to control cholera is to develop and implement a national programme for the control of all diarrhoeal diseases because of similarities in the epidemiology, pathophysiology, treatment and control of cholera.

**Guidelines for cholera control**

1. Verification of the diagnosis
2. Notification
3. Early case finding



4. Establishment of treatment centre
5. Rehydration therapy
6. Adjuncts to therapy
7. Sanitation measures
8. Vaccination
9. Health education

विसूचिका–

सूचिभिरिव गात्राणि तुदन्सन्तिष्ठेऽनिलः । यत्राजीर्णेन सा वैद्यै विसूचिति निगद्यते ॥ (भा.प्र. 6)

Due to Vayu Prakopa in body pricking pain occurs that disease called as Visuchika.

निदान–

न तां परिमिताहारा लभन्ते विदितागमाः । मूठास्ताम जितात्मानो लभन्तेऽशनलोलुपाः ॥ (भा.प्र 6)

Atimatra Ahara and Mithyahara is the Nidana for Visuchika.

लक्षण–

मूर्च्छाऽतिसारौ वमथुः पिपासा शूल भ्रमोद्वेष्टन जृम्भादाहाः ।
वैवर्ण्य कम्पौ हृद्ये रुजश्च भवन्ति तस्यां शिरसश्च भेदः ॥ (भा.प्र. 6)

Murcha, Atisara, Vamathu, Pipasa, Shula, Bhrama etc.

चिकित्सा–

जलपीतमपामार्ग मूलं हन्याद्विसूचिकाम । सतैलं कारवेल्ल्यम्बु नाशयेद्वि विसूचिकाम ॥ (भा.प्र. 6/110)

Apamarga Mula Pishti with Jala, karavellaka Patra Swarasa and Tila Taila Pana.

## Poliomyelitis

Poliomyelitis is an acute viral infection caused by an RNA virus. It is primarily an infection of the human alimentary tract but the virus may infect the central nervous system in a very small percentage of cases resulting in varying degree of paralysis and possibly death.

**Agent Factor**

**Causative Organism**- polio virus which has three serological distinct types I, II, III.

**Incubation period**- 7-14 days

**Distribution**- the disease is universal, with the active immunization programme against the infection.

**Reservoir of infection**- man is the only known reservoir of infection.

**Infectious material-** Thevirus is found in faeces and oropharygeal secretions of an infected person.

**Period of communicability-** Thecase are most infectious 7 to 10 days before and after onset of symptoms.

**Age-** the disease in all age groups, but children are usually more susceptible than adults because of acquired immunity of the adult population.

**Sex-** ratio is 3 males to one female.

**Environmental Factors -**Polio is more likely to occur during the rainy season. 60% of cases recorded in India during June to September. The environmental sources of infection are contaminated water, food, files. Polio virus survives for long time in cold environment.

**Mode of transmission**

1. Faecal oral route- this is the main route spread in developing countries. The infection may spread directly through contaminated fingers where hygiene is poor, indirectly through water, milk, foods, flies and articles of daily use.
2. Droplet infection- this may occur in the acute phase of disease when occurs in the throat close personal contact with a infected person.

**Clinical spectrum**

1. In apparent (sub clinical) infection- This occurs approximately in 91-96% of poliovirus infections. There are no presenting symptoms.
2. Abortive polio or minor illness- occurs in approximately 4-8% of the infections. It causes only a mild limiting illness due to viremia. The patient recovers quickly.
3. Non- paralytic polio- occurs in approximately 1 % of all infection presenting features are stiffness and pain in the neck and back.
4. Paralytic polio- occurs in less than one percent of infections. The virus invades CNS and causes varying degree of paralysis.

In about 50% cases a lower motor neurone type paralysis develops between 2nd and 3rd day with fever. Paralysis is flaccid type. There is foot drop, facial paralysis, eye sight with loose and flaccid limbs.

**Prevention**

1. Notification
2. Proper disposal of urine and feces.
3. Avoid over-crowding in schools and gatherings
4. Immunization



**Vaccine**

**1. Inactivated (salk) polio vaccine (IPV)-** This vaccine contains all three types of polio virus inactivated by formalin. The first three doses given at interval of 1-2 months and 4th dose 6-12 months after third dose. First dose usually given when infant is 6 weeks old. Additional doses are recommended prior to school entry and then every 5 years until the age of 18.

**Advantage -**

a. To person with immune deficiency diseases
b. To persons undergoing corticosteroid and radiation therapy.
c. To those over 50 year who are receiving vaccine for first time.
d. During pregnancy
e. Risks- no serious adverse reaction of IPV

**2. Oral (Sabin) Polio Vaccine (OPV) -** Oral polio vaccine was described by sabin in 1957 it contains live attenuated virus (type1, 2,3) grow in primary monkey kidney or human diploid cell culture.

Primary course of 3 doses of OPV at one month interval commencing the first dose when infant is 6 week old. It is recommended that a dose of OPV is required to be given all children delivered in health institution before discharge from hospital.

Dose & mode of administration- two drops

**Advantages-**

1. Since given orally it is easy administer
2. Induces both humoral and intestinal immunity
3. Antibody quickly produced in large proportion
4. Useful in control epidemics
5. Relatively in expensive.

**Complication-** OPV is free from complication

**Storage-**

1. Stabilized vaccine- recent oral polio vaccines are het stabilized. They can be kept without losing potency for a year at 4 degree C. and for a month at room temperature.
2. Non stabilized vaccine- the vaccine should be stored at -20degree C in deep freeze. In case a deep freeze is not available it might be stored temporarily in freezing chamber of the refrigerator. During transport the vaccine must be kept either on dry ice or freezing mixture.

## Viral Hepatitis

Viral hepatitis is a group systemic infection affecting the liver predominantly caused by 5 kinds of viruses at least.

Viral hepatitis may be divided into 5 types according to aetiology that is hepatitis A, B, C, D and E. Although the agents can be distinguished by its antigenic properties, the 5 kinds of viruses may produce clinical similar illness. It is acute infectious viral disease with viremia and tendency of localisation of virus in liver.

**Hepatitis A**- Hepatitis A is an acute infectious disease caused by hepatitis A virus (HAV). The disease is heralded by non- specific symptoms such as fever, headache, fatigue, generalised weakness and ache and pains, followed by anorexia, nausea, vomiting, dark urine and jaundice.

**Causative organism**- Hepatitis A virus enter virus of picornaviridae family.

**Reservoir of infection**- The human cases are the only reservoir of infection.

**Period of infectivity**- The risk of transmitting HAV is greatest from 2 weeks before to 1 week after the onset of jaundice.

**Infective material** –Mainly man's faeces, blood, serum and other fluid are infective during the stage of viraemia.

**Virus excretion**- HAV is excreted in the faeces for about 2 weeks before the onset of jaundice and for up to 2 weeks thereafter. The virus may also be excreted in urine.

**Age**- infection with HAV is more frequent among children than in adults.

**Sex**- both sexes are equally susceptible.

**Environmental factors**- in India the disease tends to be associated with periods of heavy rainfall.

**Mode of transmission**-

1. Faecal oral route – this is major route of transmission. It may occur by direct contact or indirectly by way of contaminated water, food or milk, water borne transmission is not major factor in developed countries.
2. Parenteral route- hepatitis A is rarely transmitted by parenteral route (blood and blood products or by skin penetration through contaminated needles).
3. Sexual transmission – as a sexually transmitted infection hepatitis A may occur mainly among homosexual men because of oral- oral contact.

**Incubation period**- 10-50 days



**Clinical spectrum**- The onset of jaundice is often preceded by gastrointestinal symptoms such as nausea, vomiting and mild fever. Jaundice may appear within a few days of prodromal period but anicteric hepatitis is more common.

**Diagnosis**- Test for abnormal liver function, serum alanine, aminotransferases, bilirubin, supplement the clinical pathogenic and epidemiologic findings.

**Prevention and containments**

1. **Control of reservoir**-

a. Faecal shedding of the virus is at its height during the incubation period and early phase of illness.
b. The occurrence of large number of subclinical cases.
c. Absence of specific treatment
d. Low socio-economic profile of the population usually involved.

Strict isolation of cases is not useful control measures. Usual control measure such as notification, complete bed rest and disinfection of faeces and fomites.

2. **Control of transmission**-Simple measures of personal and community hygiene i.e. hand washing before eating and after toilet. Prevention contamination of water, food, milk and purification of community water, food and milk.
3. **Vaccine**- the vaccine is given parenteral as a 2 dose series 6-18 month apart. The combination vaccine is given as 3 dose using 0 day, 1 month and 6$^{th}$ months schedule.

**Hepatitis B**

Hepatitis B known as "serum hepatitis". It is an acute systemic infection with major pathology in the liver, caused by hepatitis B virus and transmitted usually by parenteral route.

Hepatitis B is a endemic throughout the world especially in tropical and developing countries and also in some regions of Europe.

**Agent factors**

**Causative organism**-Hepatitis type B virus was discovered by Blumberg in 1963.

**Incubation period**- 7-25 weeks

**Reservoir of infection**-Man is the only reservoir of infection which can be spread either from carrier or from cases.

**Infective material**-Contaminated blood is the main source of infection, although the virus has been found in body secretions as saliva, vaginal secretions and semen of infected persons.

**Mode of transmission :**

a. **Parental route-** hepatitis B is essentially a blood–borne infection. It is transmitted by infected blood and blood products through transfusions, dialysis, contaminated syringes and needles, pricks of skin. Handling of infected blood during surgical and dental procedures etc.

b. **Perinatal transmission-** spread of infection from HBV carrier mother to their babies appears to be an important factors for high prevalence of HBV infection in some regions particularly china and South East Asia.

c. **Sexual transmission-** there is ample evidence for the spread of infection by intimate contact or by sexual route. The sexually particular male homosexuals are at very high risk of infection with hepatitis B.

d. **Other routes-** transmission from child to child often called horizontal transmission is responsible for a majority of HBV infection.

**Clinical features-** The symptoms and manifestations of Hepatitis B are similar to those of the other type of viral hepatitis.

**Prevention and containment-**

1. Avoid blood transfusion and its products, which are infected with hepatitis B virus.
2. Try to detect the carriers of diseases by tests with Australia antigens.
3. Hepatitis B vaccine-
   a. Plasma B vaccine
   b. RDNA derided vaccine hepatitis B immunoglobulin (HBIG).

**Hepatitis C**

Hepatitis C virus (HCV) was identified in year 1989. Major cause of parenteral transmitted. WHO estimated 3% of the world population is infected with HCV and around 170 million individual are chronic carrier at risk of developing liver cirrhosis and liver cancer.

Incubation period- 40-120 days

Age distribution- adults

Seasonal incidence- throughout year

Route of infection- parenteral

Occurrence of virus- month to years

Hepatitis C virus a single stranded RNA virus with properties similar to other virus.



The virus is mainly transmitted through transfusion of contaminated blood or blood products.

**Hepatitis - D**

HDV is found throughout the world but with a non-uniform distribution. It highest prevalence has been in Italy, central Asia etc.

Person who has received multiple transfusions intravenous drug abusers and their close contacts are at high risk.

Incubation periods- 2-12 weeks.

**Hepatitis - E**

The infection caused by the hepatitis E virus (HEV) which was discovered in 1980, is essentially a water-borne disease. Formerly termed enterically transmitted hepatitis non-A non-B, HEV is a 29 –nm to 32-nm RNA virus. Water or food supplies, contaminated by faeces, in which the virus excreted, have been implicated in major outbreaks reported in all parts of the world that have a hot climate.

**Incubation period-** 2-9 weeks

**Age-** young adult, aged 15-40 years.

**Distribution** – developing countries

No vaccine or specific immunoglobulin prophylaxis is available.

**Hepatitis - G**

HGV was discovered recently in 1996. The prevalence of this infection is not known.

## Typhoid and Parathphoid Fever

Typhoid fever is the result of systemic infection mainly by S. typhi found only in man. The disease is clinically characterised by a typical continuous fever for 3 to 4 weeks relative bradycardia with involvement of lymphoid tissue and considerable constitutional symptoms. The term "Enteric fever" includes both typhoid and paratyphoid fevers. The disease may occur sporadically, epidemically or endemically.

**Causative organism-** salmonella typhi, S. Paratyphi A, S. Paratyphi B.

**Reservoir of infection-** man is the only known reservoir of infection viz. cases and carrier's organism is faeces and urine. In carrier the most common infected focus is gallbladder.

**Source of infection- The** primary sources of infection are faeces and urine of cases or carrier the secondary source contaminated water, food, fingers and flies.

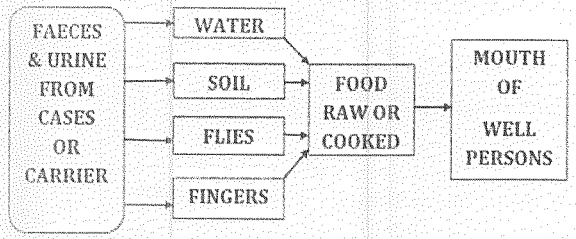
**Incubation period-** 10-14 days, but it may be as short as 3 days or as long as three weeks.

**Seasonal incidence-** incidence is reported during July to September.

**Mode of transmission**

1. Faecal route
2. Urine oral route

This may place directly through soiled hands contaminated with faeces or urine of cases or carriers. Indirectly the ingestion of contaminated water, milk, food etc.




**Clinical features-** During prodromal stage there is malaise, headache, cough and sore throat, often with abdominal pain and constipation. The fever ascends in a stepladder fashion. After about 7-10 days. Fever reaches plateau, weakness, "pea soup", diarrhoea may be present along with distension of abdomen, leukopenia and blood, urine and stool culture is positive for salmonella.

**Laboratory diagnosis of typhoid**

a. Microbiological procedure- S. typhi from blood bone marrow and stools. Blood culture is the diagnosis this disease.

b. Serological procedure- felix-widal test measures agglutinating antibody level against and H antigens. O antibodies appear on the day 6-8 and H antibodies on day 10-12 after the onset of disease.

c. New diagnostic tests- typhoid fever as an alternative to a widal teat include the IDL Tubex test marked by Swedish company. This reportedly can detect IgMOg antibodies from patient within a few minutes. Another rapid serological test "Typhi Dot".

**Control of Typhoid Fever**

**1. Control of reservoir-**

Cases- early diagnosis, notification, isolation.



Treatment- fluaroquinoinones are widely regarded as the drug of choice for the treatment of typhoid fever. Along with chloramphenicol, ampicillin, amoxicillin and trimethoprim- sulfamethnoxazole.

Disinfection- stools and urine are the sole source of infection, they should be received in closed container and disinfected with 5% cresol for at ;east 2 hours.

Follow up- examination of stools and urine should be done for S. typhi 3 to 4 month after 12 month to prevent the development of the carrier state.

Carriers- Identification- carrier is identified by cultural and serological examinations. Treatment- intensive course of ampicillin or amoxicillin 4-6gm per day.

**2. Control of sanitation-** Protect and purification of drinking water supplies improvement of basic sanitation and promotion of food hygiene are essential measures to interrupt transmission of typhoid fever.

**3. Immunization-** Anti-typhoid vaccines,

1. The Vi-polysaccride vaccine
2. The Ty 21 a vaccine

## Leptospirosis

Leptospirosis is essentially animal infection by several serotypes of leptospiro (spirocheates) and transmitted to man under certain environmental condition.

**Causative organism-** Leptospiro L. interrogans 0.1- 0.2 μm wide and 5-15 μm long.

**Source of infection-** leptospira are excreted in the urine of infected animals for a long time. Often for an entire life time in cases of rodents.

**Animal reservoir-**cattle, sheep, goats, water buffalo, pigs and horses may be infected through gazing in areas contaminated by the urine of carrier host.

**Age-** children acquire the infection from dogs more frequently than do adults.

**Occupation-** Human infections are usually due to occupational exposure to the urine of infected to animals e.g. agricultural and livestock farmers, workers, in rice fields, meat and animal handlers, veterinaries.

**Mode of transmission -**

1. Direct contact- leptospira can enter the body through skin abrasions or through intact mucous membrane by direct contact with urine or tissue of infected animal.
2. Indirect contact- through the contact of the brojken skin with soil, water or vegetation contaminated by urine of infected animals or through ingestion of food or water contaminated with leptospirae.

3. Droplet infection- infection may also occur through inhalation as when milking infected cows or goats by breathing air polluted with droplets of urine.

**Incubation period-** Usually 10 days with arrange of 4 to 20 days.

**Clinical sign and symptoms-** Mild febrile illness to sever fatal disease of liver, kidney, involvement weils disease is a form of manifestation.

**Control-**

a. Antibiotics- penicillin is the drug of choice but other antibiotics (tetracyclic or doxycycline) are also effective

b. Dose- 6 million units daily I/V

c. Environmental- this included preventing exposure to potentially contaminated water reducing contamination by rodent control and protection of worker in hazardous occupation.

**Vaccination-**Immunization of former and pets prevent diseases. In some countries Italy, USA, China the occupation curry high risk of infection vaccine are available.

## Dengue Fever

Dengue fever, also known as break bone fever, is an acute communicable disease caused by virus.

**Infectious agent:** Dengue viruses (categorize into types 1,2,3,4)

Vectors of Dengue Fever

Aedes aegypti

Aedes albopictus

**Vector-**Aedes, Albopictus

### Habitual Behaviour of Aedes Albopictus

- Female mosquitoes feed on human blood.
- They are most active 2 hours before sunset (around 5pm to 6pm) and at around 8am to 9am.
- Place- outdoors and indoors.

### Mode of Transmission

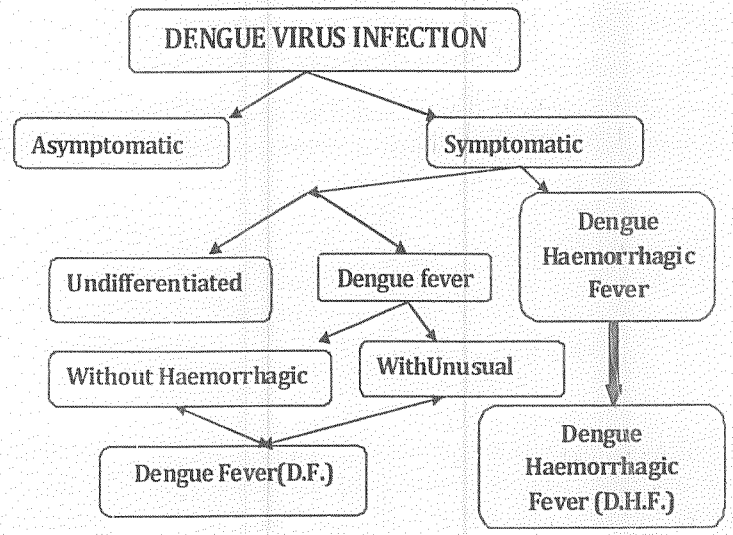
1. A healthy person gets the disease when he is bitten by an infected mosquito. The virus enters his blood from the mosquito's saliva.
2. An infected person could transmit the virus to mosquitoes if he is bitten by a mosquito anytime from the onset to the subsidence of the fever (a period of about 6 to 7 days). The disease is then spread by mosquitoes.



3. Dengue fever is not spread by contact with infected persons.

Incubation Period: 3 to 14 days, most commonly 4 to 7 days

**Clinical Characteristics of Dengue Fever**




- Fever
- Headache
- Muscle and joint pain
- Nausea/vomiting
- Rash
- Hemorrhagic manifestations

Patients may also report other symptoms, such as itching and aberrations in the sense of taste, particularly a metallic taste. In addition, there have been reports of severe depression after the acute phase of the illness.

**There are actually four dengue clinical syndromes :**

1. Undifferentiated fever;
2. Classic dengue fever;
3. Dengue hemorrhagic fever, or DHF; and
4. Dengue shock syndrome or DSS.

Dengue shock syndrome is actually a severe form of DHF.

**Clinical Case Definition for Dengue Fever**-Classical Dengue fever also known as "Break bone fever" is an acute febrile viral disease frequently presenting with headaches, bone or joint pain, muscular pains, rash and leucopenia.

Reservoir of infection- both man and mosquito the transmission cycle is "man-mosquito-man".

Aedes aegypti is main vector. Dengue outbreaks have also been attributed to Aedes albopicyus, Ades polynesiensis and several species.

**Dengue Haemorrhagic Fever**

It is sever from of dengue fever caused by infection with more than one dengue virus. Severe illness due to double infection with dengue viruses.

DHF transmitted by Aedes Aegypti.

Incubation period- 4-6 days

Symptoms- headache, anorexia, vomiting, epigastric discomfort, tenderness, abdominal pain Temperature is 40 to 41 degree C.

Criteria for clinical diagnosis of DHF.

**Clinical diagnosis-**

**a.** Fever- acute onset, high, continuous 2 to 7 days.

**b.** Hemorrhagic- manifestations including least a positive tourniquet test.

Petechiae- a minute red spot due to escape of small amount of blood

Purpura- a small haerrhagic spot in skin

Gum bleeding, Hematemesis etc.

**c.** Enlargement of liver

**Grading of severity of DHF**

**Grade I-** Fever accompanied by nonspecific constitution symptoms. The only haemorrhagic manifestation is positive tourniquet test.

**Grade II**-Patient with spontaneous bleeding usually in the from skin haemorrhages

**Grade III-** Circulatory failure manifested by rapid and weak pulse, B.P. (20 mm og hg or less), hypotension, cold clammy skin and restlessness.

**Grade IV**- Profound shock with undetectable blood pressure and pulse.

**Dengue shock syndrome (DSS)**

The clinical diagnosis :

a. All the above criteria plus



b. Shock manifested by rapid and weak pulse with narrowing of pulse pressure, hypotension, cold clammy skin and restlessness.

**Incubation period-** 5-8 days

**Distribution-** world wide

**Mode of spread-** Dengue spreads through bite of mosquito to man. The diseases does not spread from mosquito to mosquito.

**Source of infection-** infection is the infected mosquito. The mosquito become infected by biting the patient during the first 3 to 5 days of illness and they become infective in 12 days after biting the infected person.

Incidence of infection- people of all age and both sexes are affected.

**Treatment-**

- At present, there is no drug that can treat dengue fever effectively. Patients infected with classical dengue usually recover in 1 to 2 weeks.
- For serious cases, supportive treatments are provided by hospitals. If you suspect that you have dengue fever, you should seek medical treatment promptly.
- Wiping the body with warm water and proper use of anti-fever drugs that can relieve the fever.
- Don't take aspirin-containing drugs because they worsen the hemorrhage.

**Protect Yourself against Dengue Fever**

As yet, there is no effective vaccine against dengue fever. Therefore, the best prevention is to avoid being bitten by mosquitoes by paying attention to the following:

Avoid staying in dark, outdoor places such as brushwood, pavilions or the shade of a tree during the hours when Aedes albopictus is active.

**Control the Spread of Dengue Fever**-Prevent the patient from being bitten by mosquitoes.

**Elimination of Mosquitoes -**

- The most effective way to eliminate mosquitoes is to keep the environment clean and to remove stagnant water so that mosquitoes can't breed.
- Cover water containers tightly so that mosquitoes can't get in to lay eggs.
- Dispose of domestic wastes properly to prevent the accumulation of stagnant water.
- Dispose of empty bottles, cans and lunchboxesproperly, such as into a covered bin.
- Change water for aquatic plants at least once a week, leaving no water under the pots or in the bottom saucers.

- Scrub the container surfaces thoroughly to prevent mosquito eggs sticking on them.
- Ditches should be free from blockage.
- Fill up uneven ground surfaces to prevent the accumulation of stagnant water.
- Remove stagnant water immediately if mosquitoes are found to be breeding. Use environmentally friendly insecticides such as lavicidal oil if necessary.
- In cultivation ponds, water tanks or large containers, biological controls such as keeping fishes to eat mosquito larvae would be a good option.

दण्डक ज्वर–

विशिष्टमशकोद्भवो जगति दण्डकाख्यो ज्वरः । सदाऽस्थिनिचय नरस्य परिपीडन्निर्भवरम ॥ स्थिति मुनिमितान्यहानि विदधाति नित्यं तनौ । ततो निगदतो ज्वरो मुनिभिरेष सप्ताहकः ॥

एनं डेङ्गूफिवर त्वाङ्गलभाषा विज्ञा वैद्या दण्डकाख्यं ज्वर च ॥ (मा.नि. परिशिष्टि 431)

Dandaka Jwara occur one of the specific Mashaka. Which produce the pain in Asthi up to 7 days this fever called as Saptaha Jwara, Dandaka Jwara etc.

## Chikungunya

Chikungunya is a mosquito-borne viral disease first described during an outbreak in southern Tanzania in 1952. It is an RNA virus that belongs to the alphavirus genus of the family Togaviridae.

**Causative organism-** Group A virus chikungunya Virus

**Reservoir of infection-** Ades, Culex and Mansonia mosquito

**Mode of transmission-** mosquito bite

Chikungunya has been identified in over 60 countries in Asia, Africa, Europe and the Americas.The virus is transmitted from human to human by the bites of infected female mosquitoes. Most commonly, the mosquitoes involved are Aedes aegypti and Aedes albopictus, two species which can also transmit other mosquito-borne viruses, including dengue.

**Signs and symptoms-** Chikungunya is characterized by an abrupt onset of fever frequently accompanied by joint pain. Other common signs and symptoms include muscle pain, headache, nausea, fatigue and rash. The joint pain is often very debilitating, but usually lasts for a few days or may be prolonged to weeks. Hence the virus can cause acute, subacute or chronic disease.

Most patients recover fully, but in some cases joint pain may persist for several months, or even years. Occasional cases of eye, neurological and heart complications have been reported, as well as gastrointestinal complaints.

**Diagnosis-** Several methods can be used for diagnosis. Serological tests, such as



enzyme-linked immunosorbent assays (ELISA), may confirm the presence of IgM and IgG anti-chikungunya antibodies. IgM antibody levels are highest 3 to 5 weeks after the onset of illness and persist for about 2 months. Samples collected during the first week after the onset of symptoms should be tested by both serological and virological methods (RT-PCR).

**Treatment-** There is no specific antiviral drug treatment for chikungunya. Treatment is directed primarily at relieving the symptoms, including the joint pain using anti-pyretic, optimal analgesics and fluids. There is no commercial chikungunya vaccine.

**Prevention and control-** The proximity of mosquito vector breeding sites to human habitation is a significant risk factor for chikungunya as well as for other diseases that these species transmit. Prevention and control relies heavily on reducing the number of natural and artificial water-filled container habitats that support breeding of the mosquitoes.

## Malaria

Malaria is caused by Plasmodium parasites. The parasites are spread to people through the bites of infected Anopheles mosquitoes, called "malaria vectors", which bite mainly between dusk and dawn.

There are four parasite species that cause malaria in humans :

1. Plasmodium falciparum
2. Plasmodium vivax
3. Plasmodium malariae
4. Plasmodium ovale.

Plasmodium falciparum and Plasmodium vivax are the most common. Plasmodium falciparum is the most deadly.

**Reservoir of infection-** A human reservoir is one who harbours the sexual forms of parasite.

**Period of communicability-** Malaria is communicable al long as mature viable gametocytes exist in the circulating blood in sufficient density to infect vector mosquito.

Relapses- usually for Vivax and Ovale malaria to relapse more than 3 years, after the first attack. Falciparum malaria usually disappears within 1- 2 years.

Age- malaria affects all ages

Incubation period-

12 day for Falciparum.

14 day for Vivax

28 days malaria

17 days for ovale.

Environmental factors- incidence of malaria is maximum from July to September.

**Mode of spread of infection**-Malaria is transmitted exclusively through the bites of female Anopheles mosquitoes. The intensity of transmission depends on factors related to the parasite, the vector, the human host, and the environment.

**Mode of transmission-**

1. Vector transmission-malaria is transmitted by bite of certain species of female Anopheles mosquito. The single vector during her life time may infect several persons.
2. Direct transmission- malaria may be induced accidentally by hypodermic intramuscular and intravenous injection of blood or plasma. e.g. blood transfusion
3. Congenital malaria- infection of new born from an infected mother may also occur but it is comparatively rare.

Clinical features- The primary fever is marked by paroxysms which correspond to the development of the parasite in RBC.

1. Cold stage- The onset is with lassitude, headache, nausea and chilly sensations followed in an hour or so by rigors. The temperature rises rapidly to 39- 41 degree C. headache is often severe and commonly there is vomiting. In early part skin is cold, later it is hot, pulse is rapid and may be weak. It last ¼ -1 hour.
2. Hot stage- patient feels burning hot and casts of his cloth. The skin is hot and dry to touch. Headache is intense, pulse full and respiration rapid. It lasts 2-6 hours.
3. Sweating stage- fever comes down with profuse sweating temperature drops rapidly to normal and skin is cool and moist. The pulse rate becomes slower; patient feels relived and often falls asleep. It lasts 2-4 hours.

**Complication**- splenomegaly, hepatomegaly, anaemia, renal complication, collapse.

**Malaria control-**

a. The management of malaria cases in the community

b. Active intervention to control or interrupt malaria transmission with community participation.

**Management of malaria cases**- The first line of treatment of malaria is chloroquine.

1. Chloroquine-

Day 1- 10 mg/kg -600mg
Day 2- 10mg/kg- 600mg
Day 3 5mg/kg- 300mg



2. Primaquine- P. falciparum

Single dose day-1 15 and above -45mg- (7.5 mg tablet) 6 tablets

3. P. vivax- primaquine daily dose for 5 days

National antimalarial programme.

Microscopic confirmation of species

P.Vivax – Tab primaquine 0.25 mg/kg body weight (15 mg adult dose) daily for 5 days.

P. Falciparum – No further treatment required.

**Control measures**

**a) Anti-adult measures-**

1. Residual spraying: The spraying of the indoor surface of houses with residual insecticides (eg. DDT, malathion, fenitrothion) is still the most effective measure to kill the adult mosquito. Malathion and Fenitrothion are organophosphate insecticides which are being used with increasing frequency for malaria control following the development of vector resistance to DDT.
2. Space application: Application of pesticides in the form of fog or mist using special equipment. The ultra-loco-volume method of pesticide dispersion by air or by ground equipment has proved to be effective and economical.

Individual protection: Man-vector contact can be reduced by other preventive measured such as the use of repellents, protective clothing, bed nets, mosquito coils screening of houses etc.,

**b) Anti-larval measures-**

i) Larvicides : Anti-larval measures such as spoiling the collections of standing water or treating them with paris green effectively controlled malaria.

ii) Source reduction : Techniques to reduce mosquito breeding sites which include drainage or filling, deepening or flushing, management of water level, changing the salt content of water and intermittent irrigation are among the classical methods of malaria control to which attention is being paid again.

iii) Integrated control : Integrated vector control methodology which includes bioenvironmental and personal protection measure.

## Filariasis

It is a chronic disease, with periodical episode of fever, followed by Lymphangitis (infection of lymph vessels), Lymphadenitis (infection of lymph nodes), and Lymph oedema (enlargement of affected organ).

Filariasis is caused by several rounds, coiled and thread-like parasitic worms belonging to the family filaridea. These parasites after getting deposited on skin penetrate on their own or through the opening created by mosquito bites to reach the lymphatic system.

Lymphatic Filariasis (LF), commonly known as elephantiasis is a disfiguring and disabling disease, usually acquired in childhood. In the early stages, there are either no symptoms or non-specific symptoms. Although there are no outward symptoms, the lymphatic system is damaged.

This stage can last for several years. Infected persons sustain the transmission of the disease. The long term physical consequences are painful swollen limbs (lymphedema or elephantiasis). Hydrocele in males is also common in endemic areas.

**Lymphatic Filariasis**

**Incubation period-** 8-16 months

**Distribution-** is practically worldwide. In India common endemic area are situated in eastern UP. Bihar, Orissa, Kerala, Tamil Nadu and Andhra Pradesh

**Seasonal incidence-** infection is more common during hot and humid climate. This is favourable to mosquito breeding and their propagation.

**Source of infection-** infected persons and carriers harboring microfilariae in their blood.

**Mode of transmission-**Transmitted by the bite of infected mosquito responsible for considerable sufferings/deformity and disability. The parasite is deposited near the site of puncture. It passes through the puncture skin or may penetrate the skin on its own and finally reach the lymphatic system.

**Disease Manifestation**

Disease manifestation range from :

- None
- Acute-Filarial fever
- Chronic-Lymphangitis, Lymphadenitis, Elephantiasis of genitals/legs/arms
- Tropical Pulmonary Eosinophilia (TPE)
- Filarial arthritis
- Epididimoorchitis
- Chyluria, etc.



**Epidemiological Triad**

**Agent Factors-**

| Sr.No. | Parasite | Mosquito | Disease |
|---|---|---|---|
| 1. | *W.bancrofti* | Culex | LF |
| 2. | *B.malayi* | Mansonia | LF |
| 3. | *B.timori* | Anopheles/Mansonia | LF |

**Social & Environmental Factors**

Associated with Urbanization, Poverty,

Industrialization, Illiteracy and Poor sanitation.

Climate: is an important factor which influences: The breeding of mosquito Longevity (Optimum temperature 22-38$^0$C & Humidity 70%)

The development of parasite in the vector Sanitation, Town planning, Sewage & Drainage.

**Stages in Lymphatic Filariasis**

There are 4 stages:

1. Asymptomatic amicrofilariaemic stage
2. Asymptomatic microfilariaemic stage
3. Stage of Acute manifestation
4. Stage of Obstructive (Chronic) lesions

**Classification of Lymphoedema**

Lymphoedema is classified into 7 stages on the basis of the presence & absence of the following :

1. Oedema
2. Folds
3. Knobs
4. Mossy foot
5. Disability

**Stages of Lymphoedema of the Leg (Stage I)**

- Swelling reverses at night
- Skin folds-Absent
- Appearance of Skin-Smooth, Normal

**Stages of Lymphoedema of the Leg (Stage II)**

- Swelling not reversible at night
- Skin folds-Absent
- Appearance of skin-Smooth, Normal

**Stages of Lymphoedema of the Leg (Stage III)**

- Swelling not reversible at night
- Skin folds-Shallow
- Appearance of skin-Smooth, Normal

**Stages of Lymphoedema of the Leg (Stage IV)**

- Swelling not reversible at night
- Skin folds-Shallow
- Appearance of skin - Irregular,
- Knobs, Nodules

**Stages of Lymphoedema of the Leg (Stage V)**

- Swelling not reversible at night
- Skin folds-Deep
- Appearance of skin - Smooth or Irregular

**Stages of Lymphoedema of the Leg (Stage VI)**

- Swelling not reversible at night
- Skin folds-Absent, Shallow, Deep
- Appearance of skin Wart-like lesions on foot or top of the toes

**Stages of Lymphoedema of the Leg (Stage VII)**

- Swelling not reversible at night
- Skin folds-Deep
- Appearance of skin-Irregular
- Needs help for daily activities - Walking, bathing, using bathrooms, dependent on family or health care systems

**Management of Lymphatic Filariasis**

1. Treating the infection
2. Treatment and prevention of Acute ADLA attacks
3. Treatment and prevention of Lymphoedema

Treatment for uncomplicated ADLA (acutedermatolyhangioadinitis)-

- Give analgesic such as paracetamol
- Give oral antibiotic such as amoxicillin
- Clean the limb with antiseptic
- Check for any wound, cuts, abscesses clean with antiseptic if any present.
- Do not give anti filararial medicine
- Elevation of the limb, cooling the limb with cold water.
- Follow up after 2 days.

Management of severe ADLA (acutedermatolyhangioadinitis)-

- Intravenous benzylpenicillin 5 million units 3 times a day.
- In case allergy to penicilllin give IV erythromycin 1 gm 3 times per a day.
- Give analgesic such as paracetamol
- Do not give any anti filarial medicine

**Control measures**

1. **Chemotherapy**
2. **Vector control**

**Chemotherapy of Filariasis**

Drugs effective against filarial parasites

1. Diethyl Carbomazine citrate (DEC)
2. Ivermectin
3. Albendazole
4. Couramin compound

Treatment of microfilaraemic patients may prevent chronic obstructive disease and may be repeated every 6 months till mf and/or symptoms disappears.

**Diethyl Carbomazine Citrate (Hetrazan, Banocide, Notezine) :**

- Mode of action: DEC do not have direct action of parasite but mediate through host immune system.
- Very effective against mf (Microfilariacidal)
- Lowers mf level even in single dose
- Effective against adult worms in 50% of patients in sensitive cases.
- Dose: 6mg/Kg/12 days
- Recent dosage: 6mg/Kg single dose

**Diethyl Carbomazine Citrate (Hetrazan, Banocide, Notezine) :**

- Adverse reactions are mostly due to the rapid destruction of mf which is characterized by fever, nausea, myalgia, sore throat, cough, headache.

- No effect on the treatment of ADL
- Drug of choice in the treatment of TPE.

**Ivermectin :**

- Mode of action: Directly acts on mf and no action on adults.
- Very effective against mf (Microfilariacidal)
- Lowers mf level even in single dose of 200µg - 400µg/Kg body weight
- No action on TPE
- Drug of choice in Co-endemic areas of Onchocerciasis with LF.
- Adverse reactions are lesser but similar to that of DEC
- Microfilariae reappears faster than DEC

**Albendazole :**

- This antihelmenthic kills adult worms
- No action on microfilariae
- Dose: 400mg/twice day /2 weeks
- With combination of DEC & Ivermectin, it enhances the action of the drugs.
- It induces severe adverse reactions in hydrocele cases due to the death of adult worms.

## Lymphatic Filariasis Control Programme

The current strategy of filariasis control (Elimination) is based on:

1. Interruption of transmission
2. Control of Morbidity

Interruption of the transmission can be achieved through :

Chemotherapy

Vector control

Case detection and treatment in low endemic areas are suitable for preventing transmission and controlling the disease.

- In high endemic areas, Mass chemotherapy is the approach.
- DEC medicated salt is also a form of Mass treatment using low dose of drug over a long period of time (1-2 gm /Kg of Salt).

## Vector Control

Vector control involves anti larval measures, anti adult measures, personal prophylaxis. An integratedmethod using all the vector control measures alonewill bring about sustained vector control.



**I. Anti larval measures:**

1. Chemical control
   a. Mosquito larvicidal oil
   b. Pyrosene oil
2. Removal of pistia plants
3. Minor environmental measures

**II. Anti adult mosquito measures :** Anti-adult measures as indoor residual spay using DDT, HCH and Dieldrin. Pyrethrum as a space spray is also followed.

**III. Personal Prophylaxis :** Reduction of man mosquito contact by using mosquito nets, screening of houses, etc.

श्लीपद–

यः सज्वरोवक्षणजो भृशार्तिः शोधोनृणां पादगतः क्रमेण।

तच्छलिपदंम्यात करकर्णनेत्रशिश्नौष्ट नासास्वपि केचिदाहुः। (भा.प्र. 44/2)

A swelling starting at the groins and gradually involving the leg, associated with fever and severe pain is known as Shlipada. It may occur even in the hands, ears, eyes, penis, lips and nose.

Types : Vataja Shlipada, Piitaja Shlipada

Treatment : Laghana, Alepa, Swedana, Virechana, Raktamokshana etc.

Eranda Taila and Haritaki daily with Gomutra for 7 days.

Sarshapa, Shobhajana, Sarshapa Kalka and Gomutra Pralepa.

## Leprosy

Leprosy is probably the oldest disease afflicting the mankind. Possibly it was originated in Africa and spread very early to India and from there to China. There are references in Buddhist literature. In Vedic reference it is mentioned as "KushtaRoga". It has the maximum social stigma attached to it. A common belief that leprosy is due to past sins committed by the person.

There is a belief that leprosy is hereditary and incurable. There are many misconceptions about disease that causes social aversion and ostracism against leprosy patients leading to the high deformity. But due to scientific inventions leprosy has been identified a disease that can be eradicated. Hansen of Norway during 1873 discovered leprae bacilli, therefore the disease is also known as Hansen's disease

**Causative organism**

Mycobacterium leprae and Mycobacterium lepromatosis are the causative agents of leprosy.they are acid fast and occur in the human host both intra-cellular and extra-cellular.

**Incubation period** - 3 to 5 years

**Source of infection** - It is generally agreed that multi bacillary cases (lepromatous and borderline lepromatus cases) are the most important source of infection in the community.

**Infectivity** - Leprosy is a highly infectious diseases but of low pathogenicity.

**Age**- Leprosy is not particularly a disease of children. Infection can take place at any time.

**Sex**- Both the incidences and prevalence of leprosy appear to be higher in males than female most region of the world.

**Environment factors**

1. The presence of infectious cases in that environment there is evidence that humidity favors the survival of M. leprae in the environment.
2. Overcrowding and lack of ventilation with in households.

**Mode of transmission**

a. **Droplet infection**- There is more and more evidence that leprosy may be transmitted via aerosols containing M. leprae with the realization of the importance of the nose as a portal of exit, there has been increased emphasis on the respiratory tract as the portal of entry.

b. **Contact transmission**- Transmitted fromperson to person by close contact between an infectious patient and a healthy but susceptible person e.g. contact with soil and fomites such as contaminated cloths and linen.

c. **Other routes**- bacilli may also be transmitted by insect vectors, or by tattooing needles.

**Classification** - Indian classifications is official clasofication of Indian leprosy associated (Hindu Kushta nivarana sangh)

a) Indeterminate type- this denotes early cases with one or two vague hypo pigmented macules and definite sensory impairment. These lesions are bacteriologically negative.

b) Tuberculoid type- this type denotes those cases with one or two well defined lesions, which may be flat or raised hypo pigmented or erythematous and are anesthetic. The lesions are bacteriologically negative.



c) Borderline type- this type denotes those cases with four or more lesions which may be flat or raised well or ill defined, hypo pigmented or erythematous and show sensory impairment or loss. The bacteriologically positive.

d) D. lepromatus type- this type denotes those cases with diffuse infiltration or numerous flat or raised poorly defined, shiny, smooth, symmetrically distributed lesions. These lesions are bacteriologically positive.

e) Pure neuritic type- This type denotes those cases of leprosy which show nerve involvement but do not have any lesion in the skin. These case are bacteriologically negative.

**Diagnosis**

There are many kinds of leprosy but there are common symptoms including:

1. Runny nose
2. Dry scalp eye problems
3. Skin lesions
4. Muscle weakness
5. Reddish skin
6. Smooth shiny diffuse thickening of facial skin, ear, and hand
7. Loss of sensation in fingers and toes
8. Thickening of peripheral nerves
9. Flat nose due to destruction of nasal cartilage.
10. There is also phonation and resonation of sound during speech.
11. Often there is atrophy of the testes and impotency.

**Clinical examination**

i. Interogation

ii. Inspection -

a. Skin smear
b. Nasal smear
c. Nasal scrapping
d. Foot pad culture
e. Histamine test
f. Immunological test-cell mediated immunity
g. Biopsy
h. Lepromine test
i. FLA- ABS test-92.3 %

**Prevention-**

1. **Medical measures-**
   a. Estimation of the problem
   b. Early case detection
      Case finding methods-
      Contact survey-
      Group survey-
      Mass survey-

**Multidrug Therapy (MDT)-** In a recent trial, a single dose of rifampicin reduced the rate at which contacts acquired leprosy in the two years after contact by 57%; 265 treatments with rifampicin prevented one case of leprosy in this period. A non-randomized study found that rifampicin reduced the number of new cases of leprosy by 75% after three years.

BCG offers a variable amount of protection against leprosy as well as against tuberculosis.

Sulfone drug, e.g. Dapsone was discovered in 1943 for the treatment of leprosy. With the introduction of Multi-Drug Treatment (MDT) during 1981 this disease is very well under control and may be eradicated. Other drug used in leprosy clofazimine, ethionamide, quinolones, minocycline, clarithromycin.

**Duration of treatment-**

Multibacillary leprosy- MB blister pack for 12 months.

Paucibacillary leprosy- PB blister pack for 6 months.

## Rabies

Rabies also known as hydrophobia is an acute highly fatal viral disease of cemtral nerves system. Rabies is a zoonotic disease (a disease that is transmitted from animals to humans), caused by the rabies virus, of the Lyssavirus genus, within the family Rhabdoviridae.

Domestic dogs are the most common reservoir of the virus, with more than 95% of human deaths caused by dog-mediated rabies.

**Causative organism-**Lyssavirus type-1

**Reservoir of infection-**

a. Urban rabies- the transfer of infection from wild life to domestic dogs results in the creation of urban cycle which maintained by the dog and is responsible for 99% of human cases in India.



b. Wild life rabies- jackal, fox, hyena

c. Bat rabies- transmitted by vampire bat is thought to kill hundreds of thousands of cattle annually.

**Source of infection-**The virus is transmitted in the saliva of rabid animals

**Incubation period-** 3-8 weeks

**Mode of transmission**

1. **Animal bites-** In India most of the human rabies case have resulted from dog-bites. Transmission to man is particularly through rabid dog bites. E.g. dog, cat, monkey, horse, sheep, goat.
2. **Licks-** licks on abraded skin and mucosa transmit the disease.
3. **Aerosols-** aerosols transmission has been observed in nature onlyin certain caves harboring rabies infected bats.
4. **Person to person-** Man to man transmission, although rare, is possible.

**Clinical feature**

1. **Prodromal symptoms-** Headache, malaise, sore throat and alight fever lasting for 3-4 days. About 80% of patients complain of pain or tingling at the site of bite.
2. **Excitation stage-** Nervous system usually involving, in order the sensory system.The motor system the sympathetic and mental system.

The patient is intolerant to noise, bright light or a cold draught of air. Aerophobia, spasms of the pharyngeal and neck muscles, dilation of the pupils and increased perspiration, salivation and lacrimation. Mental changes include fear of death, anger, irritability and depression.

The duration of illness 2 to 3 days but may be prolonged to 5-6 days in excitational cases. Later death occurs due to convulsion, paralysis and coma.

**Diagnosis-** clinical diagnosis can be mode on basis of history of bite by animals and sign and symptoms.

**Treatment-**

a. Patient should be isolated
b. Relieve anxiety and pain by liberal use of sedative.
c. Morphine in doses of 30-45 mg repeatedly.
d. Ensure hydration and dieresis
e. Intensive therapy in the form of respiratory and cardiac support.

**Rabies vaccine-** Rabies is a 100% vaccine-preventable disease. Countries

embarking on rabies elimination programmes have successfully experienced marked reductions, often progressing to the elimination of rabies.

Rabies vaccine is defined as a fluid or dried preparation of rabies "fixed" virus grown in the neural tissues of rabbits, sheep, goats, mice or rats or in embryonated duck eggs or in cell cultures and inactivated by suitable method.

1. Nervous tissue vaccine (NTV)
2. Duck embryo vaccine (DEV)
3. Cell-cultured vaccine (HDC)

**Prevention of human rabies-**

a. Post –exposure prophylaxis
b. Pre-exposure prophylaxis
c. Post-exposure treatment of persons who have been vaccinated previously.

**Post-exposure prophylaxis**

1. **General consideration-** majority of persons requiring anti-rabies treatment are those who were bitten by a suspected rabid animal. The aim of post exposure prophylaxis is to neutralize the inoculated virus before it can enter the nervous system treated as a medical emergency.
2. **Local treatment of wound-** promote and adequate local treatment of all bite wounds and scratches is the first requisite and is of utmost importance the purpose of local treatment is to remove as much as possible from the site of inoculation before it can be absorbed on nerve endings.

a. Cleansing- immediate flushing and washing the wound, scratches and the adjoining areas with plenty of soap and water, preferably under a running tap, for at least 15 minutes is of paramount importance in the prevention of human rabies.
b. Chemical treatment- whatever residual virus remains in the wound after cleansing should be inactivated by irrigation with virucidal agents either alcohol, aqueous solution of iodine.
c. Suturing- bite wounds should not be immediate sutured to prevent additional trauma which may help spread the virus into deeper tissue. If suturing is necessary. It should be done 24-48 hours later.
d. Anti-rabies serum- the local application of anti-rabies serum or its infiltration around the wound has been shown to be highly effective in preventing rabies.
e. Antibiotics and anti-tetanus measure-
f. Observe the animal for 10 days-



3. **Immunization-** In 1883 Pasteur performed the first successful human anti-rabies vaccination.

**Indication for anti-rabies treatment-**

1. If the animal shows sign of rabies or dies within 10 days of observation.
2. If the biting animal cannot traced or identified.
3. Unprovoked bites.
4. Laboratory tests of the brain of the biting animal are positive for rabies.
5. All bites by wild animals.

**Vaccine administration** - Cell culture and purified duck embryo vaccines. The use of modern, inactivated, purified cell culture and purified duck embryo vaccine with a potency at least 2.5 IU per single intramuscular dose should be applied according to one of the following schedules.

a. **Intramuscular schedules-**

| Dose – One I/M dose (0.01 or 0.5) into deltoid | | | | | | Booster Dose |
|---|---|---|---|---|---|---|
| Day | 0 day | 3 day | 7 day | 14 day | 28 day | On the 90 day |

Advantage – result indicated that 3 to 4 injection of cell culture vaccine produce anti body levels comparable with those induce by 10 injections of nervoustissue vaccine.

Disadvantage- vaccine is more cost.

b. **Intra dermal schedules-**

Use with Purified Vero Cell Vaccine (PVRV), Purified Primary Chick Embryo Cell (PCECV), Purified Duck Embryo Vaccine (PDEV).

Two site intra dermal regimen-

Dose- one I/D dose = one 1/5 IM dose

| Day | 0 day | 3day | 7day | 28day | 90day |
|---|---|---|---|---|---|
| Sites | $X_2$ | $X_2$ | $X_2$ | $X_1$ | $X_1$ |

8 site intra dermal schedule-

Dose-0.1 ml I/D per site

| Day | 0 day | 7 day | 28 day | 90 day |
|---|---|---|---|---|
| Sites | $X_8$ | $X_4$ | $X_1$ | $X_1$ |

**Pre-exposure prophylaxis-** Persons who run a high risk of repeated exposures such as laboratory staff working with rabies virus, veterinaries, animal handlers and wild life

officers should be protected by pre-exposure immunization. Cell-culture vaccine given either as 1 ml intramuscularly or 0.1 ml intra dermally on the days 0.7 and 28 day and booster injection administered at interval of 2 years.

**Post exposure treatment of person who have been vaccinated previously-** If the bite is severe, three 1 ml intramuscular doses of HDC vaccine are recommended on 0day, 3day and 7 day.

**Prevention and control**

- Registration and licensing of all domestic dogs.
- Destroy all stray and ownerless dogs.
- Restraint of dogs in public places.
- Health education of people regarding the care of drugs and prevention of rabies.
- Vaccinate all dogs when they are 3 months of age.
- Booster dose every year or 3 years.

## Tetanus

It is a disease of painful paroxysmal spasm of voluntary muscles (masseter muscles, facial muscles, muscles of neck and back and lower limb and abdomen). All injured person are vulnerable for tetanus. Many new borne deaths occur on account of unclean delivery.

**Epidemiological triad**

**Agent-** ClostridiumTetani is a gram - positive, anaerobic, spore bearing organisms.

**Host-** the portal entry for the agent is skin

**Incubation period-** 6 day to 10 days.

**Source of infection-** The natural habitat of the organism is soii & dust.The bacilii are found in the intestine of many herbivorous animals e.g Cattle, Horses, Goats & Sheep, excreted in their faeces. The spores survive for years in nature. The spores are blown about in dust & may occur in a wide variety of situations including operation theatres.

**Period of Communicability-** Not transmitted from person to person.

**Host Factors:**

**Age:** Commonly, tetanus is a disease of the active age (5 – 40 yrs). This period predisposes to all kinds of trauma.

**Sex:** Females are more exposed to the risk of tetanus especially during delivery or abortion leading to 'Puerperal tetanus'



**Mode of action :** Infection is acquired by contamination of wounds with tetanus spores.

The range of injuries & accidents which may lead to tetanus comprise a pin prick, skin abrasion, puncture wounds, burns, human bites, animal bites, unsterile surgery, bowel surgery, injections, unsterile division of umbilical cord etc.

**Types of Tetanus :**

**Traumatic :** Trauma is a major & important cause of tetanus. Sometimes tetanus may result from most trivial or even unnoticed wounds.

**Puerperal:** Tetanus follows abortion more frequently than a normal labour. A post-abortal uterus is a favorable site for the germination of tetanus spores.

**Otogenic :** Ear may be a rare portal of entry. Foreign bodies such as infected pencils, matches & beads may introduce the infection. It is pediatrics problem.

**Prevention- Active Immunization:** It is best prevented by active immunization with tetanus toxoid. It stimulates the production of the protective antitoxin.

Two preparations are available for active immunization,

– Combined vaccine - DPT.
– Monovalent vaccines :
i) Plain or Fluid Toxoid.
ii) Tetanus vaccine, adsorbed.

**Passive Imminization :**Temporary protection against tetanus can be provided by an injection of human tetanus hyperimmunoglobin (TIG) or ATS

**i) Human tetanus Hyperimmunoglobin :**

- It is the best prophylactic to use.
- The dose for all ages is 250-500 IU.
- It doesn't cause serum reactions.
- It gives a longer passive protection upto 30 days

**ii) ATS (Equine) :**

- If human antitoxin is not available, equine antitoxin (anti-tetanus serum or ATS) should be used.
- The standard dose is 1500 IU. Injected subcutaneously after sensitivity testing.
- ATS passive protection for about 7-10 days.

**Prevention of tetanus after injury :** All wounds must be thoroughly cleaned soon after injury – Removal of foreign bodies, soil, dust, necrotic tissue. This procedure will abolish anaerobic conditions which favour germination of tetanus spores.

**Protecting the susceptible -**

**For children-** DPT, DT and TT immunization under universal immunization programme.

**For mother-** T T given under universal immunization programme.

For wounded persons:

## Acute Diarrhoeal Diseases

Diarrhoea is an acute or chronic intestinal disturbance characterized by passing of more than three bulk motions in a day or 24 hours.

**Causative organism**

Bacteria: Escherichia coli, Shigella, salmonella etc.

Virus: Rota virus, adenovirus etc.

Parasites: Entameoba hystolytica, Giardia lamblin etc.

**Mode of transmission**

Faeco - oral route
Direct transmission

**Incubation period:** Few hours

**Clinical manifestation**

1. Stools loose and fluid in consistency, greenish or yellow green in colour, may contain mucus or blood.
2. Vomiting
3. Fever
4. Poor skin turgor, dry skin and dry mouth
5. Sunken fontanelles in children.
6. Sunken eyes
7. Tachycardia
8. Hypotension
9. Irritable and restlessness
10. Pallor
11. Rapid respiration
12. Sudden collapse if not treated properly

**Treatment :** Oral rehydration therapy: Give home available liquids like rice water, oral rehydration solution packet to be dissolved in one litre of drinking water and stir with clean spon, till it dissolves. Give ¼ to ½ cup after every loose motion to a child less than 2 years of age and 100-200 ml if the child is above 2 years. The solution should be consumed within 24 hours and should not be heated or boiled.



**Appropriate feeding :**

a. Coconut water
b. Rice water
c. Dhal water
d. Mashed banana
e. Water tea
f. Breakfast feeding to be continued.

**Appropriate drugs :**

- Bacterial infection : Ampicillin, chloramphenicol
- Symptomatic treatment for fever, vomiting etc.
- Protozol infection - metronidazole.
- Intravenous infusion to severly dehydrated clients.

## Food poisoning

Food poisoning is an acute gastro enteritis caused by the ingestion of living bacteria or their toxins. (e.g) Salmonella, staphylococcal, clostridium, botulinum.

**Incubation period:** One hour to 24 hours.

**Clinical manifestation**: Vomiting, nausea, retching, abdominal tenderness, dehydration, hyperthermia, head ache, tachycardia, frequent stools may contain mucus and blood, undigested food particles and offensive in nature.

**Treatment:** Fluid replacement with oral rehydration solution and intravenous fluids if necessary. Antibiotics as prescribed by the physician. Easily digestable, bland liquid diet.

**Control measures**

1. Food sanitation- Meat inspection: The food animals must be free from infection.
2. Personal hygiene: A high standard of personal hygiene among individuals engaged in the handling, preparation and cooking of food is needed.
3. Food handlers: Those suffering from infected wounds, boils, diarrhea, dysentery, throat infection etc., should be excluded from food handling. The medical inspection of food handlers is required.

4. Food handling techniques: The handling of ready to eat foods with bare hands should be reduced to a maximum.
5. Health education: Food handlers should be educated in matters of clean habits and personal hygiene, such as frequent and through hand washing.
6. Refrigeration: Proper temperature control in the prevention of bacterial food poisoning. Food should not be left in warm pantries. Cook and eat the same day is a golden rule. Cold is bacteriostatic at temperature below 4oC and refrigeration temperature should not exceed this level.

## Amoebiasis

Amoebiasis is a common infection of the human gastro intestinal tract.

**Causative organism:** Entamoeba histolytica.

**Incubation period:** As long as the cysts are excreted, the period may be several years, if cases are unrecognized and untreated.

**Mode of transmission-** Faecal – oral route. Sexual transmission among male homosexuals. Flies, cockroaches, rodents and contaminated food and drinks.

**Clinical features**

- Colicky abdominal pain.
- Diarrhoea: watery foul smelling stool containing blood streaked mucus.

**Treatment:** Flagyl 800 mg thrice daily for 5 to 7 days.

**Control measures**

- Sanitary disposal of human excreta.
- Provision of safe and adequate drinking water.
- Hygienic kitchen practice.
- Protection of food against flies.
- Periodic examination of food handlers.
- Health education regarding, Proper toilet habits, Releasing and protecting vegetables and fruits. Controlling insects.

**Preventive measures-** Periodic deworming at intervals of 2 to 3 months.

**Hookworm infection :** Hookworm disease is a chronic infestation of small intestine. They may occur as single or mixed infections in the same person.

**Causative organism :**

- Ancylostoma duodenale
- Necator americanus



**Incubation period**: Six weeks

**Mode of transmission**: Infective larvae from soil enter the human host by piercing the skin of bare foot.

**Clinical manifestations**

- Hookworms occur in the small intestine, particularly jejunum. They cause small ulcers in the intestine and cause chronic blood loss, leads to iron deficiency anemia.
- Weakness, puffiness of the face.
- Flatulance, constipation with alternate diarrhea and pain in the abdomen.
- Odema of legs and palpitation.
- Pallor of the whole body, tongue and conjunctiva.
- Slight fever
- Loss of appetite
- Malnutrition
- Infected children may have retarded mental and physical development leading to delayed puberty.
- Affected persons have low body resistance.

**Treatment**

- The drug of choice is Tablet .Mebendazole.
- Hookworm anaemia is treated with iron and folic acid.
- Prevention and control measures
- Sanitation measures
- Sanitary latrines
- Efficient sewage disposal
- Disinfection of all faeces to avoid contamination water and soil.
- Maintain personal hygiene and cleanliness.
- Wear chapels whenever going out.
- Vegetables and fruits must be washed properly before eating.
- Educate people about the spread, danger and prevention of this disease.

## Ascariasis

Ascariasis is a common helmenthic infection in man.

**Causative organism:** Ascaris lumbricoids

**Incubation period:** About 2 months.

**Mode of transmission:** Faecal – oral route i.e. by ingestion of infection eggs with food or drink.

**Clinical manifestations**

- General weakness and his body becomes pale.
- Loss of appetite
- Occasional vomiting
- Flatulence
- Live worm may be passed in the vomit or stools.
- Sometimes patient may have an asthmatic attack.

**Treatment:** The drugs of choice are Tablet piperzine and Mebendazole.

**Prevention and control :**

- Use of sanitary latrines
- Efficient sewage disposal
- Maintain personal hygiene
- Hand washing with soap and water after defecation and before eating.
- Washing vegetables and fruits before eating them raw..
- Protection of food from flies.
- Avoid pollution of the soil and water supply.

## Meningococcal Meningitis

Meningococcal meningitis or cerebrospiral fever is an acute communicable disease caused by N. meningitis. It usually begins with intense headache, vomiting and stiff neck and progresses to coma within a few hours.

**Causative organism:** Disease caused by Neisseria meningitis.

**Mode of transmission:** The disease spread mainly by droplet infection the portal of entry is the nasopharynx.

**Incubation period:** Usually 3-4 days but many vary from 2-10 days.

**Clinical features:** Meningococcal meningitis has a sudden onset of intense headache, fever, nausea, vomiting photophobia, stiff neck and various neurological sign.

**Prevention and control**

1. Control of cases, carriers and contacts.
2. Cases: Treatment with antibiotics can save the lives of 95% of patients provided that it is started during the first 2 days of illness. Penicillin is the drug of choice.



3. Contact: Close contact of persons with confirmed meningococcal disease are at an increased risk of developing meningococcal illness.
4. Mass chemoprophylaxis: Mass medication of the total population some of which are not infected. Mass chemoprophylaxis be restricted to close and medically supervised communities. Mass treatment causes an immediate drop in the maintenance rate of meningitis and in the proportion carriers.
5. Vaccine: The vaccine should be offered only to travelers at significant risk of infection. Internationally licensed meningococcal vaccines are bivalent or tetravalent.
6. Environmental measures: Improved housing and prevention of over-crowding are long term measures.

## Japanese Encephalitis

Japanese encephalitis is a mosquito borne encephalitis infecting mainly animals and incidentally man

**Causative organism:** Group B Arbovirus (Flavi virus) and transmitted by culex mosquito.

**Mode of transmission:** The disease is transmitted to man by the infected mosquito.

**Incubation period:** The incubation period in man, following mosquito bite is not exactly known. Probably it varies from 5 to 15 days.

**Clinical manifestations**

a) Prodormal stage: The onset of illness is usually acute and is heralded by fever, headache and malaise. The duration of this stage is usually 1-6 days.

b) Acute Encephalitic stage: Fever is usually high 38 to 40.7oc nuchal rigidity.

c) Late stage of sequelae: This stage begins when active inflammation is at an end. i.e. the temperature and ESR touch normal. Neurological signs become stationary and tend to improve.

**Control and preventive measures**

**Vector control :** The vector mosquitoes of Japanese encephalitis are widely scattered and not easily amendable to control. An effective way to deal with them is a resort to aerial or ground fogging with ultra-low-volume insecticides (e.g. malathion, fenitrothion)

**Vaccination :** The vaccine provides adequate protection throughout childhood following two primary doses 4 weeks a part, and boosters after 1 year and subsequently

at 3 yearly intervals until the age of 10-15 years. The vaccine is given subcutaneously in dose of 0.5 ml for children under 3 years and 1 ml for children more than 3 years of age.

## Emerging and Re-emerging Diseases

**Emerging infectious disease-** Newly identified & previously unknown infectious agents that causes public health problems either locally or internationally.

**Re-emerging infectious disease-** Infectious agents that have been known for some time, had fallen to such low levels that they were no longer considered public health problems & are now showing upward trends in incidence or prevalence worldwide.

Emerging infectious diseases are those whose incidence has increased over the past 30 years. Some are diseases that have never been seen before. Some were previously documented but without a known aetiology. More than 30 new diseases have been identified in the past 30 years, including:

Factors Contributing To Emergence-

**Agent**

Evolution of pathogenic infectious agents (microbial adaptation & change)
Development of resistance to drugs
Resistance of vectors to pesticides

**Host**

Human demographic change (inhabiting new areas)
Human behaviour (sexual & drug use)
Human susceptibility to infection (Immunosuppression)
Poverty & social inequality

**Environment**

Climate & changing ecosystems
Economic development & Land use (urbanization, deforestation)
Technology & industry (food processing & handling)
International travel & commerce
Breakdown of public health measure (war, unrest, overcrowding)
Deterioration in surveillance systems (lack of political will)

**Transmission of Infectious Agent from Animals to Humans-** More than 2/3rd emerging infections originates from animals- wild & domestic. Emerging Influenza infections in Humans associated with Geese, Chickens & Pigs



Animal displacement in search of food after deforestation/ climate change (Lassa fever)

Humans themselves penetrate/ modify unpopulated regions- come closer to animal reservoirs/ vectors (Yellow fever, Malaria)

**Climate & Environmental Changes-** Deforestation forces animals into closer human contact- increased possibility for agents to breach species barrier between animals & humans

El Nino- Triggers natural disasters & related outbreaks of infectious diseases (Malaria, Cholera)

Global warming- spread of Malaria, Dengue, Leishmaniasis, Filariasis

**Uncontrolled Urbanization & Population Displacement-** Growth of densely populated cities- substandard housing, unsafe water, poor sanitation, overcrowding, indoor air pollution (>10% preventable ill health)

Problem of refugees & displaced persons

Diarrhoeal & Intestinal parasitic diseases, ARI, Lyme disease (B. burgdorferi) - Changes in ecology, increasing deer populations, suburban migration of population

**Human Behaviour-** Unsafe sexual practices (HIV, Gonorrhoea and Syphilis)

Changes in agricultural & food production patterns- food-borne infectious agents (E. coli)

Increased international travel (Influenza)

Outdoor activity.

**Emerging Infectious Diseases and Re-emerging Infectious Diseases**

AIDS
Tuberculosis
Cholera
Malaria
Kala-azar
Dengue, DHF and DSS
Hepatitis B,C and E
Schistosomiasis
Japanese encephalitis
Ebola Hemorrhagic fever
Rabies

Legionnaire Disease Lyme Disease
Influenza
Antimicrobial resistance
Severe Acute Respiratory Syndrome-SARS

## Kuprasangaja Vyadhi (STDS)

Word Kuprasangaja comprises of Ku -bad, Prasanga- physical contact, Ja - born or produced. These are the disease produced due to bad contacts or in other words, known as sexually transmitted diseases.

**Sexually transmitted diseases-** The sexually transmitted diseases are a group communicable diseases that are transmitted predominantly by sexual contact and caused by a wide range of bacterial, viral, protozoal and fungal agents and ectoparasites.

5 classical Venereal diseases (syphilis, gonorrhoea, lymph granuloma venerum and donovanosis).

Among STD's Gonorrhoea, syphilis and cancroids are important incidence-
Gonorrhoea- 62 million
Syphilis -12 million
Cancroid- 7 million

## Syphilis

**Causative organism-** Treponema pallidum

**Mode of transmission** – abrasion in skin, mucous membrane, blood transfusion, tattooing, kissing, hukka etc.and vertical route mother to foetus.Technical worker also may get by accidental incidence.

**Incubation period-** 14-28 days

**Classification of syphilis-**

**Primary syphilis-** incubation period- 9-10 days

The primary lesion begins with single small pink macule, late on it becomes popular and ulcerates at the site of infection, usually on genitalia, the ulcer is painless, does not bleed easily on touch.

The regional lymph nodes are emlarged and is pain less. The primarynlesion is also called hard chancre the usual sites of ulcer in males are cornal sulcus of penis, the glans penis.

In females the labia majora, labia minora, cervix, urethral orifices and clitoris are usual sites. Exua genital ulcers is seen in 10 % cases it may be found on finger, tongue, nipples, rectum, lips, anus.



**Secondary syphilis-** After 6-8 weeks of appearance of primary syphilis the secondary syphilis develops. It starts with mild fever, headache, vomiting.

**Four important sign in secondary syphilis-**

1. Skin rashes- appearance of skin rashes start with macular lesion on proximal limbs and trunks further develop to generalize popular rash. The rash is asymptomatic, symmetrical and not itchy. These lesions progress to necrotic ulcers, the palm and sole are affected. Skin rash appear about 75% of cases.
2. Generalized lymphadenopathy – generalized, firm, non-tender lymphadenopathy occur in 50% cases.
3. Condylomata lata- in warm and moist area such as perianal area, vulva, scrotum, inner thigh. Axillae and skin under pendulousbreast papules can enlarge and become eroded and produce moist pink or gray white lesions called condylomata lata.
4. Mucus patches- superficial mucosal erosions called mucus patches occur in lips, oral, mucosa, tongue, palate, pharynx, vagina, vulva, glen penis. This secondary stage is also self-limited. The sign and symptoms disappear without any treatment and no evidence of disease remains except positive serological teat for syphilis.

**Late syphilis-**tertiary stage- if affects the skin, mucosa and bones the characteristics feature is granulomatous lesion called gumma. This takes more than 10 years to appear the symptoms.

**Quaternary stage-** cardiovascular syphilis and neuro syphilis are included in this stage.

**Congenital syphilis-** transmission of syphilis infection to foetus from mother through placenta may occur at any stage of pregnancy. Usually 16$^{th}$ week of pregnancy.

**Investigation-**

Non- specific –VDRL test
RPR- rapid plasma regain test

Specific- Treponema Pallidum is demonstrable infectious lesion by dark microscopy.
Direct fluorescent antibody Treponema Pallidum Absorption test.
TPHA- T-P- haemoglatin in tests.

**Treatment-**

**Primary stage-**

Penicillin -600-1200 mg IM once daily for 12 days.
Doxycycline -100 mg orally 8 hourly for 15 days.

## Phiranga

Bhavamishra was the first physician to introduce disease Phiranga in 16th century. Before 16th century this disease was not prevailing in India.

**Nidana-**

गन्ध रोगः फिरङ्गोयं जायते देहिनां ध्रुवम । पिरङ्गीणो अगसंसर्गात फिरङ्गिण्याः प्रसगांत ॥
व्याधिरागन्तुजो ह्योष दोषाणामात्र सक्रंमः ॥ (भा.प्र.उ. 59/3)
फिरगसंज्ञके देशे बाहुल्येनैव यदभवेत । तस्मात फिरंग इत्युक्तो व्याधिर्व्याधि विशारदैः ॥

Phiranga is a contagious disease spread by the touch and sexual contact with the person suffering from this disease. Due to vitiation of Dosha which occurs later. As this disease is spread to Indians through Phiranga it is called Phiranga.

भेद–

1. बाह्य फिरंग
2. आभ्यन्तर फिरंग
3. बाह्याआभ्यन्तर फिरंग

**Treatment-**

1. Chopachini choorna- -3gm mixed with honey and recommended orally (salt is restricted this period)
2. Rasakarpura – 500mg take with Lavanga orally care should be taken not to touch medicine to the teeth. Followed by bettle leaves.
3. Saptashali vati
4. Nimba patra churna 1 part, 1/8th part Amalaki, Haritaki, 1/16th Haridra mixed and recommended orally it is useful in both Bahya and Abhantara condition. Dose24 ratti (3 gm.) per day with water.

## AIDS- Acquired Immuno-Deficiency Sydrome

Sometime called as slim disease is a fatal illness caused by a retrovirus known as human immune deficiency virus (HIV).

Problem of AIDS and HIV-

2007- Number of people living with HIV

Total- 33.2 million

Death- 2.1millions

**Analysis of surveillance data-**

**Group I-** generalized epidemic, incidence cross 5% in high risk group 1% or more in pregnant.



**GroupII-** concentrated epidemic incidence 5% in high risk group and inpregnant less than 1%.

**Group III-** low prevalence epidemic incidence reach 5% in high risk group and in pregnancy less than 1%.

**Causative organism-** human immune-deficiency virus

**Reservoir of infection-** case and carrier.Once infection life time infected.

**Source of infection-** blood, semen, CSF, lower concentration in saliva, tears, milk, urine, cervical and vaginal secretion.

**Incubation period-** few months to 6 years

**Host factor-**

**Age** -most 20-49 years

**Sex-** in North America, Europe, Australia, Africa etc.

**High risk group-** male homosexual and bisexual, hetero sexual partners.Intravenous drug abusers, transfusion, recipients of blood and blood products.

**Mode of transmission-**

Sexual
Blood contact
Maternal

**Clinical manifestations-**

1. **Initial infection-** 70% of people after few weeks of exposure develop mild illness, fever, sore throat and rash. But most are asymptomatic up to first five years.

   HIV antibodies appear between 2-12 week in the blood stream and period up to this is called 'window period' tests are negative for antibody test, but patient has HIV infection.

2. **Asymptomatic carrier-** condition with no clinical sign but persistent generalized lymphadenopathy.
3. **AIDS related symptom complex ARC-** one or more clinical sign are present, unexplained diarrhea lasting longer than a month, fatigue, malaise, loss of more than 10% of body weight , fever, night sweats, milder opportunistic infection like oral through generalized lymphadenopathy or splenomegaly.
4. **AIDS-**end stage of HIV infection, number of opportunistic infections occurs I body. Tuberculosis and Kaposi sarcoma develop in early stage.

Candida esophagitis, Cryptococcus meningitis and penicillosis, pneumonia. Toxoplasma gondi and encephalitis when T-cells reach around 100. Chronic diarrhea, sever loss of weight, AIDS encephalopathy, dementia, herpes zoster, also may develop.

**Control methods in AIDS-**

1. Sexual discretion- anal sex, multiple sex partners and sex with person infected or suspected to have AIDs should avoid or minimized.
2. Blood and blood products should be kept free from AIDS infection.
3. Blood transfusion should be given only when strictly indicated.
4. Hemophiliacs should give heat treated preparations instead of coagulation factor concentrates.
5. Health education
6. Free and anonymous HIV testing counseling and referral services should be routinely made available at places such as STD clinics, Drug treatment clinics etc.

## Gonorrhoea

The acute stage is characterised by inflammation of urethra in male and of urethra, cervix and vagina in females. There is acute burning sensation with pain and pus discharge while passing urine. Later the pus becomes thin and persists lifelong.

**Causative organism-** Neisseria Gonorrhoea.

**Incubation period-** 2-10 days

**Clinical feature-**

**In male-** anterior urethra is common site for infection; ureteral discharge and dysuria are the features. On examination mucopurulent urethral discharge is present. In 10 % cases symptoms are absent. Male homosexuals are usually asymptomatic with anal discomfort, discharge, rectal discharge, bleeding and inflamed rectal mucosa and mucopus.

**In female-** Para urethral glands or ducts, bartholins gland or ducts, endo cervical canal are inflamed, rectum may be inflamed in anal sex, 50% are symptomatic vaginal discharge, dysuria, lower abdominal pain, inter menstrual bleeding and PID are the features.

Investigation- smears of infected site reveal germ negative gonococcal.

**Complication-** acute prostitis, bartholins gland abscess, PID, infertility, ectopic pregnancy etc.

**Treatment-**

**Preventive-**

1. Adequate therapy for gonococcal infection
2. To treat adequate the male sexual partner simultaneously
3. Avoid multiple sex partners



4. Condom toll both sexual partners are free from diseases.

**Curative-**

Ceftriaxone - 250 mg I/M 7 days
Ciprofloxacin 500 mg orally 7 days
Ofloxacin - 400 mg orally 7days
Ampicillin - 3gm orally 7 days etc.

## Chanchroid

**Organism** – Haemophilus ducreyl

**Sign-** after infection a small papule develops at the site of inoculation, normally with 2-3 days. Lesion are deep ulceration is extremely painful.

**Treatment-**Ciprofloxacin, erythromycin, azithromycin etc.

## Trichomoniasis

**Organism-** Trichomonas Vaginalis

**Symptoms-** Vaginitis, Viginal discharge

**Treatment-** metronidazole, Tinidazole.

**Chlamydial Infection-**

**Organism-** Chalmydia Trachomatis

**Symptoms-** Urethritis, cervicitis, procititis, epididymitis, infant pneumonia, PID, neonatal conjunctivitis.

**Treatment-** antibiotics used- Ciprofloxacin, erythromycin, azithromycin

## Donovanosis

**Organism-** Calymmatobacterium Granulomatis

**Incubation period-** 3-40 days

**Treatment-** Ciprofloxacin, erythromycin, azithromycin

## Non-communicable Disease Epidemiology

Communicable diseases have been controlled to a considerable extent in the developed countries. On the other hand, there is a trend towards increase in prevalence of non- communicable disease due to ecological imbalance and changing lifestyle of man.

Non-communicable diseases (NCDs), also known as chronic diseases, are

not passed from person to person. They are of long duration and generally slow progression.

The 4 main types of non-communicable diseases are cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructed pulmonary disease and asthma) and diabetes.

NCDs already disproportionately affect low- and middle-income countries where nearly three quarters of NCD deaths – 28 million – occur.

All age groups and all regions are affected by NCDs. NCDs are often associated with older age groups, but evidence shows that 16 million of all deaths attributed to non-communicable diseases (NCDs) occur before the age of 70. Of these "premature" deaths, 82% occurred in low- and middle-income countries. Children, adults and the elderly are all vulnerable to the risk factors that contribute to non-communicable diseases, whether from unhealthy diets, physical inactivity, exposure to tobacco smoke or the effects of the harmful use of alcohol.

These diseases are driven by forces that include ageing, rapid unplanned urbanization, and the globalization of unhealthy lifestyles. For example, globalization of unhealthy lifestyles like unhealthy diets may show up in individuals as raised blood pressure, increased blood glucose, elevated blood lipids, and obesity. These are called 'intermediate risk factors' which can lead to cardiovascular disease, a NCD.

## Diabetes

More than 346 million people worldwide have diabetes. There is an emerging global epidemic of diabetes that can be traced back to rapid increases in overweight, obesity and physical inactivity. Diabetes is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood sugar.

Hyperglycaemia, or raised blood sugar, is a common effect of uncontrolled diabetes and over time leads to serious damage to many of the body's systems, especially the nerves and blood vessels.

In 2014, 9% of adults 18 years and older had diabetes. In 2012 diabetes was the direct cause of 1.5 million deaths. More than 80% of diabetes deaths occur in low- and middle-income countries.

**Type 1 diabetes-** Type 1 diabetes (previously known as insulin-dependent, juvenile or childhood-onset) is characterized by deficient insulin production and requires daily administration of insulin. The cause of type 1 diabetes is not known and it is not preventable with current knowledge.



Symptoms include excessive excretion of urine (polyuria), thirst (polydipsia), constant hunger, weight loss, vision changes and fatigue. These symptoms may occur suddenly.

**Type 2 diabetes-** Type 2 diabetes (formerly called non-insulin-dependent or adult-onset) results from the body's ineffective use of insulin. Type 2 diabetes comprises 90% of people with diabetes around the world, and is largely the result of excess body weight and physical inactivity.

Symptoms may be similar to those of Type 1 diabetes, but are often less marked. As a result, the disease may be diagnosed several years after onset, once complications have already arisen.

Until recently, this type of diabetes was seen only in adults but it is now also occurring in children.

**Gestational diabetes-** Gestational diabetes is hyperglycaemia with blood glucose values above normal but below those diagnostic of diabetes, occurring during pregnancy. Women with gestational diabetes are at an increased risk of complications during pregnancy and at delivery. They are also at increased risk of type 2 diabetes in the future.

Gestational diabetes is diagnosed through prenatal screening, rather than reported symptoms.

Impaired glucose tolerance (IGT) and impaired fasting glycaemia (IFG)

Impaired glucose tolerance (IGT) and impaired fasting glycaemia (IFG) are intermediate conditions in the transition between normality and diabetes. People with IGT or IFG are at high risk of progressing to type 2 diabetes, although this is not inevitable.

**Common Consequences of Diabetes-** Over time, diabetes can damage the heart, blood vessels, eyes, kidneys, and nerves.

Diabetes increases the risk of heart disease and stroke. In a multinational study, 50% of people with diabetes die of cardiovascular disease (primarily heart disease and stroke).

Combined with reduced blood flow, neuropathy (nerve damage) in the feet increases the chance of foot ulcers, infection and eventual need for limb amputation.

Diabetic retinopathy is an important cause of blindness, and occurs as a result of long-term accumulated damage to the small blood vessels in the retina. One present of global blindness can be attributed to diabetes.

Diabetes is among the leading causes of kidney failure.

The overall risk of dying among people with diabetes is at least double the risk of their peers without diabetes.

**Prevention**- Simple lifestyle measures have been shown to be effective in preventing or delaying the onset of type 2 diabetes. To help prevent type 2 diabetes and its complications, people should:

1. Achieve and maintain healthy body weight;
2. Be physically active - at least 30 minutes of regular, moderate-intensity activity on most days. More activity is required for weight control;
3. Eat a healthy diet of between 3 and 5 servings of fruit and vegetables a day and reduce sugar and saturated fats intake;
4. Avoid tobacco use - smoking increases the risk of cardiovascular diseases.

**Diagnosis and treatment**- Early diagnosis can be accomplished through relatively inexpensive blood testing.

Treatment of diabetes involves lowering blood glucose and the levels of other known risk factors that damage blood vessels. Tobacco use cessation is also important to avoid complications.

## Obesity

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health.

Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m2).

**The WHO definition is:**

A BMI greater than or equal to 25 is overweight

A BMI greater than or equal to 30 is obesity.

BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. However, it should be considered a rough guide because it may not correspond to the same degree of fatness in different individuals.

Facts about overweight and obesity

Some recent WHO global estimates follow.



In 2014, more than 1.9 billion adults, 18 years and older, were overweight. Of these over 600 million were obese.

Overall, about 13% of the world's adult population (11% of men and 15% of women) were obese in 2014.

In 2014, 39% of adults aged 18 years and over (38% of men and 40% of women) were overweight.

The worldwide prevalence of obesity more than doubled between 1980 and 2014.

Overweight and obesity are linked to more deaths worldwide than underweight. Most of the world's population live in countries where overweight and obesity kill more people than underweight (this includes all high-income and most middle-income countries).

The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended. Globally, there has been:

1. An increased intake of energy-dense foods that are high in fat; and
2. An increase in physical inactivity due to the increasingly sedentary nature of many forms of work, changing modes of transportation, and increasing urbanization.

Changes in dietary and physical activity patterns are often the result of environmental and societal changes associated with development and lack of supportive policies in sectors such as health, agriculture, transport, urban planning, environment, food processing, distribution, marketing and education.

Raised BMI is a major risk factor for non-communicable diseases such as :

1. Cardiovascular diseases (mainly heart disease and stroke), which were the leading cause of death in 2012;
2. Diabetes;
3. Musculoskeletal disorders (especially osteoarthritis - a highly disabling degenerative disease of the joints);
4. Some cancers (endometrial, breast, and colon).

The risk for these non-communicable diseases increases, with an increase in BMI.

Childhood obesity is associated with a higher chance of obesity, premature death and disability in adulthood. But in addition to increased future risks, obese children

experience breathing difficulties, increased risk of fractures, hypertension, early markers of cardiovascular disease, insulin resistance and psychological effects.

**Prevention and control-** At the individual level, people can:

1. Limit energy intake from total fats and sugars;
2. Increase consumption of fruit and vegetables, as well as legumes, whole grains and nuts;
3. Engage in regular physical activity (60 minutes a day for children and 150 minutes per week for adults).

Individual responsibility can only have its full effect where people have access to a healthy lifestyle. Therefore, at the societal level it is important to:

1. Support individuals in following the recommendations above, through sustained political commitment and the collaboration of many public and private stakeholders;
2. Make regular physical activity and healthier dietary choices available, affordable and easily accessible to all - especially the poorest individuals.

The food industry can play a significant role in promoting healthy diets by:

1. Reducing the fat, sugar and salt content of processed foods;
2. Ensuring that healthy and nutritious choices are available and affordable to all consumers;
3. Practicing responsible marketing especially those aimed at children and teenagers;
4. Ensuring the availability of healthy food choices and supporting regular physical activity practice in the workplace.

## Hypertension

Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure. Blood is carried from the heart to all parts of the body in the vessels. Each time the heart beats, it pumps blood into the vessels. Blood pressure is created by the force of blood pushing against the walls of blood vessels (arteries) as it is pumped by the heart. The higher the pressure the harder the heart has to pump.

High blood pressure increases the risk of heart attacks, strokes and kidney failure. However, hypertension is treatable and preventable.



Uncontrolled hypertension can also cause blindness, irregularities of the heartbeat and heart failure. The risk of developing these complications is higher in the presence of other cardiovascular risk factors such as diabetes. One in three adults has high blood pressure in WHO's South-East Asia Region. Nearly 1.5 million people die due to high blood pressure every year making it a leading risk factor for mortality in the Region.

However, hypertension is preventable and treatable. In some developed countries, prevention and treatment of hypertension, together with other cardiovascular risk factors, has brought about a reduction in deaths from heart disease. The risk of developing hypertension can be reduced by:

1. Reducing salt intake
2. Eating a balanced diet
3. Avoiding harmful use of alcohol
4. Regular physical activity
5. Maintaining a healthy body weight
6. Avoiding tobacco use

## Coronary Heart Diseases

Cardiovascular disease is caused by disorders of the heart and blood vessels, and includes coronary heart disease (heart attacks), cerebrovascular disease (stroke), raised blood pressure (hypertension), peripheral artery disease, rheumatic heart disease, congenital heart disease and heart failure. The major causes of cardiovascular disease are tobacco use, physical inactivity, an unhealthy diet and harmful use of alcohol.

Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels and they include:

1. Coronary heart disease – disease of the blood vessels supplying the heart muscle;
2. Cerebrovascular disease – disease of the blood vessels supplying the brain;
3. Peripheral arterial disease – disease of blood vessels supplying the arms and legs;
4. Rheumatic heart disease – damage to the heart muscle and heart valves from rheumatic fever, caused by streptococcal bacteria;
5. Congenital heart disease – malformations of heart structure existing at birth;

6. Deep vein thrombosis and pulmonary embolism – blood clots in the leg veins, which can dislodge and move to the heart and lungs.

Heart attacks and strokes are usually acute events and are mainly caused by a blockage that prevents blood from flowing to the heart or brain. The most common reason for this is a build-up of fatty deposits on the inner walls of the blood vessels that supply the heart or brain. Strokes can also be caused by bleeding from a blood vessel in the brain or from blood clots. The cause of heart attacks and strokes are usually the presence of a combination of risk factors, such as tobacco use, unhealthy diet and obesity, physical inactivity and harmful use of alcohol, hypertension, diabetes and hyperlipidaemia.

**Symptoms of heart attacks and strokes** - Often, there are no symptoms of the underlying disease of the blood vessels. A heart attack or stroke may be the first warning of underlying disease. Symptoms of a heart attack include:

- Pain or discomfort in the centre of the chest;
- Pain or discomfort in the arms, the left shoulder, elbows, jaw, or back.
- In addition the person may experience difficulty in breathing or shortness of breath; feeling sick or vomiting; feeling light-headed or faint; breaking into a cold sweat; and becoming pale. Women are more likely to have shortness of breath, nausea, vomiting, and back or jaw pain.

The most common symptom of a stroke is sudden weakness of the face, arm, or leg, most often on one side of the body. Other symptoms include sudden onset of:

- Numbness of the face, arm, or leg, especially on one side of the body;
- Confusion, difficulty speaking or understanding speech;
- Difficulty seeing with one or both eyes;
- Difficulty walking, dizziness, loss of balance or coordination;
- Severe headache with no known cause; and
- Fainting or unconsciousness.
- People experiencing these symptoms should seek medical care immediately.

## Rheumatic Heart Disease

Rheumatic heart disease is caused by damage to the heart valves and heart muscle from the inflammation and scarring caused by rheumatic fever. Rheumatic fever is caused by an abnormal response of the body to infection with streptococcal bacteria, which usually begins as a sore throat or tonsillitis in children.



Rheumatic fever mostly affects children in developing countries, especially where poverty is widespread. Globally, about 2% of deaths from cardiovascular diseases are related to rheumatic heart disease.

**Symptoms of rheumatic heart disease-** Symptoms of rheumatic heart disease include: shortness of breath, fatigue, irregular heartbeats, chest pain and fainting.

Symptoms of rheumatic fever include: fever, pain and swelling of the joints, nausea, stomach cramps and vomiting.

**Burden of cardiovascular diseases be reduced-**"Best buys" or very cost effective interventions that are feasible to be implemented even in low-resource settings have been identified by WHO for prevention and control of cardiovascular diseases. They include two types of interventions: population-wide and individual, which are recommended to be used in combination to reduce the greatest cardiovascular disease burden.

Examples of population-wide interventions that can be implemented to reduce CVDs include :

1. Comprehensive tobacco control policies
2. Taxation to reduce the intake of foods that are high in fat, sugar and salt
3. Building walking and cycle paths to increase physical activity
4. Strategies to reduce harmful use of alcohol
5. Providing healthy school meals to children.

At the individual level, for prevention of first heart attacks and strokes, individual health-care interventions need to be targeted to those at high total cardiovascular risk or those with single risk factor levels above traditional thresholds, such as hypertension and hypercholesterolemia. The former approach is more cost-effective than the latter and has the potential to substantially reduce cardiovascular events. This approach is feasible in primary care in low-resource settings, including by non-physician health workers.

For secondary prevention of cardiovascular disease in those with established disease, including diabetes, treatments with the following medications are necessary:

1. Aspirin
2. Beta-blockers
3. Angiotensin-converting enzyme inhibitors
4. Statins.

The benefits of these interventions are largely independent, but when used together with smoking cessation, nearly 75% of recurrent vascular events may be prevented. Currently there are major gaps in the implementation of these interventions particularly at the primary health care level.

In addition costly surgical operations are sometimes required to treat CVDs. They include:

a. Coronary artery bypass
b. Balloon angioplasty (where a small balloon-like device is threaded through an artery to open the blockage)
c. Valve repair and replacement
5. Heart transplantation
6. Artificial heart operations

Medical devices are required to treat some CVDs. Such devices include pacemakers, prosthetic valves, and patches for closing holes in the heart.

## Cancer

Cancer is a generic term for a large group of diseases that can affect any part of the body. Other terms used are malignant tumours and neoplasms. One defining feature of cancer is the rapid creation of abnormal cells that grow beyond their usual boundaries, and which can then invade adjoining parts of the body and spread to other organs, the latter process is referred to as metastasizing. Metastases are the major cause of death from cancer.

**The problem** - Cancer is a leading cause of death worldwide, accounting for 8.2 million deaths in 2012. The most common causes of cancer death are cancers of:

lung (1.59 million deaths), liver (745 000 deaths), stomach (723 000 deaths), colorectal (694 000 deaths), breast (521 000 deaths), oesophageal cancer (400 000 deaths) .

**Causes for cancer**- Cancer arises from one single cell. The transformation from a normal cell into a tumour cell is a multistage process, typically a progression from a pre-cancerous lesion to malignant tumours. These changes are the result of the interaction between a person's genetic factors and 3 categories of external agents, including:



1. Physical carcinogens, such as ultraviolet and ionizing radiation;
2. Chemical carcinogens, such as asbestos, components of tobacco smoke, aflatoxin (a food contaminant) and arsenic (a drinking water contaminant); and
3. Biological carcinogens, such as infections from certain viruses, bacteria or parasites.

Ageing is another fundamental factor for the development of cancer. The incidence of cancer rises dramatically with age, most likely due to a build-up of risks for specific cancers that increase with age.

### Risk factors for cancers

Tobacco use, alcohol use, unhealthy diet and physical inactivity are the main cancer risk factors worldwide. Some chronic infections are risk factors for cancer and have major relevance in low- and middle-income countries.

Hepatitis B (HBV), hepatitis C virus (HCV) and some types of Human Papilloma Virus (HPV) increase the risk for liver and cervical cancer respectively. Infection with HIV substantially increases the risk of cancer such as cervical cancer.

### Modifying and avoiding risk factors

More than 30% of cancer deaths could be prevented by modifying or avoiding key risk factors, including:

1. Tobacco use
2. Being overweight or obese
3. Unhealthy diet with low fruit and vegetable intake
4. Lack of physical activity
5. Alcohol use
6. Sexually transmitted HPV-infection
7. Infection by HBV
8. Ionizing and non-ionizing radiation
9. Urban air pollution
10. Indoor smoke from household use of solid fuels.

Tobacco use is the single most important risk factor for cancer causing about 20% of global cancer deaths and around 70% of global lung cancer deaths. In many low-income countries, up to 20% of cancer deaths are due to infection by HBV and HPV.

**Prevention strategies-**

a. Increase avoidance of the risk factors listed above.
b. Vaccinate against human papilloma virus (HPV) and hepatitis B virus (HBV).
c. Control occupational hazards.
d. Reduce exposure to non-ionizing radiation by sunlight. (UV)
e. Reduce exposure to ionizing radiation (occupational or medical diagnostic imaging).

# CHAPTER 17 Chikitsalaya Bhavana (Hospital Building)

India's Public Health System has been developed over the years as a 3-tier system, namely primary, secondary and tertiary level of health care. It provides effective, affordable health care services (curative including specialist services, preventive and promotive) for a defined population, with their full participation and in co-operation with agencies in the district that have similar concern. It covers both urban population (district head quarter town) and the rural population in the district.

There are different types of hospital run by government of India,All India Institutes of Medical Sciences, Government Medical Colleges, District Hospitals or General Hospitals,Taluk hospitals, Community Health Centre (CHCs), Primary Health Centres (PHC).etc.

तद्यथा दृढंनिवातं प्रवातैक देशंसुखविचारमनुपत्यकं धूमातपजरजसामनभिगमनीयमनिष्ठानां च शब्द स्पर्श रस रुप गन्धानांसोदपानोदूखलमुसलवर्चः स्थान स्नानभूमि महानसं वास्तुविद्याकुशलः हमेवतावतपूर्वमुपकल्पयेत ॥ (च.सू. 15/6)

Architect should construct a building which has the following features

Drudha (strong), Nivata (less ventilated), Pravatekadesha (entry of air from one direction), Sukhapravichara (with comfortable space to move), Anupatyaka(not situated near mountain or big houses), Anabhigamaniya (should not be exposed to) Dhuma, Atapa, Jala, Raja etc. Anabhigamaniya (should not be exposed to) Shabda, Sparsha, Rasa, Rupa, Gandha etc.

**Building should have following arrangements**-Udapana (water reservoir, Udukhala (Mortae), Musala(Pestle), Varcahsthana (latrine), Snana Bhum i(bathroom), Mahanasa (kitchen).

पञ्चकर्मागार - (च.सू. 15/7)

Arrangements should be made for attendants who have good conduct, cleanliness, character, devotion, ability, sympathy, who are well versed in nursing and good in administering treatment many attendants for cooking soup's, gruels etc. bathing, massaging, lifting, seating patients and grinding drugs should be present. They should be willing to work people well versed with vocal and instrumental music, chanting of verses,

ancient lore's, stories, history, Purana, who can understand desire, obedient and have knowledge about time , place etc.

Bird like- Lava, Kapinjala, animals like Shasha, Hirana, Ena, Kalapucchaka, Mrugamaatruka, Uarabhra should be present. Cow with good temper, free from diseases having young calf should be present. Proper arrangement for her fodder, dwelling and water should be made.

Provision should be made to keep vessels, spoons, tub, etc. other arrangement are made for bedding, seats, golden vessel and spittoon should be provided. Bed sheets, towel, pillow and cushion should kept there to assists lying flat, sitting, oleation, fomentation, massage, purgation, Basti, Nasya etc.

**Physical Infrastructure-**

**Size of the hospital-** Land Area (Desirable) Minimum Land area requirement are as follows :

Upto 100 beds = 0.25 to 0.5 hectare

Upto 101 to 200 beds = 0.5 hectare to 1 hectare

500 beds and above = 6.5 hectare (4.5 hectare for hospital and 2 hectare for residential)

Size of hospital as per number of Beds

**General Hospital** - 80 to 85 sqm per bed to calculate total plinth area (Desirable). The area will include the service areas such as waiting space, entrance hall, registration counter etc. In addition, Hospital Service buildings like Generators, Manifold Rooms, Boilers, Laundry, Kitchen and essential staff residences are required in the Hospital premises. In case of specific requirement of a hospital, flexibility in altering the area is kept.

Following facilities/area may also be considered while planning hospital.

1. Operation Theatre –
   One OT for every 50 general in-patient beds
   One OT for every 25 surgical beds.
2. ICU beds = 5 to 10 % of total beds
3. Floor space for each ICU bed = 25 to 30 sq m (this includes support services)
4. Floor space for Pediatric ICU beds = 10 to 12 sq m per bed
5. Floor space for High Dependency Unit (HDU) = 20 to 24 sq m per bed
6. Floor space Hospital beds (General) = 15 to 18 sq m per bed (vii) Beds space = 7 sq m per bed.
7. Minimum distance between centers of two beds = 2.5 m (minimum)
8. Clearance at foot end of each bed = 1.2 m (minimum)
9. Minimum area for apertures (windows/ Ventilators opening in fresh air) = 20% of the floor area (if on same wall) = 15% of the floor area (if on opposite walls)



**Site selection criteria**

In the case of either site selection or evaluation of adaptability, the following items must be considered: Physical description of the area which should include bearings, boundaries, topography, surface area, land used in adjoining areas, drainage, soil conditions, limitation of the site that would affect planning, maps of vicinity and landmarks or centres, existing utilities, nearest city, port, airport, railway station, major bus stand, rain fall and data on weather and climate.

Hospital Building-Planning and Lay out Hospital Management Policy should emphasize on hospital buildings with earthquake proof, flood proof and fire protection features. Infrastructure should be eco-friendly and disabled (physically and visually handicapped) friendly. Local agency Guidelines and Bylaws should strictly be followed.

**Appearance and upkeep**

The hospital should have a high boundary wall with at least two exit gates. Building shall be plastered and painted with uniform colour scheme.

There shall be no unwanted/outdated posters pasted on the walls of building and boundary of the hospital.

There shall be no outdated/unwanted hoardings in hospital premises.

There shall be provision of adequate light in the night so hospital is visible from approach road.

Proper landscaping and maintenance of trees, gardens etc. should be ensured. There shall be no encroachment in and around the hospital.

**Signage-** The building should have a prominent board displaying the name of the Centre in the local language at the gate and on the building. Signage indicating access to various facilities at strategic points in the Hospital for guidance of the public should be provided. For showing the directions, colour coding may be used.

Citizen charter shall be displayed at OPD and Entrance in local language including patient rights and responsibilities.

Hospital lay out with location and name of the facility shall be displayed at the entrance.

Directional signage's for Emergency, all the Departments and utilities shall be displayed appropriately, so that they can be accessed easily.

Florescent Fire Exit plan shall be displayed at each floor. Safety, Hazard and caution signs displayed prominently at relevant places.

Display of important contacts like higher medical centres, blood banks, fire department, police, and ambulance services available in nearby area.Display of mandatory information (under RTI Act, PNDT Act, MTP Act etc.).

**General Maintenance**-Building should be well maintained with no seepage, cracks in the walls, no broken windows and glass panes. There should be no growth of algae and mosses on walls etc. Hospital should have anti-skid and non-slippery floors.

**Condition of roads, pathways and drains**- Approach road to hospital emergency shall be all weather motor ableroads. Roads shall be illuminated in the nights.

There shall be dedicated parking space separately for ambulances, Hospital staff and visitors.

There shall be no stagnation/over flow of drains.

There shall be no water logging/marsh in or around the hospital premises.

There shall be no open sewage/ditches in the hospital.

**Environmental friendly features**-The Hospital should be, as far as possible, environment friendly and energy efficient. Rain-Water harvesting, solar energy use and use of energy-efficient bulbs/ equipment should be encouraged. Provision should be made for horticulture services including herbal garden. A room to store garden implements, seeds etc. will be made available.

**Barrier free access**-For easy access to non-ambulant (wheel-chair, stretcher), semi-ambulant, visually disabled and elderly persons infrastructure as per "Guidelines and Space Standards for barrier-free built environment for Disabled and Elderly Persons" of Government of India, is to be provided. This will ensure safety and utilization of space by disabled and elderly people fully and their full integration into the society. Provisions as per 'Persons with Disability Act' should be implemented.

**Administrative Block**-Administrative block attached to main hospital along with provision of MS Office and other staff will be provided. Block should have independent access and connectivity to the main hospital building, wherever feasible.

**Circulation Areas**-Circulation areas comprise corridors, lifts, ramps, staircase and other common spaces etc. The flooring should be anti-skid and non-slippery.

**Corridors**-Corridors shall be at least 3 m Wide to accommodate the daily traffic. Size of the corridors, ramps, and stairs shall be conducive for manoeuvrability of wheeled



equipment. Corridors shall be wide enough to accommodate two passing trolley, one of which may have a drip attached to it. Ramps shall have a slope of 1:15 to 1:18. It must be checked for manoeuvrability of beds and trolleys at any turning point.

**Roof Height**-The roof height should not be less than approximately 3.6 m measured at any point from floor to roof.

**Entrance Area**- Barrier free access environment for easy access to no ambulant (wheel-chair, stretcher), semi-ambulant, visually disabled and elderly persons as per "Guidelines and Space Standards for barrier-free built environment for Disabled and Elderly Persons" of CPWD/Min of Social Welfare, GOI.

Ramp as per specification, Hand- railing, proper lightning etc. must be provided in all health facilities and retrofitted in older one which lacks the same.

The various types of traffic shall be grouped for entry into the hospital premises according to their nature. An important consideration is that traffic moving at extremely different paces (e.g. a patient on foot and an ambulance) shall be separated. There can be four access points to the site, in order to segregate the traffic.

Emergency: for patients in ambulances and other vehicles for emergency department. Service: for delivering supplies and collecting waste.

Service: for removal of dead

Main: for all others

**Residential Quarters**-All the essential medical and para-medical staff will be provided with residential accommodation. If the accommodation cannot be provided due to any reason, then the staff may be paid house rent allowance, but in that case they should be staying in near vicinity, so that essential staff is available 24 x 7.

**Departmental Lay Out Clinical Services**- Outdoor Patient Department (OPD)-The facility shall be planned keeping in mind the maximum peak hour patient load and shall have the scope for future expansion. OPD shall have approach from main road with signage visible from a distance.

**Reception and Enquiry**-Enquiry/May I Help desk shall be available with competent staff fluent in local language. The service may be outsourced.

Services available at the hospital displayed at the enquiry.

Name and contacts of responsible persons like Medical superintendent, Hospital Manager, Causality Medical officer; Public Information Officer etc. shall be displayed.

**Waiting Spaces**-Waiting area with adequate seating arrangement shall be provided. Main entrance, general waiting and subsidiary waiting spaces are required adjacent to

each consultation and treatment room in all the clinics. Waiting area at the scale of 1 sq ft/per average daily patient with minimum 400 sq ft of area is to be provided.

**Layout of OPD**-shall follow functional flow of the patients,

e.g.: Enquiry'!Registration'!Waiting'!Sub-waiting'! Clinic'!Dressing room/Injection Room'!Billing'! Diagnostics (lab/X-ray)'!Pharmacy'! Exit

**Patient amenities**-Potable drinking water.

Functional and clean toilets with running water and flush.

Fans/Coolers.

Seating arrangement as per load of patient.

**Clinics**-The clinics should include general, medical, surgical, ophthalmic, ENT, dental, obstetrics and gynaecology, Post Partum Unit, paediatrics, dermatology and venereology, psychiatry, neonatology, orthopaedic and social service department. Doctor chamber should have ample space to sit for 4-5 people. Chamber size of 12.0 sq meters is adequate. The clinics for infectious and communicable diseases should be located in isolation, preferably, in remote corner, provided with independent access. For National Health Programme, adequate space be made available. Immunization Clinic with waiting Room having an area of 3 m × 4 m in PP centre/Maternity centre/Paediatric Clinic should be provided. One Room for HIV/STI counselling is to be provided. Pharmacy shall be in close proximity of OPD. All clinics shall be provided with examination table, X-ray- View box, Screens and hand wishing facility. Adequate number of wheelchairs and stretcher shall be provided.

**Nursing Services**-Various clinics under Ambulatory Care Area require nursing facilities in common which include dressing room, side laboratory, injection room, social service and treatment rooms etc. Nursing Station: Need based space required for Nursing Station in OPD for dispensing nursing services. (Based on OPD load of patient)

**Clinical Laboratory**-The department shall be situated such that it has easy access to IPD as well as OPD patients. The Laboratory shall have adequate space from the point of view of workload as well as maintenance of high level of hygiene to prevent the infection. Storage space shall be adequate (10% of total floor space) with separate storage space for inflammable items. The layout shall ensure logical flow of specimens from receipt to disposal. There shall be separate and demarcated areas for sample collection, sample processing, haematology, biochemistry, clinical pathology and reporting. The table top shall be acid and alkali proof.

**Blood Bank**-Blood bank shall be in close proximity to pathology department and at



an accessible distance to operation theatre department, intensive care units and emergency and accident department. Blood Bank should follow all existing guidelines and fulfil all requirements as per the various Acts pertaining to setting up of the Blood Bank.

Hospital should follow standard operating procedure for management of blood bank services including policy on rational use of blood and blood product promulgated by Central/State Government, selection of donors, counselling and examination of donors, consent for donation, issue and transport of blood, storage of blood, cross matching, blood transfusion, and safety precaution. Blood bank shall validate the test results from external labs on regular basis.

Service provided by the department with schedule of charges shall be displayed at the entrance of department.

Availability of blood group shall be displayed prominently in the blood bank.

Blood bank shall adhere to NACO guidelines and drug and cosmetic act strictly.

Blood bank shall practice first in first out policy for reduction of waste. Adequate measures shall be taken to prevent expiry of blood or blood components.

Use of blood component shall be encouraged.

Intermediate Care Area (Indoor Patient Department)-

- General IPD beds shall be categorized as following
- Male Medical ward
- Male surgical ward
- Female Medical ward
- Female surgical ward
- Maternity ward
- Paediatric ward
- Nursery
- Isolation ward
- As per need and infrastructure hospital have following wards
- Emergency ward/trauma ward
- Burn Ward
- Orthopaedic ward
- Post operative ward
- Ophthalmology Ward

- Malaria Ward
- Infectious Disease Ward
- Private ward: Depending upon the requirement of the hospital and catchment area, appropriate beds may be allowed for private facility. 10% of the total bed strength is recommended as private wards beds.

**Location**-Location of the ward should be such to ensure quietness and to control number of visitors. Ward Unit It is desirable that up to 20 % of the total beds may be earmarked for the day care facilities, as many procedures can be done on day care basis in modern times.

**Pharmacy (Dispensary)**- The pharmacy should be located in an area conveniently accessible from all clinics. The size should be adequate to contain 5 percent of the total clinical visits to the OPD in one session. For every 200 OPD patients daily there should be one dispensing counter. Pharmacy should have component of medical store facility for indoor patients and separate pharmacy with accessibility for OPD patients. Hospital shall have standard operating procedure for stocking, preventing stock out of essential drugs, receiving, inspecting, handing over, storage and retrieval of drugs, checking quality of drugs, inventory management (ABC & VED), storage of narcotic drugs, checking pilferage, date of expiry, pest and rodent control etc.

**Patient Conveniences** – Number of toilets etc. to be provided as per number of beds of Hospital/OPD load.

**Intensive Care Unit and High Dependency Wards** -General In this unit, critically ill patients requiring highly skilled life saving medical aid and nursing care are concentrated. These should include major surgical and medical cases, head injuries, severe haemorrhage, acute coronary occlusion, kidney and respiratory catastrophe, poisoning etc. It should be the ultimate Medicare the hospital can provide with highly specialized staff and equipment. The number of patients requiring intensive care may be about 5 to 10 percent of total medical and surgical patients in a hospital. The unit shall not have less than 4 beds nor more than 12 beds.

**Norms for Fitments-**

| Sl. No. | Fitments | Hospital for indoor-patients wards For male & female | Hospital with outdoor patient | | Administrative building | |
|---|---|---|---|---|---|---|
| | | | Male | Female | Male | Female |
| 1. | Water closet | One for every 6 beds | One for every100 persons | Two per 100 persons | One for every 25 persons | One for every 15 persons |



| | | | | | | |
|---|---|---|---|---|---|---|
| 2. | Wash basins | Two for up to 24 persons, add one for everyadditional 24 beds | One for every 100 persons | One for every 100 persons | One for every 25 persons | One for every 25 persons |
| 3. | Baths with Shower | One bath with shower for every 6 beds | - | - | One on eachfloor | One on eachfloor |
| 4. | Bed pan washing sinks | One for each six beds ward | - | - | - | - |
| 5. | Cleaners sink | One for each ward | One per floor Minimum | One per floor Minimum | One per floor Minimum | One per floor Minimum |
| 6. | Kitchen sinks and dish washers | One per ward | - | - | - | - |
| 7. | Urinals | One per 20 persons | One per 50 Persons | - | One/20 persons, add one per additional 20 persons. From 101 to 200 persons add @ 3% and over 200 persons add 2.5% | |

**Operation Theatre**

Operation theatres usually have a team of surgeon's, anaesthetists, nurses and sometime pathologist and radiologist operate upon or care for the patients. The location of Operation theatre should be in a quite environment, free from noise and other disturbances, free from contamination and possible cross infection, maximum protection from solar radiation and convenient relationship with surgical ward, intensive care unit, radiology, pathology, blood bank and CSSD. This unit also needs constant specialized services, such as piped suction and medical gases, electric supply, heating, air-conditioning, ventilation and efficient lift service, if the theatres are located on upper floors. Zoning should be done to keep the theatres free from microorganisms.

An Operation Theatre should also have Preparation Room, Pre-operative Room and Post-Operative Resting Room. Operating room should be made dustproof and moisture proof.

**Delivery Suite Unit** -The delivery suit unit be located near to operation theatre & located preferably on the ground floor. The delivery Suit Unit should include the facilities of accommodation for various facilities as given below:

- Reception and admission
- Examination and Preparation Room
- Labour Room (clean and a septic room)
- Delivery Room
- Neo-natal Room
- Sterilizing Rooms
- Sterile Store Room
- Scrubbing Room
- Dirty Utility
- Doctors Duty Room
- Nursing Station
- Nurses changing
- Room Group C & D Room
- Eclampsia Room

सूतिकगार

प्राकचेवास्यानवमान्मासातसूतिकागारं कारयेदपहृतास्थिसर्कराकपाले देशे प्रशस्त रुप रस गन्धायां भूमौ प्राग्द्वारमुदग्द्वारंवाबैल्वानां काष्ठानांतैन्दुकैङ्गुदकानांभाल्लातकालांवार( रू )णानांखदिराणांवाः यानिचान्या-न्यपि ब्राह्मणाः शंसेयुरथर्ववेदाविदस्तेषांवसनालेपनाच्छादनपिधानसंपदुपेत्तंवास्तुविद्या ह्रद्यायोगग्नि-सलिनोदूखलवर्चः स्थानमूमिमहानसमृतुसुखंच ॥ (च.शा. 8/33)

Before the ninth month the maternity home should be constructed in place free from bones, gravel and earthen pieces and in a ground and in a ground having soils of good look, taste and smell. The door should be facing to the east or the north. It should be made of the wood from Bilva, Tinduka, Inguda, Bhallataka, Varuna or Khadira or other trees recommended by Brahmanas well-versed in Atharvaveda. It should have excellent living space, plastering, roofing and door pans, and should be provided with, by a good architect, fireplace, water store, and place for wooden mortar, lavatory, bathroom, and kitchen. The home should be comfortable for all the seasons.



कुमारागार

अतोऽनन्तरंकुमारागारविधिमनुव्याख्यास्यामः—वास्तुविद्याकुशलः प्रशस्तंरम्यमतमस्कं निवातंप्रवा-तैकदेशे दृढमपगतश्वापपशु दंष्ट्रिमूषिकपरङ्गंसुविभक्तसलिलोलूकलमूत्रवर्चः स्थान स्नान भूमि महानसमदतु सुखं यथार्तुशयनासना स्तरणासंपन्नं कुर्यात; तथासुविहितरक्षा विधान बलिमङ्गल होम प्रायश्चितं शुचि वृद्ध वैद्यानुरक्त जनसंपूर्णम । इतिकुमारागारविधि ॥ (च.शा. 8/59)

It should be well planned by the architect. It should be spacious, beautiful, free from darkness and access of wind, well-ventilated, strong, and inaccessible for various animals, rats and insects, distinct places for water, pounding, urinal, lavatory, bathroom, and kitchen, comfortable in particular seasons, equipped with cot, chairs and beddings according to season. Protective measures, offering, auspicious rites, oblations and expiatory rites should be performed well there and it should be full of clean and elderly persons, physician and affectionate people.

**Post-Partum Unit**-It is desirable that every District Hospital should have a Post-Partum Unit with dedicated staff and infrastructure to provide Post natal services, all Family Planning Services, Safe Abortion services and immunization in an integrated manner. The focus will be to promote Post-Partum Sterilization and will be provided if the case load of the deliveries is more than 75 per month.

**Hospital Kitchen (Dietary Service)**-The dietary service of a hospital is an important therapeutic tool. It should easily be accessible from outside along with vehicular accessibility and separate room for dietician and special diet. It should be located such that the noise and cooking odours emanating from the department do not cause any inconvenience to the other departments. At the same time location should involve the shortest possible time in delivering food to the wards. Apart from normal diet diabetic, semi-solid diets and liquid diet shall be available Food shall be distributed in covered container. Quality and quantity of diet shall be checked by competent person on regular basis.

**Hospital Laundry**-It should be provided with necessary facilities for drying, pressing and storage of soiled and cleaned linens. It may be outsourced.

**Medical and General Stores**-Medical and general stores should have vehicular accessibility and ventilation, security and fire fighting arrangements. Hospital shall have standard operating procedure for local purchase, indent management, storage preparation of monthly requirement plan and Inventory analysis.

For Storage of Vaccines and other logistics
Cold Chain Room: 3.5 m × 3 m in size

Vaccine & Logistics Room: 3.5 m × 3 m in size

Minimum and maximum Stock shall be 0.5 and 1.25 month respectively. Indent order and receipt of vaccines and logistics should be monthly. Timely receipt of required vaccines and Logistics from the District Stores should be ensured.

**Mortuary**-It provides facilities for keeping of dead bodies and conducting autopsy. The Mortuary shall be located in separate building near the Pathology on the Ground Floor, easily accessible from the wards, Accident and emergency Department and Operation Theatre. It shall be located away from general traffic routes used by public. Post-mortem room shall have stainless steel autopsy table with sink, a sink with running water for specimen washing and cleaning and cup-board for keeping instruments. Proper illumination and air conditioning shall be provided in the post mortem room. A separate room for body storage shall be provided with at least 2 deep freezers for preserving the body. There shall be a waiting area for relatives and a space for religious rites.

# Paper-II

# **Samajika Swasthavritta** (Part - B)

# CHAPTER 18 Prathamiks Swasthyasam Rakshana (Primary Health Care)

Health care is the preventive, curative, restorative and promotive services provided by the official and non-official agencies of a country to its citizens.

The primary health care is the strategy evolved to achieve health for all by 2000AD by international conference on Primary Health Care sponsored by the World Health Organization, the United Nations Children's Fund, and the USSR. It was held at Alma Atta, the capital of Kazakhstan, in September 1978.

**Definition-**It is essential care made universally accessible to individuals & Acceptable to them through their full participation & at a cost the community & country can afford.

## Elements of Primary Health Care

In Alma Atta declaration in international conference held at Alma Atta (USSR) in 1978, 8 essential components were outlined.

1. Education concerning prevailing health problems & methods of preventing & controlling them
2. Promotion of food supply & proper nutrition
3. An adequate supply of safe water & basic sanitation
4. Maternal & child Health care
5. Immunization against major infectious diseases
6. Prevention & control of locally endemic diseases
7. Appropriate treatment of common diseases & injuries
8. Provision of essential drugs

## Principles of Primary Health Care

1. Equitable distribution
2. Community participation
3. Inter sartorial co-ordination
4. Appropriate technology

1. **Equitable distribution-**There should not be any difference between caste, sex, region, nationality, rich, poor, urban, rural, everyone should have facility for primary health.

2. **Community participation-**Local resources such as man, money, & material power are also essential e.g. Health guides, trained dais. Etc. Involvement of community, individual & family is the most essential aspect in community health along with the action of the State Government & Central Government.
3. **Inter sectorial co-ordination-**Primary health care involves in addition to the health sector all related sectors & aspects of national & community development in particular agriculture, animal husbandry, food, industry, education, housing, public works, communication & other sector.
4. **Appropriate Technology-** It is defined as scientifically sound, adaptable to local needs & acceptable to those who apply it & those for whom it is used, that can be maintained by the people themselves in keeping with the principle of self-reliance with resources the community & country can afford.

**Analysis of Health Status & Health Problem-**

1. Morbidity & mortality.
2. Demographic conditions of the population.
3. Environmental condition which have a bearing on health.
4. Socio-economic factors which have a direct effect on health
5. Cultural background, attitudes, beliefs & practices which affect health.
6. Primary health care
7. Medical & health services available.
8. Other services available.

**Health Problem**

1. Communicable diseases problems.
2. Non-communicable disease problems.
3. Nutritional problems.
4. Environmental sanitation problem.
5. Medical care problems.
6. Population problems.

**1. Communicable diseases problems.**

Communicable diseases are major problem in India.

1. Malaria – during 2007 -1.53 million cases of malaria &1055 death.
2. Tuberculosis- As per the WHO Global TB Report 2011, there were an estimated 8.8 million incident cases of TB (range, 8.5million-9.2 million) globally in 2010, 1.1 million deaths.



3. Diarrheal diseases- 11.2 million cases of diarrhea each year. (Morbidity & mortality especially in children below 5 years).
4. Acute Respiratory Diseases-ARD are one of the major causes of mortality & morbidity in children below 5 years of age. 13% inpatients deaths in pediatric ward are due to ARD.
5. Leprosy- prevalence rate of about 0.72 per 10,000 populations. During year 2008-09 total 1.34 lakha new case were detected.

Filaria, AIDS, Kala Azar, meningitis, Viral Hepatitis, Japanese Encephalitis, Enteric Fever are among the other important communicable diseases.

**2. Non –communicable diseases (NCDs)-** Diabetes Mellitus, CVD's, Cancer, Stroke & Chronic Lung Diseases.International Diabetes Federation, the number of people with diabetes in India currently around 40.9 million is expected to rise to 69.9 million by 2025.

The total cancer cases are likely to go up from 979,786 cases in the year 2010 to 1,148,757 cases in the year 2020.

**3. Nutritional diseases-**

a) Protein- energy malnutrition- 1to 2 % in preschool age children.
b) Nutritional anemia-60-80 % of pregnant women is anemic. 19 % maternal deaths are attributed to anemia.
c) Low birth weight-28 % of babies born is low birth weight (less than 2.5 kg) in developing countries.
d) Xerophthalmia (nutritional blindness) - 0.04 % total blindness due nutritional deficiency of vitamin A.
e) Iodine deficiency disorders- Goiter & other IDD diseases in sub-Himalayan regions.

**4. Environmental sanitation-**

**5. Medical Care problem-** financial resources are considered inadequate to furnish the cost of running such a service.

**6. Population Problem-**population problem is one of the biggest problems facing the country.

**Resources**

Resources are needed to meet the vast health needs of a community.

1. Health man power
2. Money & material
3. Time

1. **Health man power-** It includes both professional& auxiliary health personnel who are needed to provide the health care.
2. **Money-** It is an important resource for providing health services.
3. **Time-** A survey by WHO has shown that an nurse midwife spends 45 %of her time in giving medical care, 40% in Travelling, 5% on paper work & only 10% in performing duties for which she has trained.

**Health care services-**The health service is to improve the health status of the population. In India it is represent by 5 major sectors or agencies which differ from each other by the health technology applied & by the source of funds for operation.

1. **Public Health Sector-**

**a) Primary health care**

a. Primary health centers
b. Sub- centers

**b) Hospitals/ Health centers**

a. Community Health Centers
b. Rural Hospitals
c. District Hospitals
d. Specialist Hospitals
e. Teaching Hospitals

**c) Health Insurance Schemes-**

a. Employees State Insurance
b. Central Govt. Health Scheme.

**d) Other Agencies-**

a. Defense Services
b. Railways
c. Primary health care

2. **Private Sector-** Private Hospitals, Poly Clinics, Nursing Homes & Dispensaries. General Practitioners & Clinics.
3. **Indigenous System of medicine**

a. Ayurveda & Siddha
b. Unani & Tibbi
c. Homoeopathy
d. Unregistered practitioners



4. **Voluntary Health Agencies.**
5. **National Health Programmes**

**Primary health care in India-**National Health policy based on primary health care approach came to existence with the objective of "Health for All" by 2000.

1. Village level
2. Sub center level
3. Primary health center level
4. Community health center

**Village level-**Under the universal coverage & equitable distribution of health resources,

1. **Village Health Guides Scheme**

a. Training of local Dais
b. ICDS Scheme
c. Asha Scheme
d. Primary health care in India

**Village Health Guides Scheme-**The village Health Guides Scheme was introduced on 2nd October 1977.

Female are chosen by the community, they act as link between community & Governmental infrastructure.

**Selection-**

1. Permanent residents of the local community, preferable women.
2. They should be able to read & write, having minimum formal education at least up to 6th standard.
3. They should be acceptable to all sections of the community.
4. They should be able to spare at least 2-3 hours every day for community health work.

**Training-**It is conducted in the nearest primary health center, sub center. Stipend of Rs.200 is given per month. Training is given for 200 hours in 3 month.

**After training-**They receive working manual & kit containing medicines belonging to modern & traditional system of medicine

**Duties-**

- Treatment for simple ailments.
- First Aid

- Maternal & child health care with family planning.
- Health education.
- Honorarium of Rs. 50 per month, drugs worth Rs.600 per annum is provided.
- 3.23 lakh village health guides. Target is one health guider for 1000 population or a village.

**b) Local dais**-Under the rural health scheme. Local dais is trained to conduct delivery.

**Training-**

1. Basic concepts of maternal & child health, sterilization, & Obstetric skill are taught.
2. 30 days training is given with Rs. 300 per month stipend.
3. Training is conducted at PHC or sub center or MCH for 2 days or week. Other 4 days she accompanies the female health worker.

**After training-**

- Delivery kit & certificate will be provided.
- She receives Rs. 10 per delivery. When registered at PHC or sub center, for each infant registration, she gets 3 Rs.
- She plays an important role of family planning advices.

**c) ICD scheme or Anganwadi Worker-(integrated child development services)**-There is an Anganwadi worker for a population of 1000. Anganwadi worker selected from community she is expected to serve, she undergoes training in various aspects of health, nutrition, child development for 4 month.

She is a part time worker & paid Rs. 1500 per month, for the services which includes checkup, immunization, supplementary nutrition, health education referral services.

It was initiated by Govt. of India in Ministry of social & women welfare in 1975.

**d) ASHA- (Accredited Social Health Activist)**- ASHA must be the resident of the village a women (married/widow/divorced) preferable in the age group of 25- 45 years with formal education up to 8th standard, having communication skills & leadership qualities.

**Role & responsibility of ASHA**

1. ASHA will take step to create awareness & provide information to the community on determinants of health such as nutrition, basic sanitation & hygienic practices, healthy living &working conditions, information on existing health services.
2. She will counsel women on birth preparedness, importance of safe delivery, breast feeding & complementary feeding, immunization, contraception & prevention of common infections including STD.
3. ASHA will mobilize the community & facilitate them in accessing health & health related services available at Anganwadi/ sub center/ PHC.
4. She will accompany pregnant women & children requiring treatment / admission to the nearest PHC.
5. ASHA will provide primary medical care for minor ailments such as Diarrhea, fevers, first aid for minor injuries.
6. She will be provider of DOTS (directly observed treatment short course) under RNTCP.
7. She will also act as a depot holder for essential provisions like ORS, iron folic acid tablet, chloroquine, disposable delivery kit, oral pills & condoms.
8. She will inform about the birth & death in her village & any unusual health problem.



**2. Sub center level**-One sub center is established for 5000 population generally &one for every 3000 population in hilly tribal & backward area. (spread over 24km$^2$ area with a radial distance of 2.75 km.)

As of march 2008 total- 146036 sub center were established in the country.

It is equipped with one male & one female MPW(multipurpose worker)

**Services provided-**

1. Maternal health care
2. Child health care
3. Referral for safe abortion service.
4. School health service
5. Immunization
6. Family planning services.
7. National health programmes.

**Man power requirement-**

| Manpower | Existing | Proposed |
|---|---|---|
| Health worker (female) | 1 | 2 |
| Voluntary worker to keep the sub center clean & assist ANM. Rs. 100/ month | 1 optional | 1 optional |
| Total | 2/3 | 3/4 |

**3) Primary health center level**-The center which provides integrated curative, preventive & promotive aspects of health is known as primary health center. One primary health center for every 30000 rural population in the planes & one primary health center

for every 20000 population in Hilly, Tribal & backward areas.(6000 houses, spread over 150km$^2$ area and a radial distance of 7 km.) As on March 2008, 23458 primary health centers been established in the country.

**Function of the PHC-**

1. Medical care- OPD services, 24 emergency services, referral services and In-patient services.
2. MCH including family planning-antenatal care, intra-natal care, post natal care, new born care etc.
3. Medical termination of pregnancy using manual vacuum aspiration technique.
4. Safe water supply & basic sanitation.
5. School health services
6. Adolescent health care
7. Prevention & control of locally epidemics diseases.
8. Collection & reporting of vital statistics.
9. Education about health.
10. National health programme.
11. Training of health guides, health worker, local dais & health assistants.
12. Basic laboratory services.
13. Selected surgical procedures

**Staffing pattern-**

| Staff | Existing | Recommended |
|---|---|---|
| Medical officer | 1 | 3 |
| AYUSH practitioner | Nil | 1 |
| Account Manager | Nil | 1 |
| Pharmacist | 1 | 2 |
| Nurse or Mid Wife | 1 | 5 |
| Health worker female | 1 | 1 |
| Block Extension educator | 1 | 1 |
| Health assistant male& female | 2 | 2 |
| Clerks | 2 | 2 |
| Laboratory Technician | 1 | 2 |
| Driver | 1 | Optional |
| Class IV | 4 | 4 |
| Total | 15 | 24/25 |



**Medical officer at PHC**

1. He is the captain of health team. In the morning hours he treats the patient in out door. In after noon he supervises the field work.
2. His tour programme is so designed as to cover all basic health services including family planning.
3. He will plan and implement UIP as per guidelines and ensure maximum possible coverage of the population in the PHC. He will ensure proper storage of vaccine and maintenance of cold chain equipment.
4. He will visit schools in PHC area at regular intervals and arrange for medical checkup and immunization.
5. He will organize and conduct tubectomy and vasectomy camps.
6. Organize training of all health personnel like ASHA, Anganwadi worker, dais etc.
7. He ensures that national health programmes are being implemented in his area properly.
8. He visit sub centers on fixed days & hours, provides necessary guidance. He plans, promotes, directs, supervises & co-ordinates as well as evaluator.

**Health worker female (HWF)**

Health worker female limits her activities among 350-500 families.

- Registration of cases
- Care at home
- Care at PHC
- Care in the community
- Other health services

**Health worker male (HWM)**

- Record maintenance.
- Malaria, filarial Japanese Encephalitis, Kala-Azar etc. diseases identification & treatment
- Communicable diseases
- Leprosy identification
- Tuberculosis identification
- National blindness control programme
- Environment sanitation.

- Expanded programme on immunization
- Family planning implementation.

**Health assistants (male & female)-**

One health assistants supervise 6 health workers. The function includes administration, proper communication, strengthening knowledge & skills, supervision.

**b) Hospitals/ Health centers-**

**Community Health Center-** As o 31st march 2008 4276 community centers were established by upgrading the primary health centers. Each community health center covering a population of 80,000 to 1,20 lakh with 30 beds & specialists in surgery, medicine, obstetrics & gynecology, pediatrics with X ray & laboratory facilities.

Manpower for community health centers-

| Staff | Existing |
|---|---|
| Clinical manpower | |
| 1. General surgeon | 1 |
| 2. Physician | 1 |
| 3. Obstetrician/ gynecologist | 1 |
| 4. Pediatrician | 1 |
| Existing support man power | |
| Nurse- mid-wife | 7+2 |
| Dresser | 1 |
| Pharmacist | 1 |
| Lab. Technician | 1 |
| Radiographer | 1 |
| Ophthalmic assistant | 0-1 |
| Ward boy/compounder | 2 |
| Sweepers | 3 |
| Chowkidar<br>OPD attendant<br>Statistical assistant/data entry operator<br>OT attendant<br>Registration clerk | 5 |
| Total essential | 21-22+2 |



**Rural Hospitals-**It is now proposed to upgrade the rural dispensaries to PHC. At present a good number of PHCs are located at tehsil/sub-divisional/taluka headquarters.

**District hospitals-** there are proposed to convert the district hospital into District Health Center.

**Health insurance-**There is no health insurance in India. Health insurance is at present limited to industrial workers & their families. The central government employees are also covered by the health insurance, under the banner "Central Govt. Health scheme".

**Employees state insurance scheme-** ESI scheme introduced by an act of parliament 1948 in India. It has introduced for the first time in India the principle of contribution by employer & employee. The act provides for medical care in cash & kind, benefits in the sickness, maternity, employment injury & pension dependents on the death of worker because of injuries.

**Central Government health scheme-**1st introduced in New Delhi 1954. The scheme is based on the principle of cooperative effort by the employee & employer to mutual advantage of both.

**Facilities include**

1. Outpatient care
2. Supply necessary drugs
3. Laboratory &X ray
4. Hospitalization facilities Govt. & private.
5. Specialist consultation
6. Pediatric services including immunization.
7. Antenatal, natal & post natal services.
8. Supply of optical & dental aids
9. Family welfare services.

Defense Services-

Armed forces medical services the services provided are integrated & comprehensive embracing preventive, promotive, & curative services.

**Railway Services-**The railway provides comprehensive health care services through the agency of railway hospitals, health units & clinics.

**Private agencies-**Private practice of medicine provides a large share of the health services available.

Doctor population ratio as whole as 1: 1428.

**Indigenous system of medicine-** Indigenous system of medicine e.g. Ayurveda, Siddha, Homoeopathy etc.

Ayurvedic physicians alone are estimated to be about 4.38 lakhs.

**Voluntary Health Agencies**

- Provide health care services to the community at large.
- Promotes research works of the related field.
- Creates awareness in the people about health and related matters.
- Special training for medical workers.

**Main aim:**

- Health care services
- Sharing burden of people with Govt. & Private practitioners

**Advantages :**

1. Better accepted
2. Community participation
3. Flexible and non-rigid programs
4. Work at fast pace and at low operative costs
5. Opportunity to those - interested in social work

**Functions: Supplement-** work of Govt. agencies such as by providing man power, materials & money.

- Pioneering
- Education
- Demonstrations & experimental projects.....
- Guarding

The Voluntary Health Agencies occupy an important place in community health programmes.

1. Indian red cross society
2. Hind Kusht Nivaran Sangh
3. Indian council for child welfare
4. Tuberculosis association of India
5. Barat Sevak Samaj
6. Central social welfare board



7. The Kasturba memorial fund
8. Family planning association of India
9. All India women's conference.
10. The all India blind relief society
11. Professional bodies
12. International agencies.

**Indian Red Cross Society**

Established in 1920 400 branches all over India.

World Red Cross day-8th May.

Red Cross -Founder- John Henry Dunant

**Objectives-**

1. Improvement of health
2. Prevention of disease
3. Mitigation of sufferings

**Activities-**

1. Providing amenities to soldiers
2. Disaster relief services, earth quakes, floods, epidemics etc.
3. Blood banks
4. Promoting blood donation
5. Maternal & child welfare services
6. First aid services
7. Milk & medical supplies
8. Family planning

**2. Hind Kusht Nivaran Sangh (HKNS)**

It was founded in 1950 with its headquarters in New Delhi. Indian council of British Empire Leprosy Relief association (BELRA) which renamed LEPRA in 1950

**Function-**

1. Financial assistance for leprosy homes, clinics, health education, poster, publication.
2. Training of medical workers, physiotherapists.
3. Conducting research, field investigation.
4. Conducting all India leprosy worker conferences.
5. Publication of a quarterly journal of leprosy in India.

### Indian Council for Child Welfare

Established in 1952, affiliated to International Union for Child Welfare.

Development of Indian Children physically, mentally, socially, morally and spiritually in a healthy & normal manner and in conditions of freedom and dignity.

### Tuberculosis Association of India

It was started in 1939.

**Aims and objectives are :**

1. The prevention, control, treatment and relief of tuberculosis.
2. The encouragement of and assistance in the establishment throughout India of State Associations having objectives similar in whole or in part to those of the Association.
3. The affiliation or control of and the rendering of assistance to any institution having objectives similar in whole or in part to the objects of the Association.
4. The undertaking of the Research and Investigation on subjects concerning tuberculosis and allied chest diseases.
5. The doing of all such things as are incidental or conducive to the attainment of the above objectives.

### Functions

Raises funds, trains doctors, health workers & social workers in ant tuberculosis work.

Health education to facilitate early diagnosis & consultation.

New Delhi tuberculosis center.

Lady lilinthgow sanatorium. At kousali.

King Edward VII sanatorium at Dharampur& TB hospital at mehrauli.

### Bharat Sevak Samaj

Nonpolitical & non official organization formed in 1952. One of the prime objectives of the Bharat Sevak Samaj (BSS) is to help people to achieve health by their own actions & efforts. BSS has branches in all the states & in nearly all districts.

Improvement of sanitation in village is one of the important activities of the BSS.

### Central Social Welfare Board

Autonomous body under the control of ministry of Education

Set up by Govt. of India - August 1953

Survey's needs & requirements of VHAs

Promotes formation of Social Welfare organizations



Initiated family & Child Welfare Services- 1968, in rural areas- mother craft, social education, literacy classes, distribution of milk, play centers for children.

Industrial co-operatives in rural area.

### Kasturba Memorial Fund (KMF)

After The death of Kasturba Gandhi in 1944, the fund was raised with the main object of improving the lot of women, especially in the villages, through gram sevikas.

The trust has nearly a crore of rupees & is actively engaged in various welfare projects in the country.

### Family Planning Association of India (FPAI)

Established in 1949, FPA India has been recognized as India's leading and largest reproductive and sexual health organization. It provides information on sexuality education and family life and a wide range of services in sexual and reproductive health including family planning, bringing health and happiness to millions.

**Vision :** FPA India envisions sexual and reproductive health for all as a human right, including gender equality leading to alleviation of poverty, population stabilization and sustainable development.

**Mission :** FPA India strengthens a voluntary commitment to advocate for sexual and reproductive health and Rights and, choices. It promotes access to SRH information and services related to family planning, safe abortions, HIV/AIDS and sexuality to poor, marginalized and vulnerable populations including young people.

### All India Women's Conference

All India Women's Conference (AIWC) was founded in 1927 and registered in 1930 under the Societies Registration Act XXI of 1850. It is an organization dedicated to the upliftment and betterment of women and children.

Runs MCH clinics

Adult education center

Milk centers

Family planning clinics

### The All India Blind Relief Society-A

1946, relief of the blind

Ophthalmic camps

Coordination with other institutions & organizations for the blind

**International Agencies**

The Rockefeller foundation, ford foundation and CARE (cooperative for assistance and relief everywhere) are examples of voluntary international health agencies

**Rockefeller Foundation**

The Rockefeller foundation is a philanthropic organization chartered in 1913 and endowed by Mr. John D. Rockefeller. Its purpose is to promote the well-being of mankind throughout the world. The work of the Rockefeller foundation in India began in 1920 with scheme for the control of hookworm disease in the then Madras presidency.

It has given substantial aid to Virus Research Centre, Pune, All India Institute of Medical Sciences, Delhi, All India Institute of Hygiene and Public Health, Kolkata and several medical colleges, especially those at Vellore, Ludhiana and Lucknow. It also offers scholarships for advanced training of health professionals. It is providing active support to promotion of family planning, medical education and agriculture in India. It is currently supporting R and D for drugs for TB and AIDS in a big way. It has spent more than two billion dollars since its inception. Since its inception more than US 10 billion has been spent for grants and aid.

**Ford Foundation**

It was founded in 1936. It has provided assistance in various areas in health. Whereas the Rockefeller foundation earlier concentrated most of its assistance on universities and post-graduate institution, on professional education and on research, the Ford Foundation has been active in development of rural health services and family planning. Ford Foundation has helped India in following project-

1. Orientation training centers
2. Research-cu-action projects
3. Pilot project in rural health services
4. Establishment of national institution of health administration and education at Delhi.
5. Calcutta water supply and drainage scheme
6. Family planning programme

**Care (Cooperative for Assistance and Relief Everywhere)**

Cooperative for Assistance and Relief Everywhere was founded in North America in the wake of the Second World War in year 1945. It is of the world's largest independent, non-profit, non-sectarian international relief and development organization. CARE provides emergency aids and long term development assistance. CARE began its operation in India in 1950. Till the end of 1980, the primary objective of CARE – India



was to provide food for children in the age group of 6-11 years. From mid 1980s, CARE–India focused its food support in the ICDS programme and in development of pregame in the area of health and income supplementation.

**NGOs and Ayush Sector**

**NGOs (Non-Governmental Organization)-**

1. Development and Operation of Infrastructure : Community-based organizations and cooperatives can acquire, subdivide and develop land, construct housing, provide infrastructure and operate and maintain infrastructure such as wells or public toilets and solid waste collection services.
2. Supporting Innovation, Demonstration and Pilot Projects
3. Facilitating Communication
4. Technical Assistance and Training
5. Research, Monitoring and Evaluation
6. Advocacy for and with the Poor

**Freedom from Hunger**-This is an international development organization working in 14 countries across the globe. It brings innovative and sustainable self-help solutions to the fight against chronic hunger and poverty. It was established in1946.

**Agha Khan Foundation**-It was founded in 1967 by His Highness the Aga Khan. The foundation works in 11 countries including India. The overall program focuses on four major development areas-health systems, education including early childhood care and development, rural development and income generation to alleviate poverty and NGO enhancement.

**Save the Children Fund**-This UK based charity works in more than 70 countries. It was founded in 1919 to provide emergency relief to children suffering from malnutrition as a consequence of the First World War. Health care, education and welfare are the three main areas of work of this organization.

**Oxfam**-Oxfam is a confederation of autonomous NGO's committed to fight poverty and injustice in the world and work in many developing countries including India. Development activities and advocacy are the main planks of the work carried out by Oxfam.

**Others Voluntary Organizations**-Besides the above, there are many other international voluntary organizations doing very good work in the field of health. Some of these are listed below:

a. Population Council

b. International Planned Parenthood Federation
c. International Leprosy Association
d. International Agency for the Prevention of Blindness
e. International Union against Cancer
f. World Federation of the Deaf.

**AYUSH sector-** The Indian System of Medicine & Homoeopathy treatments are popular with the masses and have proven strengths of treating common and chronic diseases. In order to make available the benefits of AYUSH (Ayurveda, Unani, Siddha, Yoga & Naturopathy and Homoeopathy) to the public at large, it is very much important that adequate number of AYUSH health care units (hospitals and dispensaries) be available in all pockets of the country, so that the public may exercise their choice in accessing the health services.

**Mission and Vision :**

1. The vision statement of Ministry of AYUSH is "to position AYUSH systems as the preferred systems of living and practice for attaining a healthy India."
2. The mission statement of Ministry of AYUSH is as follows: To mainstream AYUSH at all levels in the Health Care System.
3. To improve access to and quality of Public Health delivery through AYUSH System.
4. To focus on Promotion of health and prevention of diseases by propagating AYUSH practices.
5. Proper enforcement of provisions of Drugs & Cosmetic Act 1940 and Rules framed there under relating to the ASU drugs throughout the country.

**Objectives:**

The Ministry of AYUSH has the following objectives:-

1. Delivery of AYUSH Services
2. Human Resource Development in AYUSH
3. Promotion and Propagation of AYUSH Systems
4. Research in AYUSH
5. Conservation and cultivation of medicinal plants
6. Effective AYUSH Drug Administration

**Role of Ayurveda in Primary Health Care**

The Central Council for Research in Ayurvedic sciences (CCRAS), Ministry of AYUSH, Govt. of India an autonomous body for undertaking, coordinating, formulating,



developing and promoting research in Ayurveda on scientific lines. The activities are carried out through its 30 Institutes/Centers/Units located at different states across the Country and also in collaboration with reputed academic and research organizations.

The Broad areas of research comprise Medicinal Plant Research (Medico-ethno Botanical Survey, Pharmacognosy and Tissue Culture), Drug Standardization Research & Phyto-Chemistry, Pharmacological Research (Pre-Clinical, Safety/Toxicity and Bio-logical Activity Studies), Clinical Research, Literary Research & Documentation. The extension activities include Tribal Health Care Research, Health Care Services, Information, Education and Communication (IEC) etc. The Council's Institutional network includes 8 Institutes in Category 'A' at Gwalior, Cheruthuruthy, Kolkata, Chennai, Bhubaneswar, Hyderabad, Pune & Patiala; 6 in Category 'B' at Guwahati, Jhansi, Lucknow, Bangalore, Vijayawada & Leh; 6 in Category 'C' at New Delhi, Ahmadabad, Thiruvananthapuram, Bangalore, Mumbai & Nagpur; 10 in Category 'D' at Jaipur, Tarikhet, ALRCA Chennai, Gangtok, Mandi, Jammu, Patna, Itanagar, Port Blair and Nagaland.

What makes this system of medicine unique from other medical system is its philosophical touch and spiritual approach. It is evident from the ancient scriptures that the main aim of Indian system of medicine is the wellbeing of the entire universe - 'sarvesanthuniramaya.

Man is the one who rules over the earth and this human being is a part of the great and boundless universe .He is the miniature form of universe itself, and the whole universe is like a very big family-Vasudhaivakudumbakam.

He can be compared to the taproot, from which evolves the branches and whole tree itself. The branches symbolize the society and the tree, the universe. Only when the taproot is strong the tree will be able to withstand. Keeping in mind the simple logic

Ayurveda stressed up on the health of an individual, which will lead to the health of the society and the community, which will finally evolve as the health of the universe.

From this, we can see that it is clear that one of the main aims of Ayurveda is the promotion of primary health care. In ancient India country was divided into 'Janapadhas' and the health management of each Janapadha were thoroughly undertaken and the aims and objectives that can be employed to the long-term benefit of a healthy being was also elaborately dealt with. This proves that Ayurveda can play a significant role in the promotion of primary health .The presentation of Ayurveda is in such a manner, as to make the people aware of the health and its importance, that is possible only through health education.

Ayurveda the science of life has the primary aim like prevention of health in healthy individual and prevention of diseases. Ayurveda perspective of an ideal lifestyle include following Dinacharya, Rutucharya, Sadvritta all of which are instrumental in the prevention of disease and promotion of ideal health. Primary health care through Ayurveda are observation of daily routines (Dincharya), seasonal conducts (Rutucharya), periodical body purification (Rutu Shodhana), night regimens (Ratricharya), right conducts of life (Sadavritta), proper diet(Ahara), good sleep (Nidra), sexual intercourse(Bramhacharya). Rasayana Sevan for healthy life and increases the immunity power, in pregnancy (Garbhini Charya), after delivery (Sutikakala Charya), pediatric care (Jatakarma and Bala Samskara) etc.

# CHAPTER 19 Parivara Kalyana Yojana (Family Welfare Programmes)

India launched the National Family Welfare Programme in 1951 with the objective of "reducing the birth rate to the extent necessary to stabilize the population at a level consistent with the requirement of the National economy. The Family Welfare Programme in India is recognized as a priority area, and is being implemented as a 100% centrally sponsored programme.

**Demography**- Demography, as understood today, is the scientific study of human population.

It focuses its attention on three readily observable human phenomena:

a. Change in population size (growth or decline)
b. The composition of the population and
c. The distribution of population in space.

It deals with five "demographic processes", namely fertility mortality, marriage, migration and social mobility. These five processes are continuously at work within a population determining size, composition and distribution.

**Demographic Cycle**- There are five stages in the demographic cycle.

1. First stage-(high stationary stage)-High birth rate and high death rate, where population is stationary. India during 1920.
2. Second stage (early expanding)-The death rate begins to decline and birth rate remains same e.g. many countries in south Asia and Africa.
3. Third stage (late expanding)-The death rate decreases further, with the decreasing birth rate. Birth exceeds death e.g. developing countries like India, china etc.
4. Fourth stage (low stationary)-Stage with low birth rate and low death rate resulting in stationary e.g. Denmark, Australia.
5. Fifth stage (declining stage)-The population starts to decline because lower birth rate than the death rate e.g. Germany, Hungary.

**Census**- Census is defined as the simultaneous recording of demographic, social and economic data of individuals of a country on a specified day. The data are complied,

analyzed and published. Demographic data include age, sex, place of birth, literacy, and technical and postgraduate qualifications.

**Life Expectancy-** Life expectancy or exception of life- at a given age is the average number of years which a person of that age may expect to live, according to the mortality pattern prevalent in that country. Life expectancy at birth has continued to increase globally over the years. For 1950-1955, the combined life expectancy at birth for both sexes was 46.5 years. The increase has been more marked in less developed regions of the world than in the develope5d regions.

**Family Planning**

**Definition-**An expert committee of WHO defined family planning as "a way of thinking & living that is adopted voluntarily, upon the basis of knowledge, attitudes & responsible decisions by individuals & couples, in order to promote the health & welfare of the family group & thus contribute effectively to the social development of a country."

**Objectives-**

1. To avoid unwanted births
2. To bring about wanted births
3. To regulate the interval between pregnancies
4. To control the time at which births occur in relation to the ages of the parent.
5. To determine the number of children in the family.

**Ideal contraceptive-**Ideal contraceptive is safe, effective, acceptable, inexpensive, reversible, simple to administer, independent of coitus, long lasting enough to obviate frequent administration & requiring little or no medical supervision.

**Eligible couples-**An "eligible couple" refers to a currently married couple wherein the wife is in the reproductive age, which is generally assumed to lie between the ages of 15 and 45. There will be at least 150-180 such couples per 1000 population in India.

**Target couples-**The term target couple was applied to couples who have had 2-3 living children, and family planning was largely directed to such couples.

**Health aspect of family planning-**WHO scientific group on the health aspects family planning. These can be summarized under the following headings-

1. Women's health
2. Foetal health
3. Child health

**Women's health-**Maternal mortality, morbidity of women of child bearing age,



nutritional status, preventable complication of pregnancy and abortion. Pregnancy can mean serious problem for many women. It may damage the mother's health or even endanger her life. In many developing countries the risk of dying as a result of pregnancy is 10-20 times greater than in developed countries. The risk increases as the mother grows older and after she has had 3 to 4 children.

**Foetal health-**A number of congenital anomalies are associated with advancing maternal age. Such congenital anomalies can be avoided by timing the births in relation to the mother's age. Further, the quality of population can be improved only by avoiding completely unwanted births.

**Child health-**Child mortality- it is well known that child mortality increases when pregnancies occur in rapid succession. A birth interval of 2 to 3 years is considered desirable to reduce child mortality.

Child growth development and nutrition – birth spacing and family size are important factors in child growth and development.

**Infectious diseases-**Child living in large- sized families has an increase in infection, especially infectious gastroenteritis, respiratory and skin infections.

**Small family norm-**The objective of the family welfare programme in India is people should adopt the "small –family norm". In 1970 the slogan was the famous "Do Ya Teen Bas". In view the seriousness not situation. In 1980 campaign has advocated by 2 child norm. The current emphasis is on three themes-

"Son or daughter two will do",
"Second child after 3 years" and
"Universal Immunization".

**Contraceptive Methods/fertility Regulating Methods/methods of Family Planning**

Contraceptive methods are, by definition, preventive methods to help women avoid unwanted pregnancies. They include all temporary and permanent measures to prevent pregnancy resulting from coitus.

**Temporary Method**

**Spacing method :**

1. Barrier methods
   a. Physical methods
   b. Chemical methods
   c. Combined methods

2. Intra-uterine devices
   a. Medicated
   b. Non-Medicated
3. Hormonal methods
- Oral pills
   a. Combined pill
   b. Progestogen only pill (POP)
   c. Post-coital pill
   d. Once-a-month (long acting) pill
   e. Male pill
- Depot (slow release) formulation
   a. Inject able
   b. Subcutaneous implants
   c. Vaginal rings
4. Post conceptional methods
5. Miscellaneous
   a. Abstinence
   b. Coitus interrupts
   c. Safe period
   d. Natural family planning methods
   e. Breast feeding
   f. Birth control vaccine

**Terminal Methods**

1. Male sterilization
2. Female sterilization

**1. Barrier Methods-**A variety of barrier or "occlusive" methods, suitable for both men and women are available. The aim of these methods is to prevent live sperm from meeting the ovum. Barrier methods have increased in popularity quite recently because of certain contraceptive and non-contraceptive advantages. The main contraceptive advantage is the absence of side effects associated with the pill and IUD. The contraceptive advantage includes some protection from sexually transmitted diseases, a reduction in the incidence of pelvic inflammatory disease and possibly some protection from the risk of cervical cancer.



**a. Physical methods-**

**1. Condom-**

**Method-**Spacing, physical barrier method

**Device-** Thin latex (rubber sheath) device

**Mechanism of action-** Prevents the semen being deposited in vagina

**Eligible candidate-** All men

**Instruction to us-**

i. Use new condom for each act.
ii. Fitted by unrolling on erect penis
iii. Proper care is taken during use

**Advantage-**

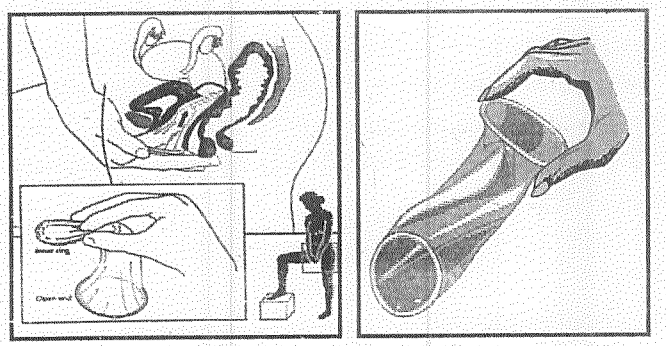
i. Easy to use
ii. Safe and inexpensive
iii. Easily available
iv. No side effects
v. Provides protection not only against pregnancy but also against STD.

**Disadvantage-** decreases the sex sensation and it may slip off or tear during coitus due to incorrect use.

**Failure rate-** 12-14 per hundred women years of exposure.

Condoms are manufactured in India by Hindustan Latex in Trivandrum, London Rubber industries in Chennai and others.

**Female Condom**



FEMALE CONDOM

**Female Condom**

**Method-** Spacing, physical barrier/conventional

**Device-** Soft, thin, transparent pouch

- Made of polyurethane plastic, latex
- Pre-lubrication with silicon
- Condom fits loosely inside the vagina
- It has flexible rings at both ends
- Internal ring is small and anchors the cervix
- Outer ring is large and stays outside

**Mechanism of action-** forms a barrier, prevent semen being deposited in vagina.

**Eligible candidate-** all women

**Instruction to use-** use just before and removed soon after sex

- Outer ring should remain outside the vagina
- Ensure that penis enters inside the condom
- Remove the condom by holding outer ring and twisting.
- Male and female condom should not be used together.

**Advantage-** Easy to use in first experience itself

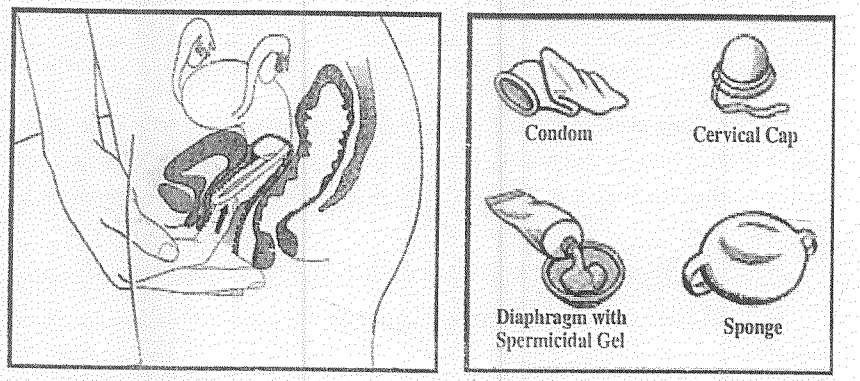
**Disadvantage-** costly, high failure rate

**Side effects-** mild irritation and latex allergy

**Additional benefits-** protects from HIV and STD

**Failure rate-** 20-25 per hundred women- years of exposure

**2. Diaphragm**






**CONDOM, CERVICAL CAP, DIAPHRAGM WITH SPERMICIDAL GEL, SPONGE**



**Condom, Cervical Cap, Diaphragm with Spermicidal Gel, Sponge**

**Method-** Spacing, physical barrier/conventional

The diaphragm is vaginal barrier. It was invented by German physician in 1882. Also known as "Dutch cap".

**Device-**The diaphragm is shallow cup made of synthetic rubber or plastic material.It ranges in diameter from 5-10 cm. It has flexible rim made of spring of metal.

**Instruction to use-** It is important that a woman be fitted with a diaphragm of the spring tension and partly by the vaginal muscle tone.

This means for successful use the vaginal tone must be responsible.

Diaphragm is inserted before sexual intercourse and must remain in place for not less than 6 hours after sexual intercourse.

A spermicidal jelly is always used along with the diaphragm.

**Advantage-** The primary advantage of the diaphragm is the almost total absence of risks and medical contraindication.

**Disadvantage-** initially physician or other trained person will be needed to demonstrate the technique of inserting the diaphragm into the vagina and to ensure a proper fit.

Diaphragm is left in the vagina for an extended period; there is a remote possibility of a toxic shock syndrome.

**Side effects-** practically nil.

**Failure rate** – 6-12 per 100 women years.

Variation of diaphragm includes the cervical cap, vault cap and vimule cap.

These devices are not recommended in the family national welfare programme.

**3. Vaginal Sponge**

**Method-** Spacing, physical barrier/conventional

**Device-** Another barrier device employed for hundreds of years are the sponge soaked in vinegar and olive oil, but it is only recently one has been commercially marketed in USA under the trade name 'TODAY'.

It is a small polyurethane foam sponge measuring 5cm X 2.5 cm. saturated with spermicidal.

**Advantage-** the sponge is for less effective than the diaphragm but is better than nothing.

**Failure rate-** Parous women is 20-40 percentages. Nulliparous women about 9-20 % per years.

**Chemical Methods**

In the 1960 before the advent of IUD's and oral contraceptives, spermicidal (vaginal chemical contraceptive) were used widely.

a. Foams- foam tablets, foam, aerosols.
b. Crams, jellies and pastes- squeezed from a tube.
c. Suppositories- inserted manually
d. Soluble films- C-shape film inserted manually

The commonly used almost modern spermicidal are "surface –active agents" which attack themselves to spermatozoa and inhibit oxygen uptake and kill sperms.

**Drawback-**

1. They have a high failure rate
2. They must be used almost immediately before intercourse and repeated before each sex act.
3. They must be introduced into those regions of the vagina where sperms are likely to be deposit.
4. They may cause mild burning or irritation besides, messiness.

The spermicidal should be free from potential systemic toxicity. It should not have an inflammatory or carcinogenic effect on the vaginal skin or cervix.

It is really effective preventing pregnancy when used alone. Spermicidal are not recommended by professional advisers. They are best used in conjunction with barrier methods.

**Intra-Uterine Devices-**

Types of IUD-

Two types of IUD

1. Non-medicated
2. Medicated

Both are usually made of polyethylene or other polymers. Medicated or bioactive IUDs release either metal ions (copper) or hormones (progestogens).

The non-medicated or insert IUDs are often referred to as first generation IUDs. The copper IUDs comprise the second and the hormone releasing IUDs the third generation IUDs.



The medicated IUDs were developed to reduce the incidence of side effects and to increase the contraceptive effectiveness.

In India, under the National Family welfare programme, Cu-T 200B is being used from 2002. Cu-T 380A has been introduced in the programme.

**First generation IUDs**

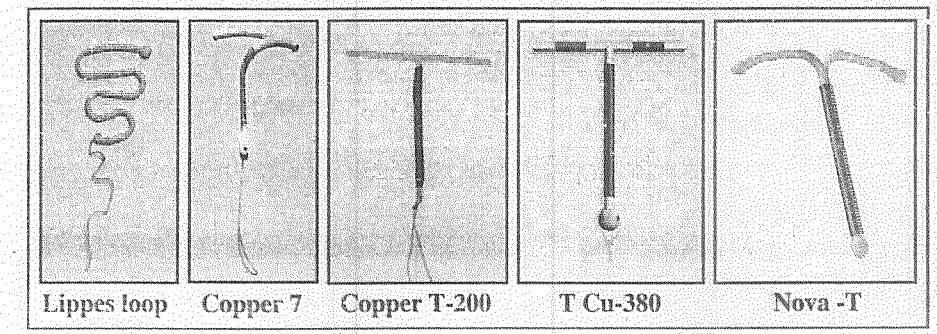
The first generation IUDs comprise the insert or non-medicated devices, usually made of polyethylene or the polymers.

They appeared in different shape and sizes loops, spirals, coils, rings and bows of all the metals, the lippes loop is the best known and commonly used device in developing countries.

**Lippes loop**

**Device-**It is double –S shaped device made of polyethylene, a plastic material that isnon-toxic, non tissue reactive and extremely durable.

**Contains-** Made of polyethylene, a plastic material. Small amount of barium sulphate to allow X-ray observation.




**Instruction for uses-** The loop has attached thread or "tail" made of fine nylon, which project into the vagina after insertion. The tail can easily felt and is a reassurance to the user that the loop is in its place. The tail also makes it easy to remove the loop when desired.

**Size-** The lippes loop in four sizes A, B, C and D the latter being the largest.

**Side effects-** pain and bleeding. The larger are more suitable for multi parous women.

**Second Generation IUDs-**A new approach was tried in the 1970 by adding copper to IUD. It was found that metallic copper has a strong anti-fertility effect. The addition

of copper has made it possible to develop smaller devices are easier to fit, even in nulliparous women.

Earlier devices- Copper- 7
Copper T-200
Newer devices- Various of the T devices -TCu-220C, T Cu-380 A or Ag, Nova T
Multi load devices ML-Cu250, ML-Cu-375

The number included in the names of the devices refer to the surface area of the copper on the device Nova-T and T Cu-380Ag are distinguished by silver core over which is wrapped the copper wire.

The newer copper IUDs multi load device and variants of the T device after the further advantage of having an effective life of at least 5 years.

**Advantages-**

1. Low expulsion rate
2. Lower incidence of side effects, e.g. pain and bleeding
3. Easier to fit even in nulliparous women
4. Better tolerated by nulliparous
5. Increased contraceptive effectiveness
6. Effective as post coital contraceptives, if inserted within 3-5 days of unprotected intercourse.

**Third Generation IUDs-** Based on still another principles i.e. release of a hormone. Most commonly used device is progestacert, the hormone is released slowly in the uterus at the rate of 65 mcg daily. IUds releasing levinogestrel is also found.

**Advantage-** Lower menstrual blood loss and fewer days of bleeding compared to copper T devices.

**Disadvantage-** costly

**Mode of action-**

1. Increase viscosity of cervical mucus; there by prevent sperm from emerging cervix.
2. High levels of progesterone in endometrium and relatively low levels of oestrogen make endometrium unfavorable for implantation.

**Effectiveness** – The IUD is one the effective reversible contraceptive methods. The "theoretical effectiveness" of IUD is less than that of oral and injectable hormone contraceptive.

**Change of IUDs-** insert IUDs such as lippes loop may be less in place as long as required if there are no side effects.



T Cu-380A-10 years
T Cu-200- 4 years
Nova T- 5 years
Progeasterone releasing IUD- every year
Levonogestrel IUD- 7 years

**Advantages of IUDs-**

1. Simplicity i.e. no complex procedures are involved in insertion, no hospitalization is required.
2. Insertion takes only a few minutes
3. Once inserted IUD stays in place as long as required
4. Enexpensive
5. Contraceptive effect is reversible by removal of IUD.
6. Virtually free of systemic metabolic side effects associated with hormonal pills.
7. Highest continuation rate.
8. There is no need for the continual motivation required to take a pill daily or to use a barrier methods consistently. Only a single act of motivation is required.

**Contraindication-**

1. Suspected pregnancy
2. Pelvic inflammatory diseases
3. Vaginal bleeding of undiagnosed etiology
4. Cancer of cervix, uterus and other pelvic tumors
5. Purulent cervical discharge
6. Deformation of the uterine cavity due to congenital malformations.
7. Unmotivated person

**The ideal IUD candidate-**

1. Who has borne at least one child
2. Has no history of pelvic diseases
3. Has normal menstrual periods
4. is willing to check the IUD tail
5. Has access to follow-up and treatment of potential problem
6. Is a monogamous relationship.

**Timing of insertion of IUD-**The most propitious for insertion of a menstrual or within 10 days of beginning of menstrual periods.

Side –effects and complication-

Bleeding, pain, pelvic infection, uterine perforation, pregnancy, ectopic pregnancy, expulsion, fertility after removal cancer and teratogenesis, morality (one death per 1,00,000).

**Copper T**

**Method**-Spacing, second generation intra- uterine device

**Device**- small, flexible plastic frame of silver core, wrapped with copper wire(TCu-380A)

**Mechanism of action**- by foreign body reaction, it alters the bio-chemical change in the uterus, disturb sperm and egg union and implantation.

**Eligible candidate**-all women of reproductive life

Not a method of choice for nulliparous

**Insertion-**

- Within 10 day of menstrual bleeding
- Within 5 day after unprotected sex
- Within 48 hours after delivery
- 6-8 week after delivery
- 12 week after delivery

Insertion into uterus by trained person after pregnancy is ruled out

**Instruction**- check the string regularly

Follow up visit one month after insertion and once a year afterwards

**Advantage**

- Simple insertion effects, low risk,
- Long time protection (10 year)
- No continued motivation is needed
- Can be used within three to five day as post coital contraceptive
- No interruption in the sex

**Disadvantage**- needs trained person for insertion, periodic replacement, needs yearly follow up

**Side effects**- irregular bleeding, expulsion, pain, backache during monthly bleeding, perforation, infection, pelvic infection and inflammatory disease, anemia, ectopic pregnancy.



**Additional benefits (non- contraceptive benefits)**- Prevent endometrial cancer.

**Contraindication**- Suspected pregnancy, Nulliparous and women having multiple partners, Anemia, abnormal bleeding, Pelvic inflammatory diseases, cervix, uterus and ovarian cancer, HIV without treatment, systemic lupus erythematosus (SLE)- severe thrombocytopenia. Previous ectopic pregnancy, congenital uterine malformation.

**Effective failure**- 1.5 per hundred women- years of exposure up to 10 year.

**Hormonal Contraceptive Methods**

Hormonal contraceptive used as most effective spacing method of contraception.

Oral contraceptives of the combined type are almost 100% effective in preventing pregnancy.

More than 65 million in the world are estimated to take the 'pill'.

**Classification**

1. **Oral pills**
   a. Combined pill
   b. Progestogen only pill (POP)
   c. Post-coital pill
   d. Once-a-month (long acting) pill
   e. Male pill
2. **Depot (slow release) formulation**
   a. Inject able
   b. Subcutaneous implants
   c. Vaginal rings

**1. Oral Pills-**

**a. Combined Oral Pill**

**Method**- spacing, low dose hormonal contraceptive

**Device**- blister pack contains 21 hormonal pills and 7 IFA tablets. Each hormonal pill.

**Contains** –progestin: Norgestrel 0.3 mg

Estrogen : ethniyl estradiol 0.03 mg

**Mechanism of action**- by inhibiting ovulation. Prevents sperm entry by making cervical secretion thick

**Eligible candidate**- any women after screening

**Instruction to use-**

- Consultation and screening before starting
- New pack for each cycle staring at 5th day
- Take one tablet orally every day, at fixed time
- Any missed pill should be taken as soon as possible periodic follow up.

**Advantage**

- Easy to use, effective and cheap
- Controlled by women herself
- Can be stared at any time except pregnancy and stopped at any time
- Reversible and does not interfere with sex
- Available under social marketing and free distribution.
- HIV infected women on antiretroviral therapy (ART) can use oral contraceptive pills (OCP) along with condom for additional protection.

**Disadvantage-** adverse effects on lactation, long term use may cause non-communicable diseases.

**Side effects-** Breast tenderness, Weight gain, disturbance in serum lipid, Mood changes, Deep vein thrombosis, Cervical cancer

**Contraindication-** age more than 40 year, Breast feeding mother, Breast cancer , Treatment on anticonvulsants or rifampicin, Hyperlipidemia, Hypertension, diabetes,, cardiac problem, stroke, Active liver/ gall bladder diseases, Thrombophebitus

**Additional benefits-** Non contraceptive benefits. Endometrial and ovarian cancer, Anemia, Pelvic inflammatory diseases, Benign breast disorders, Ovarian cysts, Ectopic pregnancy, Ovarian cancer

**Failure rate-** less than 1 per hundred women years of exposure

**Brand name-** Mala-D Mala-N

**b. Progestogen - Only-pill (POP)**

**Method-** spacing, low dose hormonal contraceptive

This pill is commonly referred to as "mini pill" or "micro pill".

**Contains-**Only progestogen which is given in small doses throughout the cycle.

**Mechanism of action-**It works by thickening the cervical mucus, which acts as a barrier to stop sperm entering the womb. It also makes the lining of the womb thinner, to prevent it accepting a fertilized egg.

**Advantage-**This type of pill is good for women who are breast-feeding, older women, smokers and others who cannot use the combined pill.



It can also help with pre-menstrual syndrome (PMS) and painful periods.

The pill does not interfere with the spontaneity of sex.

**Instruction to use-**It must be taken at the same time each day or at most within three hours of that time.

It will not work if taken over three hours late, or if have vomiting and diarrhea, in these cases extra protection is needed.

**Side effects-**It can cause irregular bleeding and periods may stop altogether while are taking it.

**Effectiveness-** 98% if taken correctly.

**c. Post-Coital Contraception/emergency Contraception-**This is NOT a regular method of birth control and should never be used as one.

Emergency contraception, or emergency birth control, is used to keep a woman from getting pregnant when she has had unprotected vaginal intercourse.

Unprotected can mean that no method of birth control was used.

It can also mean that a birth control method was used but did not work – like a condom breaking or when a woman has forgotten to take her birth control pills.

**Two methods are available-**

1. Hormonal- Post coital or morning after recommended within 72 hours of unprotected intercourse. Emergency contraception consists of taking two doses of hormonal pills taken 12 hours apart and started within three days after having unprotected sex. The pills are 89% effective at preventing pregnancy.
2. IUD- Another type of emergency contraception is having the Copper T IUD put into your uterus within five days of unprotected sex. This method is 99.9% effective at preventing pregnancy.

**d. Once - A - Month Pill (long Acting)**-Experiment with Once- A-month oral pill in which Quinestrol a long acting estrogen is given in combination with short acting progestogen have been disappointing

**e. Male Pills-** The search for male contraceptive begins 1950.

A male pill made of Gossypol a derivation of cotton seed oil has been very much in the news.

It is effective in producing azoospermia or severe oligospermia but as many men be permanently azoospermic after taking 6 month.

Further Gossypol could be toxic.

**B. Depot Formulations**

It is highly effective reversible, long acting & estrogen free for spacing pregnancies in which a single administration suffices for several month or years cannot be stressed.

**Inject able contraceptives -**

Two types :

1. Progestogen
2. Newer once a month combined injectable

**a. Progestogen-only Injectable**

a) DMPA (Depot Medroxy progesterone acetate)
b) NET-EN (Norethisteroneenantate)
c) DMPA-SC

**a) DMPA (Depot Medroxy progesterone acetate)**

Since 1960

Dose- 150 mg I/M every 3 month

Advantage - it does not effect on lactation

Disadvantage- Increase weight, irregular menstrual bleeding and prolonged infertility.

**b) NET-EN (Norethisteroneenantate)**

Since 1966

Dose - 200mg I/M every 60 days

Administration - 5th day of menstrual period.

**c) DMPA-SC-**

Inject under the skin rather than in muscle

Dose - 104 mg S/C every 3 month.

**Side effects** - DMPA-SC& NET-EN have similar side effects disruptions normal menstrual cycle & unpredicted bleeding.

**Advantages-**

1. Birth control shot given once every three months to prevent pregnancy
2. 99.7% effective preventing pregnancy
3. No daily pills to remember

**Disadvantages-**

1. Extremely irregular menstrual bleeding and spotting for 3-6 months!
2. NO PERIOD after 3-6 months



3. Weight change
4. Breast tenderness & Mood change
5. Does not protect against STDs

**b. Sub Dermal Implants-** It is known as Norplant for term contraception capsule contain 35 mg of levanogestrel.

**Method-** spacing hormonal –depot

**Device-** small flexible, silastic plastic rods having progrgesterone

**Mechanism of action-** by thickening cervical mucus, it blocks sperm entry and prevents ovulation

**Eligible-** all women

**Implantation-** implanted under the skin by minor surgical procedure by trained provider

Inner (medical) side of the upper arm is preferred

Implanted within 7 days of starting of menstrual cycle

**Advantage-** long lasting- reversible

**Disadvantage-** not reported

**Side effects-** menstrual irregulatries, breast tenderness, enlarged ovarian follicles, weight gain.

**Contraindication-** liver, gall bladder disease, breast cancer, unexplained bleeding

**Failure rate-** 0.2 per 100 women years of exposure using 3-7 year

**c. Vaginal Rings**

**Method-** spacing hormonal

**Contains-** Flexible contraceptive vaginal ring that contains the hormones estrogen and progesterone. The ring releases a continuous low dose of hormones that stops the ovaries from releasing an egg each month.

**Instruction to use-**

1. You squeeze the ring between your thumb and index finger and insert it into your vagina.
2. Insert the ring in the vagina and leave it there for three weeks
3. Remove the ring for one-week ring-free period, on the same day of the week at about the same time.
4. During the one-week break, you will usually have your menstrual period.

**Advantages-** Low Maintenance: One ring every three weeks

**Disadvantages-** You will need to visit your doctor for a prescription

Does not protect against STDs and HIV

**Post- Conceptional Methods/Termination Of Pregnancy - A**

**Abortion-**Termination of pregnancy before the fetus becomes viable (capable of living independently). This has been fixed administratively at 28 weeks when the fetus weight approximately 1000 gm (1 kg).

**Two type of abortion-**

1. Spontaneous abortion
2. Induced abortion

Spontaneous abortion-occur once every 15 pregnancies. They may be considered "nature's method of birth control"

Induced abortion-it may be legal or illegal.

Medical termination of pregnancy act 1971It is health care measure which helps to reduce maternal morbidity & mortality resulting from illegal abortion.

It is a post- conceptional method of family planning

**MTP Act 1971 Rules-**

1. The condition under which a pregnancy can be terminated-
   a) Medical - pregnancy endanger the mother's life
   b) Eugenic - abnormality in fetus.
   c) Humanitarian- pregnancy is result of rape.
   d) Socio-economic condition- risk of injury to health of the mother
   e) Failure of contraceptive devices.
2. The person or persons who can perform abortion –
   - Registered medical practitioner having experience in gynecology & obstetrics.
   - Pregnancy does not exceed 12 weeks.
3. Where abortion can be done- Government hospital or Government approved hospital.

**Miscellaneous Methods**

1. Abstinence
2. Coitus interrupt us



3. Safe period (Rhythm method)
4. Natural family planning methods
   a) Basal Body Temperature method (BBT)
   b) Cervical mucus method
   c) Symptothermic method
5. Breast feeding
6. Birth control vaccine-

**1. Abstinence**

- The method of birth control which is completely effective is complete sexual abstinence
- Not having sexual intercourse at any time. Includes vaginal, anal, or oral intercourse
- 100% effective at preventing pregnancy and STDs

**Advantages-**Free, Safe, You can remain abstinent while on birth control

**Disadvantages-** If you might have sex with your partner, it is better to plan on using birth control ahead of time

**2. Coitus Interruptus**

- This is the oldest method of voluntary fertility control.
- It involves no cost or appliances. It continues to be a widely practiced method.
- The male withdraw before ejaculation & there by tries to prevent deposition of semen into vagina, some couples are able to practice this method successfully.
- It is better than using no family planning method at all.
- Effectiveness: Failure rate can be as high as 15% (15 pregnancies per 100 women).

**3. Safe Period (Rhythm Method)**

- Also known as Calendar method by Ogino (1930 )
- This method can be used for patients with regular cycles only.
- This is done depending on the exact knowledge of ovulation day and avoiding intercourse during the days before and after ovulation;

For example in a regular period that occurs every 28 days the exact day of ovulation should be the day 14 so intercourse should be avoided 4-5 days before and after this days.

There are many methods to detect ovulation days;

1. Increase in body temperature by about 0.5 $^{0}$C.
2. Change in type cervical mucus.

3. Ovulation kits nowadays are available for detection ovulation day

**Draw back-**

1. A women's menstrual cycle are not always regular if the cycle are irregular it is difficult to predict the safe period.
2. It is only possible for this method to be used by educated & responsible couples with high degree of motivation & cooperation.
3. Compulsory abstinence of sexual intercourse for nearly one half of every month. What may be called "programmed sex".
4. This method is not applicable during the postnatal period.
5. A high failure rate of 9 per 100 women years.

**4. Natural Family Planning Methods-**

a. **Basal body temperature method (BBT)**- Result of an increase in Production of progesterone. The rise of temperature in very small 0.3 to 0.5°C. When no ovulation occurs (e.g. as after menarche, during lactation) the body temperature does not rise.

b. **Cervical Mucus Method-** Also known "Billing Method" or "Ovulation Method". This method is based on observation of changes in the characteristics of Cervical mucus, at the time of ovulation cervical mucus becomes watery Clear resembling raw egg white, smooth, slippery, profuse. It is recommended that the woman uses a tissue paper to wipe the inside of vagina to assess the quantity and characteristics of mucus.

c. **Symptothermic Method-** This method combines the temperature cervical mucus & Calendar technique for identifying the fertile period. It woman cannot clearly interpret one sign, she can "double check" her interpretation with another therefore this method is more effective than the "Billing Method."

**5. Breast Feeding**

- Sometimes called LAM (Locational Amenorrhea Method)
- A natural way to prevent pregnancy after giving birth
- Effective, safe, convenient, and free
- Lasts for up to six months after giving birth

**6. Birth Control Vaccine**

- Vaccine prepared from Beta-sub unit of human chorionic gonadotropin (HCG)
- The vaccine has recently passed an important milestone; it has completed the first leg of phase II efficacy trials.



**Terminal Methods (Sterilization)**

Procedure performed on a man or a woman permanently sterilizes

Female = Tubal Ligation -85%

Male = Vasectomy-15%

In India in spite of the fact that sterilization is simpler, safer & cheaper than female sterilization.

**Guidelines for sterilization-**

1. The age of the husband should not ordinarily be less than 25 years nor should it be over 50 years.
2. The age of the wife should not be less than 20 years or no more than 45 years.
3. The motivated couples must have two living children at the time of operation.
4. If the couple has 3 or more living children.

**Female sterilization:** It is an operation where resection of a segment of both fallopian tubes is done to achieve permanent sterilization.

Failure rates vary by procedure, from 0.8%-3.7%

**Indications-**

1. Couples who desire permanent sterilization
2. Women with medical disorders in whom pregnancy care is risk of impairing health or being hazardous of life.
3. Women with severe inheritable genetic disorders in whom child bearing is not desirable.

**Contra indications**

**Absolute**

1. Active perineal infections
2. Severe cardio pulmonary or metabolic disorders
3. Lack of informed consent.

**Relative**

1. Marked obesity
2. Medical or surgical risk factors present due to severe anaemia
3. Uncontrolled diabetes.

**Disadvantages**

1. This method is permanent not easily reversible.

2. It does not offer protection against STDs.
3. There are small surgical risks involved.

**Male sterilization or vasectomy:** It is a surgical procedure in the male where segments to vas deferens of both sides are resection and the cut ends are legated.

**Failure rate** - 0.1%, more effective than female sterilization.

Person turns sterile after 30 ejaculations.

**Advantages :**

1. Simple operative procedure which can be performed under local anaesthesia
2. Does not require hospitalization
3. Free from long term side effects
4. Does not alter sexual functions
5. Costs are lower
6. Surgical reversible possible
7. Failure rate is 3-4 per 100 procedures.

**Disadvantages :**

a. Procedure is permanent
b. Does not protect against STDs
c. Not free from surgical risks.
d. Some men suffer from psychological ill effects.

## The Family Planning in Ayurvedic System of Medicine

The population of India 2012 about more than 122 crores. So the world is facing a critical & difficult days as the population are increasing very fast.

It is the bounden duty of ever educated citizen to see that the growth of population is retarded at an early date or else we have to face lack of clothing, housing & food.

The family planning methods which were in vague since time immemorial are to be adopted at least, to control the birth rate and live happily and healthy. Family planning adopted in Ayurveda as well as explained in Ratimanjari, (1800 AD) Rasaratnas-amuchaya (1400AD), Bhavaprakasha (1600AD), Yogaratnakar (1800AD), Bhaishajya Ratnavali (1900AD), Atharvaveda (1200BC), Vatasayana Kama Sutra (300BC) & in Kousik Sutra there is description of Vasectomy in Male & Tubectomy in Female.

The following are some of the method s advocated in Ayurveda.

1. Brahmacharya
2. Avoiding coitus during Rutukala



3. Vaginal jelly, douches, plugging, fumigation.
4. Contraceptive to prevent the formation of semen or to produce defective ovum.
5. Coitus during Anrutukala (safe period)
6. Aborteficients
7. Prolonging marriage of couples.
8. The use of artificial aids like sheath in preventing conception.
9. Surgical methods.

**1. Brahmacharya**- The purpose of coitus during the ancient period was only to have a pregnancy & not mainly meant for sexual pleasure. So they have advised Brahmacharya as one of the major step of birth control. Ancient generation was finding Brahmacharya easy to adopt & practice in their day to day life.

**2. Rutukala (Unsafe Period)**-Rutukala means genetic period. It has been stated inSusruthaSamhitaSharira5 chapter that Rutukala is stated to be 12 days after the last menstruation. In this period female reproduction & generative organs will produce ovum & it will be ready to receive sperms. It results a fertility station.

**3. Anrutukala (Safe Period)**- After period of unsafe period the reproductive organ of women will start receding like the petals of lotus. Which close in evening. It has been said that the period up to the next menstruation is Anrutukala or ungenetic period if the coitus is conducted in these periods there will be no. pregnancy.

**4. Vaginal jelly, douches, plugging & fumigation etc to prevent pregnancy-**

- Fumigation of vagina must be done with decoction of root of Nimba at the time of menstruation.
- The powdered root of Dhatura must be introduced into vagina
- Castor & gingerly oil may be kept inside vagina in a cotton before inter course.
- Powder of rock salt which is dipped in Tila oil be kept inside before coitus.
- The powder of seed of Palasha must be painted into vagina along with honey for 7 days.

**5. Contraceptive to prevent the formation of semen or to produce defective ovum** : Charakacharya has pointed out the etiology for delayed pregnancy in fertile women. When they are performing coitus during the period of Anrutukala & the aggravated Doshas in sperms & ovum's & defective in diet & activities of intercourse.

Some drugs administered internally to render the ovum or sperm defective in Ayurveda.

Bhavaprakash, Yogaratnakara, Vidyajeevana, Kamasutra are explain

1. Japakusuma, Puran Guda, Arnala (kanji) are to taken in equal proportion in dose of 5 Tola per day for a week.

2. पिप्पलीविड्गटंकणसमचूर्णयापिबेत्पयसा । ऋतुसमयेनहितस्यागर्भः संजायतेक्वापि॥

(यो. र. योनिव्यापतचिकित्सा)

Pippali, Vidanga, Tankana powder mixture of drugs are taken for a week after menstruation in dose of 2 Grams each.

3. Kanji should be prepared in Japakusuma& must be taken for 3 days after. (Yo. Ra. Page 409)
4. Old Jaggery of the quality of a 1 Pala should be taken daily.
5. Three year old Jaggery must be administered for a period of 15 days in dose of 8 Tola per day.
6. Prepare a decoction from Chitraka root (lat. Plumbago zylylanica) & it should be taken for a period of 3 day after menstrual period.
7. Take Sarshapa seeds along with rice water will produce the sterility in female.
8. Powder of Palasha seed must be taken orally with water for 3 days will also produce same effects.
9. If 3 castor seeds are administered for a week will prevent fertility for 2-3 years.
10. Administration of Sweta Gunga (Lat. Abrus precatorus) one on 4th day two day 5th & three on 6th day of menstruation has been found to produce the sterility.
11. Decoction of root bark of Agnimanth must be taken with rice water.
12. Talisapatra & Gairika must administer for 3 days or 4 day along with water.
13. Dhattura plant must be tied to the lady inner waist in the Krushna Paksha Chaturdarshi period will also prevent conception.
14. Haridra must be taken in water for 6 days after menstruation.
15. Castor oil & jingelly oil are mentioned as vaginal purifier they must be applied before sexual intercourse to produce sterility.

**External use of contraceptives:** Jaggery, Madanpala, seeds drone & Yavakshara. These must be powdered & must be kept for some hour in the milk of Snuhi & must be kept in vagina will produce menses.

**6. Artificial Appliances :** In Sushruta Chikitsa there is a mention that the penis must be covered with sheath. So even during those days gents were using sheath similar to 'Nirodh'

Artificial applications or a sheath made of different metals is preventing pregnancy.



**7. Abortificients :**

- Take the seeds of Gunja 1 part, Tankan & Dadima roots 3 parts & administer orally to produce abortion.
- Nirgudi should be made into a paste with Chitrak Mula & Madhu be taken in Karsha Pramana.
- Stem & Leaves of Eranda must be inserted into vagina up to 4 inches will produce abortion even up to 4 month.
- The lime of temple if administered in Karsha Pramana the lady will bleed immediately.
- The stool of horse must be grinded in liquid kanji & filtered & administered with rock salt.

**8. Prolonging marriage of couples :** Our ancient have advocated 25 years of age for an adult male & 16 years for a lady to marry. The delay in marriage time of the couple will indirectly prevent the pregnancy.

**9. Surgical Methods :**

Female sterilization-

Male sterilization-

# CHAPTER 20 Matrusishu Kalyana Yojana-Mother and Child Health Programme

Maternal and child health care is one of the main components of (PHC) systems as declared at the Alma Ata Conference in 1978. In India women of child bearing age 15-44 years and children under 15 years constitute 57.5 % of total population.

Maternal and child care services provided by the MOH, UNRWA and NGOs together services are free of charge

**MCH services-** Are the Sites where women and children seek their preventive and curative services. It is a PHC component where these services should be available affordable and accessible to all the target population in their communities.

Aims-

1. Reeducation of maternal, perinatal, infant and childhood mortality and morbidity.
2. Promotion of reproductive health.
3. Promotion of physical and psychological development of the child and adolescent in the family.

**Aspects of the programme-**

1. Maternal care
   a. Antenatal care
   b. Intra natal care
   c. Postnatal care
2. Child health-
   a. Infant- neonatal and post neonatal care
   b. Care of preschool chiid
   c. Care of school going child

Components of MCH Activities-

**Women health-**

- Provision of antenatal care including regular examination immunization-proper nutrition and self-care.
- Provision of safe delivery site





- Postnatal follow up
- Family planning services
- Health education (counseling)

**Child health-**

- Growth and development monitoring including proper nutrition with emphasis on breast feeding. (Well baby clinic)
- Immunization of all children.
- Screening of all newborns for phenylketoneurea (an inherited inability to metabolize phenylalanine which, if untreated, causes brain and nerve damage) and congenital hypothyroidism.
- Health education to ensure healthy children.
- Early discovery of congenital abnormalities.

## Maternal and Child Welfare Center ( मातृ शिशु कल्याण केन्द्राणि )

These centers are established under the supervision of medical officers of the health. The essential provision for center is a well-equipped lady health visitor, who is assisted by a trained Dai.

The center should consist of :

1. A waiting room
2. A consultation room
3. A small dispensary
4. A washing room
5. A lavatory adjoining the waiting room
6. Staff quarters for the lady health visitor/ mid-wife/ ANM and trained Dai in close proximity to the welfare center.
7. A large compound for use as playground for the children.

The staff should consist of-

1. A lady visitor and mod-wife/ANM one lady health visitor annually attends to about 200-240 births 200 infants and about 600-700 preschool children. A mid-wife/ ANM can attended to 100 births.
2. A lady superintendent- she is a voluntary honorary lady worker, who can afford to spare some time to assist the lady health visitor in her work.
3. A visiting lady medical officer- she attends the center once or twice in a week. She is specialist in diseases of women and children and runs antenatal and baby clinics.

4. Dais- One or two trained dais and mid wife are attached to the center to render assistance at the time of delivery to poor and deserving mothers.
5. Specialists- In some of the centers venereal, orthopedic or dental specialists also attend the center one or twice a forth night. The chief value of the center is to provide medical and hygienic advice to the mothers who should be used and persuaded to bring their children to the centers for periodical checkup. Leaflets in different languages should be distributed giving instructions regarding maternity and child welfare work.

Annual baby show may be held in the centers. Some centers will provide cheap meals for poor expectant and nursing mothers. Milks also will supply free or at a nominal cost to needy mothers and children. In some centers dental or venereal clinic and clinic for orthopedic work and ultra violet treatment are also provided.

## Maternal Health

Definition (WHO) Maternal health refers to the health of women during pregnancy, childbirth and the postpartum period.

**Objectives of the program-**

1. To provide optimal antenatal care to pregnant women as early as possible.
2. To prevent and detect any deviation on the normal pattern in of pregnancy.
3. To identify and give special attention and care to pregnant women at risk.
4. To ascertain outcome of each registered pregnancy and follow up on the survival of new born infants.
5. To reduce maternal deaths by early detection and management of risk factors and complications.
6. To ensure that optimal standard of care are provided to high risk pregnant women during delivery by extending assistance towards their hospitalization costs.
7. To prevent adverse development that may arise after childbirth by providing postnatal care either at home or in MCH clinic as early as possible and within 42 days.
8. To promote birth spacing by avoiding too early, too late, too frequent and too close pregnancies by provision of comprehensive family planning services to women (counseling and supplies.
9. Encourage women to share responsibility of own health and maintaining healthy life style such as weight control, physical exercise.

**Elements of maternal health-**

1. Antenatal care.
2. Natal care.



3. Postnatal care.
4. Family planning.
5. Family health counseling

## Antenatal Care

Antenatal care is the health care given to the pregnant women from the first month till the delivery time, to insure safe pregnancy and safe outcome.

The outcome is referred to safe delivery and healthy newborn.

The objective of antenatal care is to assure that every wanted pregnancy culminates in the delivery of a healthy baby without impairing the health of the mother.

Good antenatal care is vital for achieving the objectives stated later on. Bad antenatal care may be worse than none.

**Objectives of antenatal care-**

1. To maintain the mother and babies in the best possible state of health.
2. To recognize abnormalities and complications at an early stage.
3. To educate the mother in the physiology of pregnancy.
4. Antenatal care is the cornerstone of obstetrics. Though the problems of labour are more dramatic and demand attention, many of them could be avoided by effective detection and management of antenatal variations from the normal.

**Activities-**

1. General medical and obstetric history
2. Routine physical examination including: General and abdominal examination, Blood pressure and weight are routine measurements during each visit.
3. Level of the uterus is defined each visit after the 12th week of pregnancy.
4. Health education: Assessment of the educational needs of the woman related to her history and the physiological changes occurring in her body.
5. Topics: Nutrition, Personal hygiene, Care of nipples, Awareness about signs and symptoms associated with high risk pregnancy, physiology of pregnancy.
6. Provision of supplements including ferrous tablets and folic acid tablets
7. Laboratory tests: Complete blood examination including hemoglobin level, fasting blood sugar, blood group and Rh factor. Urine examination for the presence of albumin, sugar and infection.
8. Immunization: Tetanus toxoid should be given for all pregnant women (primi gravidas).

The first does is usually given at 20 weeks of pregnancy. The second does is given 5 years later.

9. Curative services where women are treated for acute illness such as treatment of the uro-genital tract infection.
10. Assessment of risk pregnancy: During ante-natal care women are classified according to the risks associated with the pregnancy.

**Risk factors Medical conditions-** Diabetes mellitus, Anemia, Hypertension, Urinary tract infection, Heart disease, Epilepsy, Variety of problems related to drug usage and conditions treated.

Risk factors related to past obstetric history-History of operative delivery, History of a stillbirth or neonatal death, previous ante-partum hemorrhages, previous post-partum, hemorrhages, History of low birth weight infant.

### Natal Care

Natal care is referred to the care given to women during childbirth.

Caring for woman in labor demand sensitivity and awareness of her perceptions of labour and of her needs as they relate to her experience.

Delivery sites should be- Hygienic, Well equipped, have qualified trained persons.

These sites could be in hospitals or delivery hospitals or in the community either in primary health care centers or separate maternity homes

Natal care should not be limited to the delivered women but care should be given to the newborn at the same time.

### Postnatal Xare

Care of mother after delivery is known as post natal or post partal care. This can be broadly divided into care of mother & care of new born.

**Objectives-**

1. To prevent complication of post partal period.
2. To provide complications of restoration of the mother to optimum health.

**Postnatal care-**

3. To check adequacy of breast feeding.
4. To provide family planning services.
5. To provide basic health education to mother /family.

**To prevent complication of post partal period**-Puerperal sepsis, thrombo-phelbitis, secondary hemorrhage & urinary infection should be handled with care.



**Complications of restoration of the mother to optimum health**-So physical examination should be done properly. Anemia should be treated by iron & folic acid supplement. If necessary calcium supplement should also be given.

**Adequacy of breast feeding**-Immediately after the birth of the new born, breast feeding is suggested. Infant is dependent completely on breast milk up to 4-6 months. Later supplementary food are necessary for the proper growth of the child.

**Family planning services**-It is most essential because it will be a burden for the mother if she conceives with in the first year.

**Basic health education-**

1. Hygiene- personal & environmental
2. Pregnancy spacing-
3. Important health checkup & birth registration.

### Appropriate Care for Children

The children belonging to 0-14 years are included.

Total population of children divided into three groups depending on age.

1. Infants-
   a. Neonatal (first 28 days after birth)
   b. Post neonatal (28$^{th}$ day to 1 year)
2. Preschool children(1-4 years)
3. School going children (5-14 years)

### Neonatal Care

Early neonatal care- the first week of life is the most crucial period in the life of infant.

In India 61.3 % of all infants deaths occur within the first month of life.

More than of death is greatest during the first 24-48 hours after birth.

The problem is more acute in rural areas where expert obstetric care is scare. Environment condition baby is born are usually unsatisfactory.

**Objectives-**

1. Establishment & maintenance of cardiac respiratory functions.
2. Maintenance of body temperature.
3. Avoidance of infection.
4. Establishment of satisfactory feeding regimen.
5. Early detection & treatment of congenital disorder, especially infections.

**Immediate care after delivery-**

1. **Clearing the airway-** establishment & maintenance of cardiac respiratory functions is most important thing moment the baby is born. To help establishment breathing, the airways should be cleared of mucus & other secretions.
2. **Neonatal care (APGAR SCORE)-**

| Sign | Score-0 | 1 | 2 |
|---|---|---|---|
| Heart rate | Absent | Slow (below 100) | over 100 |
| Respiratory effort | Absent | slow irregular | good crying |
| Muscle tone | Flaccid | some flexion of extremities | active movements |
| Reflex response | No response | Grimace | cry |
| Color | Blue, pale | body pink extremities blue | completed pink |
| Total score-10 | Severe depr-ession 0-3 | mild depression 4-7 | no depression 7-10 |

**3. Care of the umbilical cord-** In case of normal infant, umbilical cord should be cut tied when it has stooped pulsating. Care must be taken to prevent tetanus of the newborn by using properly sterilized instruments & cord ties. It is essential to apply an antiseptic preparation on the cord stump & the skin around the base. It dries &shrivels up & separates by aseptic necrosis in 5-8 days.

**4. Care of the eyes-** Before the eyes are open, the lid margins of the newborn should be cleaned with sterile wet swabs.

**5. Care of the skin-** When a baby a few hours old, the first bath is given with soap & and warm water to remove vernix, meconium & blood clots. Some prefer to apply warm oil before bath.

**6. Maintenance of body temperature-** The normal body temperature of newborn is between 36.5-37.5 degree Celsius.

**7. Breast feeding-** Breast feeding should be initiated within an hour of birth instead of waiting several hours as is often customary. Although there is little milk at time, it helps to establish feeding & a close mother-child relationship, know as bonding. The first milk which is called "colostrum" is the most suitable food for the baby during this early period because it contains a high concentration of protein & other nutrients

It is the ideal food for the infant. No other food is required by baby until 6 months after birth. Normal condition Indian mother secrete 450-600 ml of milk daily with 1.1 gm protein per 100 ml. The energy value of human milk is 70 kcal per 100 ml.



**Advantages-**

1. It is safe, clean, hygienic, cheap, & available to infant at correct temp.
2. It fully meets the nutritional requirement of infant in the first few months.
3. It contains antimicrobial factors such as macrophages, lymphocytes, secretary IgA, anti-streptococcal factor, lysozyme, lactoferrin which provide protection not only diarrheal other diseases also like RTI, enterocolitis.
4. It is easily digested & utilized by both normal & premature babies.
5. It promotes bonding between the mother & infant.
6. It protects babies from the tendency to obesity.
7. Sucking is good for baby it helps in the development of jaw &teeth.
8. It prevents malnutrition & reduces infant mortality.
9. It prevents neonatal hypocalcaemia & hypomagnesaemia.
10. It helps parents to space their children by prolonging the period of infertility.
11. Special fatty acids in breast milk lead to increased intelligence & better visual acuity. A breast fed baby is likely to have an IQ of around 8 points higher than a non- breast fed baby.

**Artificial feeding-** the main indications for artificial feeding are failure of breast milk, prolonged illness or death of the mother. It is crucial for the baby to fed "breast- milk substitutes"- e.g. dried whole milk powder, fresh milk from a cow or other animal or commercial formulae.

**Principles of artificial feeding (Nutritional needs)-**

1. Infants require an average of 100 kcal of energy per kg of body weight per day.
2. Protein requirement is about 2gm/kg of body weight during the first 6 month. 1.5 gm/ kg by the end of one year.
3. Carbohydrate requirement is about 10 gm/kg of body weight daily.
4. After 4 month of age undiluted boiled & cooled milk should be given.
5. Infants need feeding at frequent intervals about 6-8 times a day, older babies 5 times a day.
6. During illness the calories need is increased & it should be met.

**Care of The Pre-School Child**

Children between 1-4 years of age generally called pre-school age children.

Pre-school age children about 12 % of the general population in India. A large majority of these children live in rural & tribal areas & urban slums.

The pre-school age mortality in India is as high as 4.9 % of all deaths. The high mortality which is largely due to infection & malnutrition.

The prevalence of severe protein energy malnutrition ranged 5-6 % mild protein energy malnutrition about 40%.

## School Health Service

The health problem of school children varies one place to another.

**Objectives-**

1. The promotion of positive health.
2. The prevention of disease
3. Early diagnosis, treatment & follow-up of defects
4. Awakening health consciousness in children.
5. The provision of healthful environment.

**Aspects of school health service-**

1. Health appraisal
2. Remedial measures & follow-up
3. Prevention of communicable diseases.
4. Health school environment
5. Nutritional services.
6. First aid & emergency care.
7. Mental health
8. Eye health
9. Dental health
10. Health education
11. Education of handicapped children.
12. Proper maintenance & use of school health records.

## Child Health Problems

The problem facing the health worker in the developing world are vast & are nowhere more evident than in the field of childcare.

1. Low birth weight
2. Malnutrition



3. Infections & parasitosis
4. Accidents & poisoning
5. Behavioral problems.

**1. Low birth weight-** The birth weight of infant is single most important determinant of its chance of survival, healthy growth & development.

There are two main group of low weight babies- those born prematurely (short gestation) & those with fetal growth retardation.

A target birth weight of at least 2.5 kg for 90 % of newborn infants, & an adequate growth of children as measured by weight-for-age, together constituted global indicator number "8" for monitoring & evolution of the global strategy for health for all 2000.

By international agreement low birth weight has been defined as a birth weight of less than 2.5 kg the measurement being taken preferably within the first hour of life.

WHO estimates that globally about 25 million low birth weight babies are born each year.

Infants who weigh less than 2.5 kg at birth represent about 28 % of all live birth in India. In India mean birth weight is between 2.7 to 2.9 kg.

2. **Malnutrition-** It is most widespread condition affecting the health of children. Unsuitable foods, lack of purchasing power of family as well as traditional belief & don't know what the baby should eat, often lead to an insufficient balanced diet, resulting malnutrition.

In India the national family health survey included survey of nutritional status of young children both chronic & acute under nutrition were found to high in all the 7 states.

Namely Haryana, Karnataka, Maharashtra, Orissa, Tamilnadu, Uttar Pradesh& Goa.

At present in India 65% children under 5 years age are underweight. This includes 43% moderate to severe cases, 16 % severe malnutrition.

Malnutrition makes the child more susceptible to infection recovery is slower & mortality is higher.

**3. Infectious & parasitic diseases-** Young children fall an easy prey to infectious diseases. The leading childhood diseases are- diarrhea, respiratory infections, measles, pertussis, polio, neonatal tetanus, tuberculosis & diphtheria.

**4. Accidents & poisoning-** In the developed world, accidents & poisoning have

become a relatively more important child health problem. Accidents among children are frequent in the developing countries also, especially burns, trauma, poisoning as a result of home accidents to in increasing degree ,drowning, traffic accidents.

**5. Behavioral problem**-Behavioral disturbances are notable child health problem, the importance of which is increasing recognized in most countries.

The international union for child welfare has estimated that there are 1.5 million such children in India alone.

**Indicators of Mch Care.**

1. Maternal mortality rate-
2. Mortality in infancy & childhood-
   a. Perinatal mortality rate
   b. Neonatal mortality rate
   c. Post-neonatal mortality rate
   d. Infant mortality rate
   e. 1-4 year mortality rate
   f. Under 5 mortality rate
   g. Child survival rate

**Maternal Mortality Rate**

$$= \frac{\text{Total no. of female death due to complication of Pregnancy, childbirth or within 42 days of delivery from "puerperal causes" in an area during a given year}}{\text{Total no. of live births in the same area and year}} \times 1000$$

**Perinatal Mortality Rate**

$$= \frac{\text{Late foetal death (28 weeks gestation \& more) + early neonatal deaths (first week) in one year}}{\text{Live birth in the same year}} \times 1000$$

**Neonatal Mortality Rate**

$$= \frac{\text{Number of death of children under 28 days of age in year}}{\text{Live birth in the same year}} \times 1000$$

# CHAPTER 21 Preventive Geriatrics - Problems of Elderly, Prevention and Control Measures

Aging is a natural process. In the words of Seneca "Old age is an incurable disease", but more recently Sir James sterling Ross commented "You do not heal old age You protect it You promote it You extend it".

Ageing is a natural, inevitable, irreversible, always progressive, biological phenomenon and associated with decline mental functions. No one knows when it is going to begin, but it is said that nobody grow old nearly for certain number of years. Ageing occurs at different levels like social, behavioral, physiological, morphological, cellular, and molecular.

Systemic problems and disabilities are common in old age due to structural and functional changes of body and these are multi factorial in nature. This health problem directly have impact on quality of life.

In year 2002 estimated 605 million old person in the world. By 2025 the number of elderly people is expected to rise more than 1.2 billion.

Ayurveda (>1500 BC) - the ancient Indian system of medicine has mentioned about the eight branches (Ashtanga Ayurveda) of Ayurveda viz

1. Kayachikitsa (General Medicine),
2. Balaroga (Paediatrics),
3. Grahachikitsa (treatment of diseases related to Psychology),
4. Urdhvangachikitsa (treatment of the diseases of the Head and neck, ENT),
5. Shalyatantra (Surgery),
6. Damshtra (treatment of poisonous stings and bites),
7. Jara/Rasayana (Geriatrics) and
8. Vajikarana (Andrology).

Geriatrics was first mentioned in Ayurveda. The term 'Geria' is very close to the Sanskrit word "Jara".

Rasayana is defined as :

"रसायनचततजनीयतयतजरव्याधीनाशनम"।

Means Rasayana is a branch of medicine which deals with the prevention of premature ageing, management of diseases and especially the management of diseases related to Old age.

Geriatrics or geriatric medicine is a sub-specialty of internal medicine & family medicine that to promote health by elderly people. It aims to promote health by preventing & treating diseases & disabilities in older adults.

The term Geriatrics was coined in the U.S.A. by Dr. Ignatz Nascher in 1909.

**Definition**-Geriatrics- a branch of medicine dealing exclusively with the problem of ageing & the diseases of the elderly. It derived from the Greek Root "ger-gero-geronto" meaning "old age" or "the aged".

Geratology/ gereology- the science dealing with old age.

Gerontologist= a person who treats problem related to ageing.

Paribhasha-

Jara- derived from the root जृषवयोहानौ explained as ''वयः कृतश्लथमासंद्यवस्था-विशेष''

Meaning loosening of muscle & other tissues under the influence of ageing. (Vachaspatya)

**Synonyms of Jara-**

स्थाविरम, विस्त्रसा, वृद्धः, प्रवयः, स्थविर, जीन, जीर्ण, जरनः, जरित.

According to Charaka, Vaya classified as Bala, Madhyama and Jeerna .

According to Sushruta-

Bala-upto 16 years.

a) Ksirapa-upto 1 year

b) Khsiraannada-2 years

c) Annada-2-16 years

Madhya vaya-16-70 years.

Vridhi-up to 20 years

Yavana - 21-30 years

Sampurna - 31-40 years

Hani - 41-70 years.

Vridha - 71-100 years

According to WHO old age classified in

Young old - between the ages of 60-75years



Old- old- between the ages 75-85 years

Very old- age of 86 years & above

All the Acharya have considered the Jara at the age of 60/70 years. According to modern Science, considered the old age at 60 years onwards.

**Ageing process**-Ageing is the progressive and generalized impairment of functions resulting in the loss of adaptive response to stress and in increasing the risk of age related diseases. The overall effect of these alterations is an increase in the probability of dying, which is evident from the rise in age-specific death rates.

**Aging is two types-**

1. **Natural aging (Kalaja Jara)**- which occurs at or after the proper age i.e. 60 years even after following daily & seasonal routines explained in Swasthavritta & use of Shodhana at proper time . Appearance of sign & symptoms of aging at a particular scheduled age is considered as Kalaja Jara (normal aging). It is that which progress slowly, it is not curable &consider to be Yapya with treatment like Rasayana.

**Factors responsible for Kalaja Jara (normal aging)-**

1. Swabhava (natural factors)
2. Kala (time factor)
3. Vata
4. Shareera Vruddhukara Bhava- Abhava (kala yoga, Swabhava Samsiddhi, Ahara Sousthava, Avighata )

Jara is a Swabhava Bala Pravritta Vyadhi.

**2. Premature aging (Akalaja Jara)**- occurs before the age of 60 & due to improper health care measures. Akalaja means 'AsamayeJata' i.e. one which occurs untimely. Hence the sign & symptom of aging prior to schedule age is considered as Akalaja Jara (premature / unschedule aging) It is curable with Rasayana drugs according to Dosha& stage of aging.

**Theories of aging-**

1. Master clock theory- on of the oldest. Theories & no longer has high credibility. It posits that aging is under direct genetic control. It suggests that the rate of aging within each species has developed for the good of each species.
2. Intoxication theory- proposed by T.H. montgomery, an eminent zoologist as metabolic waste products of toxic nature accumulate in the tissues through faulty excretory process to effect a true intoxication & aging of the organism. Some pathologist has considered what is known as 'brown pigment' in cellular components as the sign of aging.

3. Ruber theory- 1908 he presented evidence linking metabolic rate & aging. He postulated that life is a chemical chain reaction, the duration of which is dependent upon the concentration of the reactants & the rate of reaction. Physiological signs of aging are gradual deterioration in function & capacity to respond to environment stress. Metabolism slows, as does the ability to maintain a constant internal environment in response to change in temp. Diet & oxygen supply. Net decreases of cell in the body & to the dysfunction of cell that remain. The completion of the reaction results in death.
4. Rate of living theory-proposed by Pearls in 1928 & is closely related to Ruber'stheory. His theory is based on the concept that the duration of life varies inversely with the rate of energy expenditure.
5. Somatic mutation theory- Dr. Leo Szilard in 1959. According to him, genetic mutations of DNA accumulate with time, ultimate resulting in miscopying & functional failure. But this theory was not accepted as much research who investigated exhaustively indicated that somatic mutation is not involved in aging process.
6. The error catastrophe theory-proposed by Dr. Leslie Orgel in 1963 his hypothesis was that if an error was made in the Molecular copying processes that results in synthesis of a given protein, the faulty protein could then sets off a chain of flawed events which could result in an "Error Crisis" – a cascade of altered biochemical process that inpair cellular functioning, such as that which occur in aging.
7. Cross linkage theory- proposed in 1968 by Dr. Johan Bjorsten who stated that an alteration secured in structural protein which caused them to develop inter & intermolecular cross link with other protein. The progress of cross linking process is responsible for the change that occurs with aging & at one stage it halts leading to th e cessation of cellular function.
8. Glycation theory or loose cannon theory- proposed by Dr. A. Cerami who held the view that non enzymatic reactions of glucose& other reducing sugar with amino groups of protein & nucleic acids result in a series of events which alter protein &nucleic structure& function. The process continues as the age advances contributing to the stiffening & loss of elasticity that occur in aging tissues.
9. Neuro-endocrine theory or weak link theory- proposed by Professor Vladimir Dilman Russia in 1983. this theory states that aging is due to the losses of receptor sensitivity to feedback inhibition with time, resulting in a progressive shifting of homeostasis & alterations of hormone levels & there with time .
10. Free radical theory-one of the popular theories of aging was first proposed by Dr. Denham Harman in 1956. Aging results from an accumulation of changes caused by



reactions in the body initiated by highly reactive molecules known as "Free Radicals". The change induced by free radical are believed a major cause of aging, diseases development & death.

**Rasayana**

A/C Charaka "A procedure by which Rasadi Sapta Dhatuis sanctified in all respect through proper nourishment is known as Rasayana."

A/C Dalhana "A therapy through which the drugs prevents the senility, cures the diseases, preserve the youthful state & act as restorative."

A/C Bhavamishra " A therapy which stops or prevents the senility & cures the diseases is known as Rasayana."

**Types of Rasayana-**

According to mode of administration-

1. Kutipraveshila Rasayana
2. Vatatapika Rasayana

b) According to objective -

1. Kamya Rasayana (Prana, Medha, Shari)
2. Naimittika Rasayana (specific disease)
3. Ajasrika Rasayana (Satvika Ahara)

c) Special Rasayana drugs-

1. Medhya Rasayana
2. Achara Rasayana

d) According to effects-

1. Samshodhana Rasayana
2. Samshamana Rasayana

e) According to uses-

Shshruta Acharya Explains-

1. Sarvaopaghata Shamaneeya
2. Medhayusha Kameeya
3. Swabhava Vyadhi Pratishedhaneeya
4. Nivrutta Santapeeya

List of formulations indication in Jara-

**Choornakalpana-**

1. Amlakasaya Brahma Rasayana (A.H.)

2. Amalaki Rasayana (A.H.)
3. Asanadichoorna Rasayana (A.H.)
4. Ashwagandha Choorna (A.H.)
5. Bringarajadi Choorna (B.R.)
6. Prathama Triphala Rasayana (R.R.S.)
7. Drutiya Triphala Rasayana (R.R.S.)
8. Triteeya Triphala Rasayana (R.R.S.)

**Vati Kalpana-**

1. Vidangadiyoga(A.H.)

**Lavana Kalpana-**

1. Shshruta Narikela Prayoga(R.R.S.)

**Taila Kalpana-**

1. Tuvaraka Taila (A.H.)

**Lehya Kalpana-**

1. Prathama Bhramha Rasayana (Charaka)
2. Chavanaprasha (Charaka)
3. Chatur, Amalaka Rasayana (Charaka)
4. Dhatri Rasayana (A.H.)
5. Beeja Rasayana (A.H.)
6. Jaranashaka Vidangadi Rasayana (A.H.)
7. Swagata Jaranashaka Beejaka Rasayana (A.H.)
8. Haritaki Yoga (A.S.)
9. Triphala Yoga (A.S.)
10. Tushanyadi Yoga (A.S.)
11. Vruddhadaruka Rasayana (B.R.)

**Yogas-**

1. Indra Rasayana (Charaka)
2. Shilajeeta (AH.)
3. Swarana Makshika Yoga (A.S.)
4. Jaranashaka Makshika Yoga (A.S.)
5. Amrtarnava Rasa (B.R.)
6. Barhat Poorna Chandraodaya Rasa (B.R.)



7. Sarva Rogahara Rasayan (B.R.)
8. Mashika Rasayana (R.R.S.)
9. Pippaalyadi Rasayana (RRS)

**Other Yogas-**

1. Pathya Rasayana (C.D.)
2. Ashwaganda Rasayana (C.D.)
3. Jala Rasayana (C.D.)
4. Triphala Rasayana (Charaka)
5. Indrikta Rasayana (Charaka)
6. Varhikanda Yoga (A.H.)

**Health Problem of the Aged**

**1. Problem due to the aging process-** No one knows when old age begins. The "biological age" of a person is not identical with his "chronological age". Our knowledge about ageing process is incomplete. We do not know much about the disabilities incident to the aging process. Following are some of the disability considered as incidents.

a. Senile cataract
b. Glaucoma
c. Nerve deafness
d. Osteoporosis affecting mobility
e. Emphysema
f. Failure of special senses
g. Change in mental outlook.

**2. Problem associated with long term illness-** Certain chronic diseases are more frequent among the older people than younger people.

1. Degeneration diseases of heart & blood vessels
2. Cancer
3. Accidents
4. Diabetes
5. Diseases of locomotors system
6. Respiratory illnesses
7. Genitourinary system-

**3. Psychological problems-**

1. Mental changes- impaired memory, rigidity of outlook & dislike of change are some

of the mental change in the aged. Reduced income leads to fall in the living standard of elderly.

2. Sexual adjustment- between 40 & 50, there is cessation of reproduction by women & diminution of sexual activity on the part of men. During this phase physical & mental disturbance may occur.
3. Emotional disorder - emotional disorder result from social maladjustment. Failure to adapt can result in depression, weariness etc.

**Lifestyle & healthy aging**

By adopting a healthier lifestyle, the risk of a whole range of diseases can be reduced. These factors are-

1. Diet & nutrition –a good diet reduce the chance of developing the diseases of old age.
2. Exercise- it control the weight, improve emotional wellbeing, relives stress, improve blood circulation, increases flexibility, lower blood pressure, lower blood sugar level, improve bone density.
3. Weight- overweight & obesity have major problem worldwide. Obesity is an important factor in heart diseases, stroke, HTN, diabetes, arthritis, breast cancer.
4. Smoking-
5. Alcohol-
6. Social activity-

**Health status of aged in India**

The govt. of India announced a national policy on older person in January 1999. The program me for first time recognizes formation of self-help groups, association of older person for advancement of their right & utilization of their experience & services. 234 old age homes, 398 day care center & 40 mobile medical units are operational.

Indira Gandhi National Old Age Pension scheme was launched to provide monthly pension to people over 65 years & living below poverty line.

# CHAPTER 22 World Health Organization

It is a specialized, non-political health agency of untied nation with headquarters at Geneva.

**History-**

- During conference held at San Francisco WHO took its origin in April 1945.
- Constitution was drawn in International health conference at New York in 1946.
- Formal existence of WHO began on 7th April 1948.
- Every year 7th April is celebrated as World Health Day.

**Objectives-**

1. The attainment by all people of the highest level of health
2. Health for all 2000 A.D.

**Aims-**

1. Health is a state of complete physical, mental& social well being& not merely the absence of disease or infirmity.
2. Enjoyment of highest attainable standard of health by all without differentiation of race, religion, political belief, economic & social condition.
3. Health promotion & protection by state.
4. Healthy development of child is of basic importance.
5. Informed opinion & active co-operation on the part of the public care most important in improvement health of people.
6. Govt. has responsible for health of their people.

**Two important health policies -**

1. Alma Atta conference in 1978 on Primary Health Care.
2. Global strategy for Health for all by 2000.

Both WHO & UNICEF are striving towards the goal.

Eligibility for membership-

- Open to all countries.
- In 1996 WHO had 190 member states & 2 associate members.

**Functions of WHO-**

1. Act as directing coordinating authority on all international health works.
2. Permits WHO member states to identify collectively priority of health problem throughout the world.
3. Define collectively health policy & targets to cope with them.
4. Device strategies, principles & programmers.
5. For establishing promoting international standard in the field of health.

**Broad areas-**

1. Prevention & control of specific diseases.
2. Development of comprehensive health services throughout the world.
3. Family health improvement.
4. Environmental health monitoring & protection.
5. Regular updating of health statistics.
6. Support to biomedical research.
7. Publication of health literature & information.
8. Co-operation with other agencies.

**Structure of WHO-**

**Principle organs-**

1. World Health Assembly
2. Executive board
3. The secretariat

**World Health Assembly-**It is the supreme governing body of the organization and consists of delegates of the Member States, each of whom carries one vote. The Assembly meets every year in May, usually at Geneva. It may also hold meeting at other places. For example, the Fourteenth Assembly met in Delhi in 1961.

**Functions-**

1. To determine international health policy & program.
2. To review work of past year.
3. To approve budget needed for the following year.
4. To elect member states to designate a person to serve for executive boards & to replace retiring members.

**The Executive Board-**



- Initially 18 members were present. They are designated by member states & presently 32 members are present.
- Members are "technically qualified in field of health." they are designated by Govt. but do not represent govt.
- 1/3rd of members are replaced each year.
- Meeting is held twice in a year. Effective decision & policies of assembly.
- It has power to take measures during emergency like, epidemics, earth quakes, flood etc.

**The Secretariat-** Director General is the head & chief technical & administrative officer of WHO at Geneva.

**Function-** The WHO Secretariat is the administrative wing of the WHO headed by the Director-General. It comprises about 5000 international public servants working in 14divisions and13 programs listed below:

**Divisions**

1. Division of Epidemiological Surveillance and Health Situation and Trend Assessment
2. Division of Communicable Diseases
3. Division of Vector Biology and Control
4. Division of Environmental Health
5. Division of Public Information and Education for Health
6. Division of Mental Health
7. Division of Diagnostic, Therapeutic and Rehabilitative Technology
8. Division of Strengthening of Health Services
9. Division of Family Health
10. Division of Non-communicable Diseases
11. Division of Health Manpower Development
12. Division of Information Systems Support
13. Division of Personnel and General Services
14. Division of Budget and Finance.

**Programs**

1. Health and Biomedical Information Program
2. Malaria Action Program
3. Parasitic Diseases Program
4. Expanded Program on Immunization
5. Diarrheal Diseases Control Program

6. Program for External Coordination
7. Special Program for Research and Training in Tropical Diseases
8. Special Program of Research, Development and
9. Research Training in Human Reproduction Action Program on Essential Drugs
10. Special Program on AIDS
11. Pharmaceuticals
12. Health for All Strategy Coordination
13. Office of Research Promotion and Development.

The WHO Secretariat provides technical and managerial support to member states for planning and implementing their national health programs. Besides the Director-General, the Secretariat also has five assistant Director-Generals, under whom the variousdivisions listed above are placed. The first Director-General of WHO was Dr Brock Chisholm, a man of wide vision.

**Regions and Head Quarters and Regions**

| Sr. No. | Regions | Regional head quarters |
|---|---|---|
| 1 | South East Asia | New Delhi (India) |
| 2 | Africa | Harare (Zimbabwe) |
| 3 | America | Washington (USA) |
| 4 | Europe | Compenham(Denmark) |
| 5 | Eastern Mediterranean | Alexandria (Egypt) |
| 6 | Western Paciphic | Manila (Philippines) |
| 7 | Main head quarter | Geneva |

**Alma Atta Declaration**

- In 1978 International conference was held at Alma Atta. (USSR).
- A new approach to health care came into existence as a part of movement set world health assembly 1977 I.E. Health for all by 2000.
- Fundamental principle of HFA strategy is equality that is equal health status for people & countries with an equitable distribution of health resources.
- Alma Atta conference brought the concept of 'primary health care', especially to vast majority of rural people & urban poor without health care facility.
- It called all Governments to make national polices, strategies & plan of action to implement & sustain primary Health care as an integral part of national health system.

# CHAPTER 23 International Health Agencies - United Nations Agencies, Health Work of Bilateral Agencies

Health services in developing countries mostly reflect their own widely varying capacities. The international system plays an ancillary role, comprising four types of agency: multilateral, bilateral, nongovernmental, and other.

**Multiiateral Agencies**

The term multilateral means that funding comes from multiple governments (as well as from non-governmental sources) and is distributed to many different countries. The major multilateral organizations are all part of the United Nations.

1. The United Nations is made up of 192 countries from around the world. It is often called the UN.
2. It was set up in 1945, after the Second World War, as a way of bringing people together and to avoid further wars.
3. It started with 51 countries. The United Kingdom is one of the original members. Germany did not join until 1973.

**The UN has 4 main purposes-**

1. To keep peace throughout the world;
2. To develop friendly relations among nations;
3. To help nations work together to improve the lives of poor people, to conquer hunger, disease and illiteracy, and to encourage respect for each other's rights and freedoms;
4. To be a center for harmonizing the actions of nations to achieve these goals.

The World Health Organization (WHO) is the premier international health organization of the UN with its headquarters at Geneva. Technically it is an "intergovernmental agency related to the United Nations." WHO and other such intergovernmental agencies are "separate, autonomous organizations which, by special agreements, work with the UN and each other through the coordinating machinery of the Economic and Social Council." According to its constitution (1948) its principal goal is "the attainment by all peoples of the highest possible level of health."

WHO has three main divisions. The governing body - the World Health Assembly, meets once a year to approve the budget and decide on major matters of health policy.

All the 200 or so member nations send delegations. The World Health Assembly elects 31 member nations to designate health experts for the Executive Board, which meets twice a year and serves as the liaison between the Assembly and the Secretariat, which carries on the day-to-day work of the WHO. The Secretariat has a staff of about 4,500,with 30% of the employees at headquarters in Geneva, 30% in six regional field offices, and 40% in individual countries, either as country-wide WHO representatives or as representatives of special WHO programs.

**World Bank**

The **World Bank** (International Bank for Reconstruction and Development) was established in 1944 to raise the standard of living in the less developed countries. It gives loan for projects that are aimed at economic growth. Its projects are diverse, including electricity, transport, water supply, agriculture, health, welfare and population control. The World Bank is owned by 183 member countries. The World Bank group is the world's largest source of development assistance. It works in more than 100 developing countries with its primary focus of helping the poorest people in the poorest countries. The Bank provides nearly 16 billion US dollars every year in loans to its client countries. Currently, in India, the World Bank is supporting the two largest programs in the health sector anywhere in the world. These are the National Program for Control of Blindness and the National AIDS Control Program.

The **United Nations Children's Fund (UNICEF)** is a United Nations Programme headquartered in New York City that provides long-term humanitarian and developmental assistance to children and mothers in developing countries. It is one of the members of the United Nations Development Group and its Executive Committee.

UNICEF was created by the United Nations General Assembly on December 11, 1946, to provide emergency food and healthcare to children in countries that had been devastated by World War II. In 1954, UNICEF became a permanent part of the United Nations System and its name was shortened from the original United Nations

International Children's Emergency Fund but it has continued to be known by the popular acronym based on this old name. UNICEF relies on contributions from governments and private donors. Governments contribute two thirds of the organization's resources; private groups and some 6 million individuals contribute the rest through the National Committees. It is estimated that 91.8% of their revenue is distributed to



Program Services. UNICEF's programs emphasize developing community level services to promote the health and well-being of children. UNICEF was awarded the Nobel Peace Prize in 1965 and the Prince of Asturias Award of Concord in 2006.

Most of UNICEF's work is in the field, with staff in over 190 countries and territories. More than 200 country offices carry out UNICEF's mission through a program developed with host governments. Seventeen regional offices provide technical assistance to country offices as needed.

The United Nations International Children's Emergency Fund was established by the UN in 1946 to provide help and relief to children in countries where the Second

World War had caused wide damage. In 1953, it was renamed as United Nations Children's Fund but the abbreviation UNICEF was retained.

**The UNICEF has the following offices :**

1. UNICEF Headquarter Office at New York
2. UNICEF Regional Office for Europe at Geneva
3. UNICEF Regional Office for Eastern and Southern Africa at Nairobi
4. UNICEF Regional Office for West and Central Africa at Abidjan
5. UNICEF Regional Office for the America and the Caribbean at Bogota
6. UNICEF Regional Office for East Asia and the Pacific at Bangkok
7. UNICEF Regional Office for the Middle East and North Africa at Amman
8. UNICEF Regional Office for South Asia at Kathmandu
9. UNICEF Regional Office for Central and Eastern Europe, Commonwealth of Independent States and Baltic States at Geneva
10. UNICEF Office for Japan at Tokyo.
11. India falls under the South Asia region along with Bangladesh, Bhutan, Pakistan, Afghanistan, Nepal, SriLanka and Maldives.

**Functions**

During its earlier years of functioning, the UNICEF worked in close collaboration with WHO and sponsored the BCG campaign, campaigns against VD and malaria, and the distribution of skimmed milk. Later, it started supporting in a big way the programs related to maternal and child health, nutrition, health education and environmental sanitation, including water supply. The recent tendency on the part of UNICEF is to give more emphasis on integrated maternal and child health programs. In India, the Integrated Child Development

Service (ICDS), has received substantial inputs from the UNICEF. The EPI (Expanded Program of Immunization) is also supported by the UNICEF. Primary Health

Care, ORT (management of diarrhoea through oral rehydration therapy) and promotion of breastfeeding are some of its other areas of interest. The UNICEF has also provided support for programs aimed at controlling goitre, anaemia and xerophthalmia.

The four areas of special emphasis by the UNICEF are child health, child nutrition, family and child welfare and education. The UNICEF has also played an important role in the field of water supply and sanitation. The UNICEF also proposes to play a more positive role in family planning.

**Food and Agriculture Organization (FAO)**

Formed in 1945 with Headquarters in Rome, its prime concern is the increased production of food to keep pace with the ever-growing world population.

The chief aims of FAO are :

1. To help nations raise living standards
2. To improve nutrition of the people of all countries
3. To increase the efficiency of farming, forestry and fisheries
4. To better the condition of rural people and, through all these means,
5. To widen the opportunity of all people for productive work.

The joint WHO/FAO expert committees have provided the basis for many cooperative activities-nutritional surveys, training courses, seminars and the coordination of research programmers on brucellosis and other zoo noses

The FAO is also linked to the World Food Program (WFP) and works in close collaboration with the WHO. The WHO and FAO have jointly sponsored a large number of expert committees on food and nutrition, the recommendations of which have been published as Technical Report Series of the WHO/FAO. The FAO also shares interest in control of brucellosis and other zoonoses.

Since 1994, FAO has undergone major restructuring. The reforms include increased emphasis on food security, increased use of experts from developing countries and broadened links with the private sector and nongovernmental organization.

**United Nation Development Programme (UNDP)**

The UNDP projects cover virtually every economic and social sector – agriculture, industry, education and science, health, social welfare, etc. The member countries – rich and poor-of the United Nations meet annually and submitting proposal to the UNDP.

**Focused areas :**

1. Poverty Reduction & Millennium Development Goals
2. Democratic Governance
3. Environment & Energy for sustain development
4. Crisis Prevention & Recovery



**Functions - UNDP**

1. UNDP is at the center of the UN's efforts to reduce global poverty.
2. Chairs the United Nations Development Group (UNDG), which includes the UN'skey players in international development.
3. UNDP's network links and coordinates global and national efforts to achieve the Millennium Development Goals (MDGs),
4. At the country level, UNDP plays two important roles, one as a partner for development work and the other as manager of the Resident Coordinator system.
5. UNDP helps developing countries attract and use aid effectively.
6. It encourages the protection of human rights and the empowerment of women.
7. Coordinates the development activities of the United Nations.
8. Plays a key role in helping to reform the UN as part of the United Nation Development Group (UNDG).

**The United Nations Fund for Population Activities (UNFPA)**

The United Nations Fund for Population Activities carries out programs in over 130 countries and territories. The Fund's aims are to build up capacity to respond to the needs in population and family planning. UNFPA began operations in 1869. UNFPA has three main program areas: Reproductive Health including Family Planning and Sexual Health; Population and Development strategies and Advocacy.

1. Providing assistance to India since 1974.
2. Funding national level schemes, area projects for intensive development of health and family welfare infrastructure and improvement in the availability of services in the rural areas
3. To develop national capability for the manufacture of contraceptives,
4. To develop population education programmers,
5. To undertake organized sector projects,
6. To strengthen programme management as well as to improve output of grass –root level health workers and
7. Introduction of innovative approaches to family planning and MCH care

**International Labor Organization (ILO)**

Soon after the First World War, it was recognized that problems of industry, like

disease, know no frontiers. In 1919, ILO was established as an affiliate of the League of Nations to improve the working and living conditions of the working population all over the world. The headquarters of ILO is in Geneva, Switzerland.

The purposes of ILO are:

1. To contribute to the establishment of lasting peace by promoting social justice
2. To improve, through international action, labor conditions, and living standards
3. To promote economic and social stability.

ILO is the only tripartite U.N. agency with government, employer, and worker representatives. This tripartite structure makes forum in which the governments and the social partners of the economy of its 183 Member States. They can freely and openly debate and elaborate labour standards and policies.

### United Nations Educational, Scientific and Cultural Organization (UNESCO)

The United Nations Educational, Scientific and Cultural Organization was formed in 1945 and currently has 188 members. The main objective of UNESCO is to contribute to peace and security in the world by promoting collaboration among nations through education, science, culture and communication. In 2000 AD, its budget was 400 million US Dollars. UNESCO publishes the World Education Report annually.

### United Nations High Commission for Refugees (UNHCR)

The United Nations High Commission for Refugees was established in 1950 to provide protection and assistance to refugees. Refugees are legally defined as people who are outside their countries of origin because of a well founded fear of persecution based on their race, religion, nationality, political opinion or membership in a particular social group, and who cannot or do not want to return home. As a humanitarian non-political organization, UNHCR has two basic aims to protect refugees and to seek ways to help them restart their live-in a normal environment. In addition to refugees, there are an estimated 20 to 25 million internally displace persons, i.e. people who have fled their homes generally during a civil wat, but have stayed in their home countries. UNHCR also helps these internally displace persons. Health care is also an integral part of such operations of UNHCR.

### United Nations Industrial Development Organization (UNIDO)

The United Nations Industrial Development Organization helps developing countries in their fight against marginalization in today's globalized world. UNIDO was set up in 1966 and became a specialized agency of the United Nations in 1985.

### UNAIDS

UNAIDS is a joint United Nations Program on HIV/AIDS. The partners in this joint program include UNICEF, UNDP, UNFPA, UNDCP, UNESCO, WHO and the World Bank. Specific global targets addressing an expanded response to the HIV/AIDS epidemic are the main activity of the organization. The Inter country Office for the South Asia Region is based at New Delhi.



### Bilateral Agencies

In addition to supporting multilateral agencies, most industrialized nations also provide aid on a "country-to-country" basis, attempting to match a recipient's needs with the donor's objectives and capacity to assist, usually subject to political considerations. Smaller donors are geographically selective; for example, Australia emphasizes its Western-Pacific neighbors. Others emphasize their expertise; for example, the Netherlands supports water technologies. Some follow historical links; for example, France emphasizes its former colonies. Some both receive and donate international aid, for example, Cuba, and China. The United States links aid to democratic reforms and human rights, although restricting support for reproductive rights since 2001.Bilateral agencies functioning in India are USAID for malaria eradication, Family planning & Education; SIDA for RNTCP, DANIDA for NBCP.

### Colombo Plan

This was conceived at a meeting of Common wealth Foreign Ministers in Colombo in 1950. It consists of a group of 20 developing countries in South and South East Asia and 6 developed countries (USA, UK, Canada, Australia, New Zealand and Japan). The assistance to member countries is mainly aimed at agricultural and industrial development. Some funds are earmarked for health also. Health activities in India related to Colombo Plan have included supply of cobalt therapy units by Canada and establishment of the All India Institute of Medical Sciences at New Delhi through financial assistance from New Zealand. Many fellowships for training of health personnel have also been provided from time to time.

### United States Agency For International Development (USAID)

The United States Agency for International Development, established in 1961, provides assistance to a large number of countries in the world. It has supported several health programs in India, including control of malaria and other communicable diseases, water supply and sanitation, family planning, nutrition and medical and nursing education. Prior to establishment of USAID, the US assistance was channelled through the Technical Cooperation Mission.

Two other US agencies providing assistance are :

1. Public Law 480 (Food for Peace) Program

2. US Export Import Bank.

**USAID** is currently providing massive assistance to AIDS/HIV control in India. The APAC Project in Tamil Nadu and the AVERT project in Maharashtra are funded by USAID through the National AIDS Control Organization.

### DANIDA

Danish International Development Assistance is funded by the Government of Denmark. It has supported many major activities in India in relation to health and education. DANIDA is currently supporting three major health programs in India—DANLEP (Danida Assisted National Leprosy Eradication Program) was launched in 4 districts in three State of Madhya Pradesh, Orissa and Tamil Nadu in 1986. DANLEPs multipronged strategy consists of infrastructural support, health education, human resource development, program monitoring and prevention and care of deformities; DANPCB (Danida Assisted National Program for Control of Blindness) which was initiated in 1978. It is currently in the third phase of extension. In the first phase primary health centre infrastructure strengthening was the objective while in the second phase human resource development and decentralization by setting up District Blindness Control Societies was the major input. The third phase is continuing the gains of the earlier two phases and it is proposed to set up a National Eye Care Resource Cant RE through this assistance; DANTB (Danida Assisted Revised National Tuberculosis Control Program) was initiated in 1996.

Phase I end in 2001 but DANIDA has already committed to support a second phase for a further period of five years.

### DFID

The Department for International Development is the organization channelizing British government assistance. The main objective of DFID is the global effort to eliminate world poverty in the 21st century. These targets include halving the proportion of people living in extreme poverty by 2015. The other objectives of DFID include achieving universal primary education by2015, making progress towards gender equality and empowering women by eliminating disparities in primary and secondary education by 2005, reducing infants and child mortality rates by two-thirds by 2015, reduce maternal mortality ratios by 3/4th by 2015 and implement national strategies for sustainable development by 2005. DFID activities are focused in4 States in India—Madhya Pradesh, Andhra Pradesh, Orissa and West Bengal. In the health sector DFID is supporting reproductive health services, control of HIV/AIDS, tuberculosis control, community eye care and polio eradication.

Other bilateral government agencies active in India are the Swedish, Canadian, and Norwegian Agencies for International Development.



**International Nongovernmental Organizations (NGOs)** are increasingly active in development work as the inadequacies of bilateral and multilateral responses become more apparent. Sometimes known as "people to people" aid, their activities are mostly specific, for example, targeting trachoma, and cataract, while some are general, for example, aid for orphans. Supported mainly by voluntary subscriptions or donations, some NGOs also act under contract to governments or other agencies.

The largest NGO is the International Red Cross and Red Crescent movement, which has national counterparts within most countries. It is mandated under the Geneva Conventions to assist prisoners and civilians in armed conflicts, including visiting detainees and enabling them to communicate with the outside world, setting up surgical hospitals and emergency teams, rehabilitation of war-disabled persons, and providing independent information on prisoners and war victims.

Other well-known international NGOs are Oxford Famine Relief (OXFAM), CARE International, Save the Children International Alliance, and World Vision. Medecins Sans Frontieres (MSF, Doctors without Borders) was recently awarded the Nobel Peace prize (1999). Founded in France in 1971, MSF provides health aid to war victims, and assists in other health disasters and development initiatives.

# CHAPTER 24 National Health Policy

Policy is a system, which provides the logical framework and rationality of decision making for the achievement of intended objectives.

- It is the statement that guide and provide discretion within limited boundaries.
- Policy sets priorities and guide resources allocations. Public health policy improves conditions under which people live: Secure, safe, adequate and sustainable livelihood
- Lifestyle and environments, including housing.
- Education, nutrition, childcare, reproduction health.
- Transportation, information and communication, necessary community and personal social and health services.
- Policy adequacy may be measured by its impact on population health.

First formal NHP was formulated in 1983 and since then there have been marked changes in the determinant factors relating to the health sector.

**Objective-**

1. To achieve an acceptable standard of good health amongst the general population of the country.
2. To increase access to the decentralizing public health system by establishing new infrastructure in deficient areas and, by upgrading the infrastructure in existing institutions.
3. To ensuring a more equitable access to health services across the social and geographical expanse of the country.
4. To enhance the contribution of the private sector in providing health service for the population group which can afford to pay for services.
5. To increase the aggregate public health investment through a substantially increased by the central government.
6. To strengthen the capacity of the public health administration at the state level to render effective service delivery.
7. To rationalize use of drugs within the allopathic system.
8. To increase access to tried and tested systems of traditional Medicine.





Goals to be Achieved by 2000-2015-

2003-Enactment of legislation for regulating minimum standard in clinical Establishment / Medical institution

2005-

- Eradication of Polio & Yaws
- Elimination Leprosy
- Increase State Sector health spending from 5.5% to 7% to of the budget.
- Establishment of an integrated system of surveillance, National Health Accounts and Health Statistics
- 1% of the total budget for Medical Research
- Decentralization of implementation of public health program

2007- Achieve of Zero level growth of HIV/AIDS

2010-

- Elimination of Kala-Azar
- Reduction of mortality by 50% on account of Tuberculosis, Malaria, Other vector & water borne Diseases
- Reduce prevalence of Blindness to 0.5%
- Reduction of IMR to 30/1000 live births &MMR to100/ Lakh live births
- Increase utilization of public health facilities from current level of <20% to > 75%
- Increase health expenditure by government from the existing 0.9% to 2.0% of GDP
- Increase share of Central grants to constitute at least 25% of total health spending
- Further increase of State sector Health spending from 7% to 8%
- 2% of the total health budget for medical Research
- 2015- Elimination lymphatic Filariasis.

# CHAPTER 25 Health Statistics

Health and medical statistics incorporate a variety of data types. The most common statistics reported are vital (birth, death, marriage, divorce rates), morbidity (incidence of disease in a population) and mortality (the number of people who die of a certain disease compared with the total number of people). Other common statistical data reported are health care costs, the demographic distribution of disease based on geographic, ethnic, and gender variables, and data on the socioeconomic status and education of health care professionals.

**Sources-**

1. Experiments performed in the laboratory or in the wards
2. Surveys and epidemiological investigation carried out by trained teams in the field to investigate health problems
3. Records like birth and death registers and other medical records in hospitals.

**Uses-**

1. To define normalcy
2. To test whether the difference between two populations, regarding a particular attribute, is real or a chance occurrence
3. To study the correlation or association between two or more attributes in the same populations
4. To evaluate the efficacy of vaccines, sera, etc. by control studies
5. To locate, define and measure the extent of morbidity and mortality in the community
6. To evaluate the achievements of public health programs
7. To fix priorities in public health programs.

## Data Collection

While deciding about the method of data collection to be used for the study, the researcher should keep in mind two types of data viz., primary and secondary.

The primary data are those which are collected afresh and for the first time, and thus happen to be original in character.

The secondary data, on the other hand, are those which have already been collected by someone else and which have already been passed through the statistical process.





The methods of collecting primary and secondary data differ since primary data are to be originally collected, while in case of secondary data the nature of data collection work is merely that of compilation. Describe the different methods of data collection, with the pros and cons of each method.

## Collection of Primary Data

Collect primary data during the course of doing experiments in an experimental research but in case we do research of the descriptive type and perform surveys, whether sample surveys or census surveys, then we can obtain primary data either through observation or through direct communication with respondents in one form or another or through personal interviews.

Several methods of collecting primary data, particularly in surveys and descriptive researches. Important ones are:

(i) Observation method, (ii) interview method, (iii) through questionnaires, (iv) through schedules, and (v) other methods which include (a) warranty cards; (b) distributor audits; (c) pantry audits; (d) consumer panels; (e) using mechanical devices; (f) through projective techniques; (g) depth interviews, and (h) content analysis.

**Observation Method-**The observation method is the most commonly used method especially in studies relating to behavioral sciences. In a way we all observe things around us, but this sort of observation is not scientific observation. Observation becomes a scientific tool and the method of data collection for the researcher, when it serves a formulated research purpose, is systematically planned and recorded and is subjected to checks and controls on validity and reliability.

**Interview Method-**The interview method of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses. This method can be used through personal interviews and, if possible, through telephone interviews.

**(a) Personal interviews:** Personal interview method requires a person known as the interviewer asking questions generally in a face-to-face contact to the other person or persons.

The chief merits of the interview method are as follows:

1. More information and that too in greater depth can be obtained.
2. Interviewer by his own skill can overcome the resistance, if any, of the respondents; the interview method can be made to yield an almost perfect sample of the general population.
3. There is greater flexibility under this method as the opportunity to restructure questions is always there, especially in case of unstructured interviews.

4. Observation method can as well be applied to recording verbal answers to various questions.
5. Personal information can as well be obtained easily under this method.
6. Samples can be controlled more effectively as there arises no difficulty of the missing returns; non-response generally remains very low.
7. The interviewer can usually control which person(s) will answer the questions. This is not possible in mailed questionnaire approach. If so desired, group discussions may also be held.
8. The interviewer may catch the informant off-guard and thus may secure the most spontaneous reactions than would be the case if mailed questionnaire is used.
9. The language of the interview can be adopted to the ability or educational level of the person interviewed and as such misinterpretations concerning questions can be avoided.
10. The interviewer can collect supplementary information about the respondent's personal characteristics and environment which is often of great value in interpreting results.

**Weaknesses of the Interview Method-**

1. It is a very expensive method, especially when large and widely spread geographical sample is taken.
2. There remains the possibility of the bias of interviewer as well as that of the respondent; there also remains the headache of supervision and control of interviewers.
3. Certain types of respondents such as important officials or executives or people in high income groups may not be easily approachable under this method and to that extent the data may prove inadequate.
4. This method is relatively more-time-consuming, especially when the sample is large and recalls upon the respondents are necessary.
5. The presence of the interviewer on the spot may over-stimulate the respondent, sometimes even to the extent that he may give imaginary information just to make the interview interesting.
6. Under the interview method the organization required for selecting, training and supervising the field-staff is more complex with formidable problems.
7. Interviewing at times may also introduce systematic errors.
8. Effective interview presupposes proper rapport with respondents that would facilitate free and frank responses. This is often a very difficult requirement.



**(b) Telephone interviews:** This method of collecting information consists in contacting respondents on telephone itself. It is not a very widely used method, but plays important part in industrial surveys, particularly in developed regions.

**Chief merits of such a system are:**

1. It is more flexible in comparison to mailing method.
2. It is faster than other methods i.e., a quick way of obtaining information.
3. It is cheaper than personal interviewing method; here the cost per response is relatively low.
4. Recall is easy; callbacks are simple and economical.
5. There is a higher rate of response than what we have in mailing method; the non-response is generally very low.
6. Replies can be recorded without causing embarrassment to respondents.
7. Interviewer can explain requirements more easily.
8. At times, access can be gained to respondents who otherwise cannot be contacted for one reason or the other.
9. No field staff is required.
10. Representative and wider distribution of sample is possible

**Demerits-**

1. Little time is given to respondents for considered answers; interview period is not likely to exceed five minutes in most cases.
2. Surveys are restricted to respondents who have telephone facilities.
3. Extensive geographical coverage may get restricted by cost considerations.
4. It is not suitable for intensive surveys where comprehensive answers are required to various questions.
5. Possibility of the bias of the interviewer is relatively more.
6. Questions have to be short and to the point; probes are difficult to handle

**Collection of Data through Questionnaires-** This method of data collection is quite popular, particularly in case of big enquiries. It is being adopted by private individuals, research workers, private and public organizations and even by governments.

In this method a questionnaire is sent (usually by post) to the persons concerned with a request to answer the questions and return the questionnaire. A questionnaire consists of a number of questions printed or typed in a definite order on a form or set of forms.

The questionnaire is mailed to respondents who are expected to read and understand the questions and write down the reply in the space meant for the purpose in the

questionnaire itself. The respondents have to answer the questions on their own.

The method of collecting data by mailing the questionnaires to respondents is most extensively employed in various economic and business surveys. The merits claimed on behalf of this method area follow:

1. There is low cost even when the universe is large and is widely spread geographically.
2. It is free from the bias of the interviewer; answers are in respondents' own words.
3. Respondents have adequate time to give well thought out answers.
4. Respondents, who are not easily approachable, can also be reached conveniently.
5. Large samples can be made use of and thus the results can be made more dependable and reliable.

**Collection of Data through Schedules-** This method of data collection is very much like the collection of data through questionnaire, with little difference which lies in the fact that schedules (proforma containing a set of questions) are being filled in by the enumerators who are specially appointed for the purpose.

### Some Other Methods of Data Collection

1. Warranty cards: Warranty cards are usually postal sized cards which are used by dealers of consumer durables to collect information regarding their products. The information sought is printed in the form of questions on the 'warranty cards' which is placed inside the package along with the product with a request to the consumer to fill in the card and post it back to the dealer.
2. Distributor or store audits: Distributor or store audits are performed by distributors as well as manufactures through their salesmen at regular intervals. Distributors get the retail stores audited through salesmen and use such information to estimate market size, market share, seasonal purchasing pattern and so on. The data are obtained in such audits not by questioning but by observation.
3. Pantry audits: Pantry audit technique is used to estimate consumption of the basket of goods at the consumer level. In this type of audit, the investigator collects an inventory of types, quantities and prices of commodities consumed. Thus in pantry audit data are recorded from the examination of consumer's pantry. The usual objective in a pantry audit is to find out what types of consumers buy certain products and certain brands, the assumption being that the contents of the pantry accurately portray consumer's preferences.
4. Consumer panels: An extension of the pantry audit approach on a regular basis is known as 'consumer panel', where a set of consumers are arranged to come to an understanding to maintain detailed daily records of their consumption and the same is made available to investigator on demands.

   In other words, a consumer panel is essentially a sample of consumers who are interviewed repeatedly over a period of time. Mostly consume panels are of two types viz., the transitory consumer panel and the continuing consumer panel.

   A transitory consumer panel is set up to measure the effect of a particular phenomenon. Usually such a panel is conducted on a before-and-after-basis. Initial interviews are conducted before the phenomenon takes place to record the attitude of the consumer.

   A continuing consumer panel is often set up for an indefinite period with a view to collect data on a particular aspect of consumer behavior over time, generally at periodic intervals or may be meant to serve as a general purpose panel for researchers on a variety of subjects. Such panels have been used in the area of consumer expenditure, public opinion and radio and TV listenership among others.
5. Use of mechanical devices: The use of mechanical devices has been widely made to collect information by way of indirect means. Eye camera, Pupil metric camera, Psycho galvanometer, Motion picture camera and Audiometer are the principal devices so far developed and commonly used by modern big business houses, mostly in the developed world for the purpose of collecting the required information.
6. Projective techniques: Projective techniques (or what are sometimes called as indirect interviewing techniques) for the collection of data have been developed by psychologists to use projections of respondents for inferring about underlying motives, urges, or intentions which are such that the respondent either resists to reveal them or is unable to figure out himself. In projective techniques the respondent in supplying information tends unconsciously to project his own attitudes or feelings on the subject under study. Projective techniques play an important role in motivational researches or in attitude surveys.

### Collection of Secondary Data

Secondary data means data that are already available i.e., they refer to the data which have already been collected and analyzed by someone else. When the researcher utilizes secondary data, then he has to look into various sources from where he can obtain them. In this case he is certainly not confronted with the problems that are usually associated with the collection of original data. Secondary data may either be published data or unpublished data. Usually published data are available in: (a) various publications of the central, state are local governments; (b) various publications of foreign governments or

of international bodies and their subsidiary organizations; (c) technical and trade journals; (d) books, magazines and newspapers; (e) reports and publications of various associations connected with business and industry, banks, stock exchanges, etc.; (f) reports prepared by research scholars, universities, economists, etc. in different fields; and (g) public records and statistics, historical documents, and other sources of published information.

**Presentation-**After the data been collected, it has to be sorted out and presented properly for analysis and interpretation. Presentation of data is an important stage in statistical study. Intelligent presentation makes the data more comprehensible. It aids the reader in quick understanding of complication data. There are two main methods of presentation

1. Tabulation
2. Drawing

**Tabulation-** When a mass of data has been assembled, it becomes necessary for the researcher to arrange the same in some kind of concise and logical order. This procedure is referred to as tabulation.

Tabulation is essential because of the following reasons.

1. It conserves space and reduces explanatory and descriptive statement to a minimum.
2. It facilitates the process of comparison.
3. It facilitates the summation of items and the detection of errors and omissions.
4. It provides a basis for various statistical computations.

Tabulation can be done by hand or by mechanical or electronic devices. The choice depends on the size and type of study, cost considerations, time pressures and the availability of tabulating machines or computers.

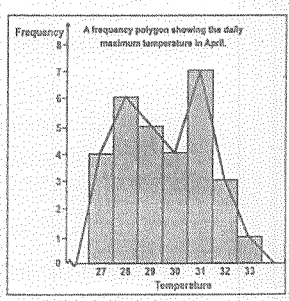
**Three types of tables in use:**

1. Master Table- In this table initial readings as per the designed proforma are serially recorded. When the number of observation is large and several attributes have to be studied, the master table is a must. For example, postgraduate medical students have to prepare a master table or master chart for presentation of their thesis data.
2. Simple Table- in this characteristic under observation is fixed and the number or frequency of events is small.
3. Frequency Distribution Table- This is most important table in statistical work. In a frequency table large, unsorted data is presented in a small manageable number of groups. It records how frequently a characteristic occurs in persons of the same group.



In qualitative data, the characteristic remains the same and frequency varies, while in quantitative data, both are variable. Frequency tables can be prepared using either type of data.

**Drawings-**




1. Histogram- It is a graphic presentation of a frequency distribution. The character of different group is indicated on the horizontal axis or abscissa, while frequency is indicated on the vertical axis or ordinate. The frequency of each group forms a column or rectangle. The heights of frequency rectangles vary and the area of rectangle represents the frequency. Such a diagram is called histogram and made use of in presenting quantitative data.
2. Frequency polygon- it is simply a derivation from the histogram obtained by joining the midpoints of various histogram blocks.
3. Frequency curve- when the number of observation is large, the polygon loses angulation and it becomes a frequency curve.

**Vital Statistics**

Vital statistics are conventionally numerical records of marriage births, sickness, and death by which the health and growth of community may be studied. Or it is a branch of biometry deals with data and law of human mortality, morbidity & demography.

**Purpose :** Community Health: To describe the level of community health, to diagnose community illness & to discover solutions to health problems.

**Administrative purpose :** It provides clues for administrative action to create administrative standards of health activities.

**Health programmed organization :** To determine success or failure of specific health programmed or undertake overall evaluation of public health work.

**Legislation purpose :** To promote health legislation at local, state & national level. Government Purpose: To develop, policies, procedure at state and central level.

**Uses:-**

1. To evaluate the impact of various National Health Programmes.
2. To plan for better future measures of disease control.
3. To explain the hereditary nature of the disease.

4. To plan and evaluate economic and social development.
5. It is a primary tool in research activities.
6. To determine the health status of individual.
7. To compare the health status of individual one nation with others.

**Sources of Vital Statistics:-**

1. Civil Registration System: It is defined as the continuous permanent and compulsory recording of the occurrence of vital events like live births, deaths, fetal deaths, marriages, divorces, as well as annulments, judicial separation, adoption. Civil registration is performed under a law and regulation so as to provide legal basis to the records and certificate made from system.
2. National Sample Survey: The data collected from the census are not very reliable and available only once in 10 years. In absence of reliable data from the civil registration system (SRS), the need for reliable statistics at national and state levels is being met through sample surveys launched from time to time.
3. Sample Registration System: In this system, there is continuous enumeration of births and deaths in a sample of villages/urban blocks by a resident part-time enumerator and then an independent six monthly retrospective survey by a full time supervisor.
4. Health Surveys: A few important sources for demographic data have emerged. These are National Family Health Surveys (NFHS) and the District Levels Household Surveys(DLHS) conducted for evaluation of reproductive and child health programmes. NFHS provide estimates of fertility, child mortality and a no. of fertility, child mortality and a no. of health parameters relating to infants and children at state level. The DLHS provide information at the district level on a no. of indicators relating to child health, reproductive health problems and quality of services availability to them.

**Live birth:** Live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles. Whether or not the umbilical cord has been cut or the placenta is, attached, each product of such a birth is considered live-born. It may be mentioned that under the Indian "Registration of Births and Deaths Act, 1969" birth includes both live birth and stillbirth.

**Fetal death:** Fetal death is death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy.



The death is indicated by the fact that, after such separation, the fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles.

**Stillbirth:** It is synonymous with late fetal death, i.e. twenty-eight completed wise of gestation.

**Immaturity (prematurity):** In international classification of disease, an immature infant is a live born infant with a birth weight of 2500 g (5.5 Ibs) or less. In some countries a live-born infant with a period of gestation less than 37 weeks is specified as 'premature' regardless of weight. Such premature infant may be considered as 'immature' in International Classification.

**Death:** "Death is the permanent disappearance of all evidence of life at any time after live birth has taken place" (postnatal cessation of vital functions without capability of resuscitation).

**Infant deaths:** Deaths under one year of age.

**Neonatal deaths:** Deaths occurring under 28 days of age.

**Perinatal deaths:** Deaths occurring after 28 weeks of fetal life and within 7 days after birth. It is often difficult to know the correct fetal age. In such situation, fetal weight of 1000 gm is considered to represent gestational age of 28 weeks, as suggested by the Ninth Revision (1975) of International Classification of Diseases. If both gestational age and birth weight are unknown, then a body length (crown to heel) of 35 cm is taken asequivalent to 28 weeks gestational age.

**Maternal deaths:** Deaths associated with complications of pregnancy, childbirth and puerperium.

$$\textbf{Crude Birth Rate} = \frac{\text{Birth Rates Number of live births which occurred in the population of a given geographical area during a given year}}{\text{Mid-year total population of the given geographic area during the same year}} \times 1000$$

**Morbidity rates**-Incidence: It means occurrence of new cases due to any particular disease, during a specified period of time such as week, month or year, usually a calendar year.

Prevalence: Includes both old and new cases that existed during the defined period.

Mortality rates- A death rate. There are a number of different types of mortality rates as, for examples, the following:

- The fetal mortality rate: The ratio of fetal deaths to the sum of the births (the live births + the fetal deaths) in that year.
- The infant mortality rate: The number of children dying under a year of age divided by the number of live births that year.
- The maternal mortality rate: The number of maternal deaths related to childbearing divided by the number of live births (or by the number of live births + fetal deaths) in that year.

**Fertility rates**-The definitions of various rates are given below. The respective values are given in age of fertility is generally taken as 15 to 49 years. However, some people prefer to regard the fertile period as 15 to 45 years.12

General fertility rate (GFR) : Number of live births per 1000 women in the reproductive age group (15-49 years) in a given year.

General marital fertility rate (GMFR) : Number of live births per 1000 married women in the reproductive age-group (15-49 years) in a given year.

Total fertility rate (TFR) - Average number of children that would be born to a woman if she experiences the current fertility pattern throughout her reproductive span (15-49 years).

Total marital fertility rate (TMFR): Average number of children that would be born to a married woman if she experiences the current fertility pattern throughout her reproductive span, i.e. 15 to 49 years. (The TFR serves an estimate of the average number of children per family).

Gross reproduction rate (GRR): - Average number of daughters that would be born to a woman if she experiences the current fertility pattern throughout her reproductive span (15-49 years).

Net production rate (NR): Average number of daughters that would be born to a woman if she experiences the current fertility and mortality patterns throughout her reproductive span (15-49 years).

Age-specific fertility rate: Number of live births in a year to 1000 women in any specified age group.

**Health Survey**- A health survey is basically a program for studying a population or a particular segment of a population in order to assess its health problems or to detect conditions to which preventive measures may be applied. A health survey has a much wider connotation compared to a morbidity survey.



Community health surveys should always be planned with the intent of carrying out an appropriate action program. Needless to say that a community which cooperates in a health survey legitimately expects some health benefits to accrue to its members. These could be limited to examination and referral or could also include provision of treatment facilities.

The National Family Health Surveys (NFHS) are nationwide surveys conducted with a representative sample of households throughout the country, under the Ministry of Health and Family Welfare, Government of India. The three NFHS surveys conducted to date are a major landmark in the development of a demographic and health data base for India. The NFHS surveys use standardized questionnaires, sample designs, and field procedures to collect data. The information provided by NFHS surveys assists policymakers and programme administrators in planning and implementing population, health, and nutrition programmes. The MOHFW designated the

International Institute for Population Sciences (IIPS), Mumbai, as the nodal agency for each of the three rounds of NFHS.

Each round of NFHS has had two specific goals: a) to provide essential state and national level data to monitor health and family welfare programmes and policies implemented by the Ministry of Health and Family Welfare and other ministries and agencies, and b) to provide information on important emerging health and family welfare issues.

Health surveys in Indian schools indicate that morbidity and mortality rates of children are among the highest in the world. Morbidity of school children has been studied in small surveys in Tamil Nadu.

# CHAPTER 26 Swasthya Prashasana (Health Administration)

The health system in India has three links

1. Central
2. State
3. District or Local

India is a union of 28 states and 7 union territories. The states are independent in matter relating to the delivery of health care to the people.

Each state has its own system of health care delivery. The central responsibility consists mainly of policy making, planning, guiding, assisting, evaluating and coordinating, the work of state health ministers. So that health services cover every part of country and no state lags behind for these services.

**At the Central**

**Official Organ**

- Union Ministry of Health and Family
- Director General of Health Services
- Central Council of Health and Family

**Union Ministry of Health and Family Welfare**

Union ministry of health and family welfare
↓
Headed by Cabinet Minister
↓
Minister of State

Deupty Health Minister
↓
Secretary of the Gov. of India (Executive head)
↓

Department of Family Welfare
↓
Secretary of the Gov. of India
↓





Joint Secretary
↓
Administrative staff
↓
Directorate general of health services
↓
Subordinate officer

Additional secretary
↓
Commissioner
↓
One joint secretary

**Function-**

| S.No. | Union list | Concurrent list |
|---|---|---|
| 1. | International health relations and administration of port quarantine | Prevention of extension of communicable diseases from one unit to another |
| 2. | Administration of central institutes | Prevention of adulteration of foodstuffs |
| 3. | Promotion of research through research centers | Control of drugs and poisons |
| 4. | Regulation and development of medical pharmaceutical, dental and nursing standards | Vital statistics |
| 5. | Establishment and maintenance of drug standards | Labour welfare |
| 6. | Census and collection and publication of other statistical data | Ports other than major |
| 7. | Immigration and emigration | Economic and social planning |
| 8. | Regulation of labour in the working of mines and oil fields | Population control and family planning. |
| 9. | Coordination with States and with other ministries for promotion of health. | |

**Directorate general of health services** – Principal advisor in both medical and public health matter.

DGIIS
↓
Additional Director General of Health Services
↓
Team of Deputies

↓

Administrative Staff

↓

Directorates-Three main units

| Medical care and Hospital | Public Health Administration | General |
|---|---|---|

**Function of DGHS**

**General-** survey, planning, co-ordination, programming, and improvement of all health in the country.

**Specific-**

1. International health relations
2. Control of drug standard.
3. To run the medical store depot.
4. Post graduate training in national institutions.
5. Education of some medical colleges
6. Medical research
7. Central government health scheme
8. National health programme
9. Central health education bureau
10. Health intelligence
11. National medical library

Central council of health-

Chairman – Union health minister

Members – State health ministers

**Function-**

1. To consider and recommend broad outlines of the health policy
2. To make proposals for legislation in fields of medical and public health.
3. To make recommendations to the central government regarding the health.
4. To established any organization with appropriate functions for promoting and maintain cooperation between central and state health administrations.

## II- At the State Level

The state health administration was started in the year 1919.



The state list which become the responsibility of the state included

- Provision of medical care
- Preventive health services
- Piligrim within the state

**State ministry of health and family welfare-**

Headed - Cabinet minister and deputy minister. (Political head)

Responsibility - formulating policies

Monitoring the implementation of these policies and programmes.

**State health directorate and family welfare-**

Principle advisor in matters relating to medicine and public health

Assisted by joint director, regional joint director and assistant directors.

## III- At the District Level

Principal unit of administration in India.

District health organization - identifies and provide the needs of expanding rural health and family welfare programme. Within each district again, there are 6 types of administrative areas. No uniform model of district health organization.

1. Sub-divisions
2. Tehsils
3. Community development blocks
4. Municipalities and corporations
5. Village
6. Panchayats

Districts

↓

Urban — Sub-Division — Rural

↓

Taluka 200-600 Villages

Community Development Blacks-100 villages or 80000-1.2 laksh (Tehsildar)

↓

Villages-1 BDO (block) development officer)

↓

Panchayats

Corporation-more than 2 lakhs (Mayor)

↓

Municipal Boards - 10000-2 lakhs (Chairman)

↓

Town area committees-5000-10000 populations

**Panchayati Raj**-3 tier structure of rural local self-government in India, linking the village to the district.

1. Panchayat - at the village level
2. Panchayat Samiti- at the block level
3. Zilla Parishad- at the district level

**At the village level-**

1. **The Gram Sabha-** It is the assembly of all the adults of the village, which meets at least twice a year. The gram sabha considers proposals for taxation, discussion the annual programme and elects members of the gram Panchayat.
2. **The Gram Panchayat-** It is the executive organ of the Gram Sabha, and an agency for planning and development at the village level. Its strength varies from 15 to 30, and the population covered also varies from 5,000 to 15,000 or more. The member of the Panchayat holds office for a period of 3 to 4 years. Every panchayat has an elected president (Sarpanch or Sabhapati or Mukhiya), a vice president and a panchayat secretary. The powers and functions of the Panchayat secretary are very wide- they cover the entire field of civic administration, including sanitation and public health; and of social and economic development of the village.
3. **The Nyaya Panchayat-**

**At the block level-** The block consists of the about 100 villages and a population of about 80,000 to 1,20,000. The Panchayat Raj agency at the block level is the Panchayat Samiti/ Janpada Panchayat. The Panchayat samite consists of all Sarpanchas of the village panchayat in the block : MLAs, MPs residing in the block area, representatives of women, scheduled castes, scheduled tribes and cooperative societies. The block development officer(BOD) is the ex-officio secretary of the Panchayat Samiti.

**At the district level-** The Zilla Parishad is the agency of rural local self-government at the district level. The member of the Zila Parishad include all heads of the Panchayat samitis in the district MPs, MLAs of the district; representatives od scheduled castes, schedule tribes and women; and 2 persons of experience in administration, public life or rural development.

**Community health Centre's**

Established and maintained by the State Government under programme.

As per minimum norms, a CHC is required to be manned by four Medical Specialists i.e. Surgeon, Physician, Gynecologist and Pediatrician supported by 21 paramedical and other staff.



It has 30 in-door beds with one OT, X-ray, Labour Room and Laboratory facilities.

It serves as a referral centre for 4 PHCs and also provides facilities for obstetric care and specialist consultations.

As on March, 2011, there are 4,809 CHCs functioning in the country.

**Primary health Centre's**

First contact point between village community and the Medical Officer.

To provide an integrated curative and preventive health care with emphasis on preventive and promotive aspects of health care.

Established and maintained by the State Governments under the Programme.

Manned by a Medical Officer supported by 14 paramedical and other staff.

NRHM - two additional Staff Nurses at PHCs (contractual).

It acts as a referral unit for 6 Sub Centre's and has 4 - 6 beds for patients.

There were 23,887 PHCs functioning in the country as on March 2011.

**Sub-Centre**

Most peripheral and first contact point between the primary health care system and the community.

Manned by at least one ANM / Female Health Worker and one Male Health Worker.

Under NRHM, one additional second ANM on contract basis.

Provide services in relation to maternal and child health, family welfare, nutrition, immunization and control of communicable diseases.

Provided with basic drugs for minor ailments.

Ministry of Health & Family Welfare are providing 100% Central assistance to all the Sub-Centre's. 148,124 Sub Centre's functioning in the country as on March 2011.

**Village**

Accredited Social Health Activist (ASHA) for 1000 population

Chosen by and accountable to the panchayat.

Act as the interface between the community and the public health system.

Facilitate preparation and implementation of the Village Health Plan

The other persons are

- Dais
- Anganwadi workers

**AYUSH**

Old acceptance in the communities in India.

Form the first line of treatment in case of common ailments in most of the places

Ayurveda is the most ancient medical system with an impressive record of safety and efficacy.

Mainstreaming AYUSH to strengthen the Public Health System at all levels.

AYUSH facilities had been co-located with 208 District Hospitals (36%), 910 Community Health Centers (23%) and 3883 Primary Health Centers in the country.

# CHAPTER 27 National Health Programmes

India became independent, several measure have been undertaken by the national government to improve the health of the people.

Prominent among these measures are national health progremmes, which have been launched by central government for control/eradication of communicable diseases, improvement of environmental sanitation, the standard of nutrition, control of population & improving rural health.

1919- Montague- Chelmsford reforms
1946- Health Survey and Development Committee (Bhore Committee)
1950- Constitution of India
1951- The Five Year Plans
2002- National Health policy
2002- 2007- Tenth Five year plan
2007- 2012- Eleventh Five year plan

**Classification of National Health Programmes**

1. Programmes related to provision of health care
2. Programmes aimed at controlling communicable diseases
3. Programmes aimed at controlling non- communicable diseases
4. Programmes related to Maternal and Child Health and Special Groups
5. National Nutritional Programmes
6. National Emergency Preparedness Plan
7. Programmes related to Environmental Sanitation
8. Poverty Alleviation Programmes
9. Minimum Needs Programme(Basic Minimum Service Programme)

**Programmes for Communicable Diseases**

1. National Vector Borne Diseases Control Programme (NVBDCP)
2. Revised National Tuberculosis Control Programme
3. National Leprosy Eradication Programme
4. National AIDS Control Programme

5. Universal Immunization Programme
6. National Guinea worm Eradication Programme
7. Yaws Control Programme
8. Integrated Disease Surveillance Programme

**Programmes for Non Communicable Diseases**

1. National Cancer Control Program
2. National Mental Health Program
3. National Diabetes Control Program
4. National Program for Control and treatment of Occupational Diseases
5. National Program for Control of Blindness
6. National program for control of diabetes, cardiovascular disease and stroke
7. National program for prevention and control of deafness

**National Nutritional Programs**

1. Integrated Child Development Services Scheme
2. Midday Meal Programme(MDMP)-school lunch programme.
3. Special Nutrition Programme (SNP)
4. National Nutritional Anemia Prophylaxis Programme
5. National Iodine Deficiency Disorders Control Programme
6. Vitamin A prophylaxis programme
7. Balwadi nutrition programme.
8. Mid- day meal scheme (national programme of nutrition support to primary education)

**Programs related to System Strengthening /Welfare**

1. National Rural Health Mission
2. Reproductive and Child Health Programme
3. National Water supply & Sanitation Programme
4. 20 Points Programme

**Programmes for Communicable Diseases :** Communicable diseases- an illness due to specific infectious agent or its toxic products capable of being directly or indirectly transmitted from man to man, animal to animal, or from the environment (through air, dust, soil, water, food, etc.) to man or animal.



## Revised National Tuberculosis Control Program (RNTCP)

**Global Burden of Disease**-In 2008 an estimated 9.4 million incident cases of TB globally with 11.1 million prevalent cases with 5.7 million notified cases of TB. 1.4 million cases of HIV associated with TB; and 1.8 million deaths including 0.52 million deaths in HIV +ve patients. Using DOTS 36 million patients were cured between 1995-2008.

**Burden of Disease - India**

- Yearly 1.8 million persons (5000/day) develop TB out of which 0.8 million are new smear +ve cases and 0.13 million cases of multi drug resistance.
- Mortality of 0.32 million cases each year
- Annual risk of being infected with TB is 1.5% and once infected 10% life time risk of developing TB
- 2 out of every 5 Indians are infected with TB bacillus and patients with PTB can infect 10-15 persons in a year
- 5% of TB patients are HIV +ve
- Direct and indirect cost of TB to India amount to Rs. 13,000 crore per year (US$ 3 billion)

"Tuberculosis is defined as an infectious disease caused by a bacterium; that most commonly affects the lungs." Currently, it kills "three million people" a year and could claim up to 30 million lives if not controlled.

Mycobacterium tuberculosis as causative agent for tuberculosis.

TB germs are passed through the air when a person, who is sick with TB disease coughs, sings, sneezes, or laughs. To become infected with TB germs, a person usually needs to share air space with someone sick with TB disease (e.g., live, work, or play together). The amount of time, the environment, and how sick the person is all contribute to whether or not you get infected.

**How are TB germs not spread**

- Through quick, casual contact, like passing someone on the street
- By sharing utensils or food
- By sharing cigarettes or drinking containers
- By exchanging saliva or other body fluids
- By shaking hands
- Using public telephones

**Common Symptoms of TB Disease**

1. Cough (2-3 weeks or more)

2. Coughing up blood
3. Chest pains
4. Evening raising Fever
5. Night sweats
6. Feeling weak and tired (general weakness)
7. Losing weight without trying
8. Decreased or no appetite
9. If you have TB outside the lungs, you may have other symptoms

Incubation period- From infection to development of a positive TB skin test reaction (the incubation period) is approximately 2 to 12 weeks. The risk for developing active disease is the highest in the first two years after infection and development of a positive TB skin test reaction.

Source of infection-Human source and Bovine source

Communicability- infection as long as not treated communicability reduces by 90% within 48 hr's of treatment.

Age- under 5 age group 1%, 15 years above 30%

Sex- more prevalent in male than females.

Mode of transmission- Droplet infection and Droplet nuclei

**Revised National Tuberculosis Control Program (RNTCP)**

National tuberculosis programme (NTP) has been in operation since 1962.

Its two objectives :

1. Long term objectives.
2. Short term objectives.

**1. Long term objectives-**

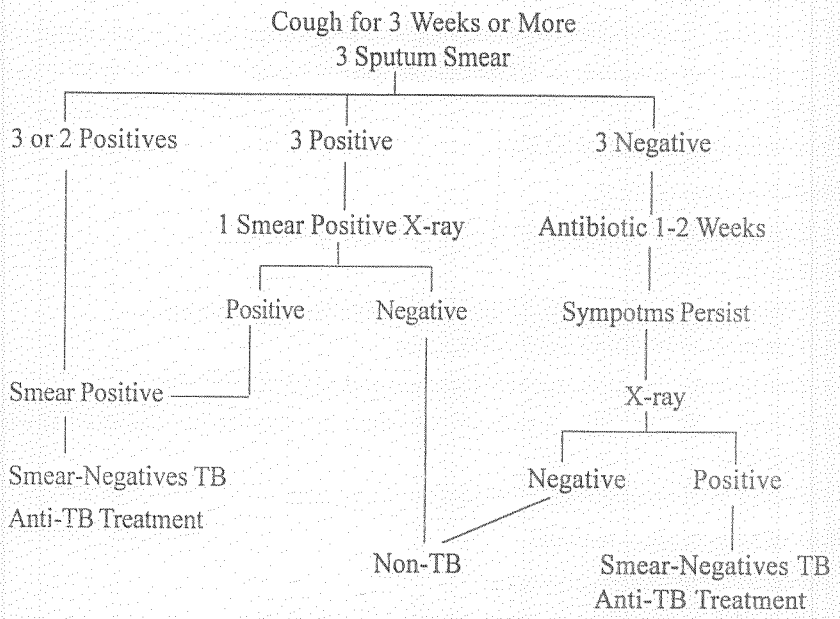
- One case infects less than one new person annually
- The prevalence of infection in the age group below 14 years is brought down to less than 1 percent.

**2. Short term objectives-**

- To detect maximum number of T.B. cases among the out patients attending any health institution with symptoms suggestive of tuberculosis & treat them effectively
- To vaccinate new born & infant with BCG.
- To undertake the above objectives in an integrated manner through all the exiting health institutions in the country.



**Diagnosis of TB in RNTCP - Smear Examination**




The government of India WHO &World Bank together reviewed the NTP in the year 1992. Based on the findings a revised strategy for NTP was evolved.

**The salient features of this strategy are :**

1. Achievement of at least 85 percent cure rate of infectious cases through supervised short course chemotherapy involving peripheral health functionaries.
2. Augmentation of case finding activities through quality sputum microscopy to detect at least 70% estimated cases.
3. Involvement of NGO's information, education & communication & improved operational research.

**Revised Strategy-**

1. Augmentation of organizational support at Central and State levels for meaningful coordination
2. Increased budgetary outlay
3. Use sputum testing as the primary method of diagnosis among self-reported patients
4. Standardized treatment regimens

5. Augmentation of the peripheral level supervision through the creation of a sub district supervisory unit
6. Ensuring a regular, uninterrupted supply of drugs up to the most peripheral level
7. Emphasis on training, IEC, Operational research and NGO involvement in the program

**Prevention and Control of TB-**

**Medical interventions-**

- Chemotherapy
- Immunoprophylaxis
- Chemoprophylaxis-isoniazid 5mg/kg body weight daily x 6 months
- Treatment of HIV-infected / AIDS cases
- Strategies for prevention of HIV infection as per NACO guidelines
- Silicosis: Screen patients with silicosis once in 6 months and treat for TB when necessary
- For extra pulmonary TB surgery sometimes required

**Non-Medical interventions-**

- Exercise - lifestyle modifications
- Nutrition - to prevent malnutrition in children and adults
- Others
- Health education to increase community awareness, role of BCG vaccination etc.
- Intervention to reduce poverty and economic condition
- Training
- Incentives
- Monitoring and evaluation

Difference in National Tuberculosis Program (NTP) and Revised NTCP

| | **National Tuberculosis Program (NTP)** | **Revised NTCP** |
|---|---|---|
| **Objective** | Early diagnosis & Treatment | Breaking the chain of transmission |
| **Operational Targets** | 1. Not defined | 1. Cure rate 85%<br>2. Case finding 70% of estimated cases |
| **Strategy** | 1. Short Course Chemotherapy (SCC) unsupervised | 1. DOTS (Directly Observed Treatment Short Course Chemotherapy<br>2. Uninterrupted drug supply |
| **Diagnosis** | 2. Conventional<br>1. More emphasis on X-rays<br>2. Two sputum smears<br>3. One sputum positive is considered a case | 1. Mainly sputum microscopy<br>2. Three sputum smears<br>3. One positive is not a case |



**Direct Observed Therapy Short-term (DOTS)**

DOTS is a community based TB treatment and care strategy which combines the benefits of supervised treatment, and the benefits of community based care and support.

DOTS are given by peripheral health staff such as MPWs or through voluntary workers such as teachers, Anganwadi workers, Dais, Ex-patients, Social workers etc.

They known as DOT 'agent' & 'paid' incentive/ honorarium of 150 per patient completing the treatment

**Components of DOTS**

1. Case detection with the help of microscopy with a system of multi-tier cross-checking and quality assurance of sputum smear
2. Regular and uninterrupted supply of drugs: Patient wise box.
3. Direct observation while the patient is getting Chemotherapy by the health worker or community volunteers
4. Systemic evaluation and monitoring to ensure cure
5. Political and administrative commitment to ensure financial support and sustainability

**Diagnosis-Overnight/Early morning**

**Second day** → **Sputum examination-Spot-first day** → **Spot – second day**

3 samples of sputum stained with Zeihl Neelsen technique under microscope collected on two days Culture, BACTEC, ELISA Test, PCR Test, Restriction Fragment Length Polymorpism (RFPL), FTB (Fast Plaque TB), QTB-G (Quantiferon TB Gold), Tuberculin Test can be used for diagnosis

Drugs and regimen used in RNTCP- All the drugs are administered thrice weekly

The number before the letters refers to the number of months of treatment

R = Rifampicin

E = Ethambutol
H = INH
S = Streptomycin
Z = Pyrazinamide
K = Kanamycin
O = Ofloxacin
Et = Ethionamide
C = Cycloserine

**Treatment under RNTCP-**

**Category I (Red Box-high priority)-**

Type of patients:
New cases sputum smear +ve
Seriously ill sputum –ve
Seriously ill extra-pulmonary
Regimen: 6 months
Intensive phase: 2(HRZE)3
Continuation phase: 4(HR)3
H = INH R = Rifampicin Z = Pyrazinamide E = Ethambutol

Sputum testing done on 2, 4 and 6 months of treatment. If sputum +ve at 4 months then another sputum smear test is done on 5 months. If +ve the patient is declared failure. Registered as a fresh case on the category II regimen.

**Category II (Blue Box-High priority)**

Type of patients:
Sputum +ve relapse
Sputum +ve failure
Sputum +ve treatment after default
Regimen: 8 months
Intensive phase : 2 (HRZES) 3 + 1(HRZE)3
Continuation phase : 5 (HRE) 3

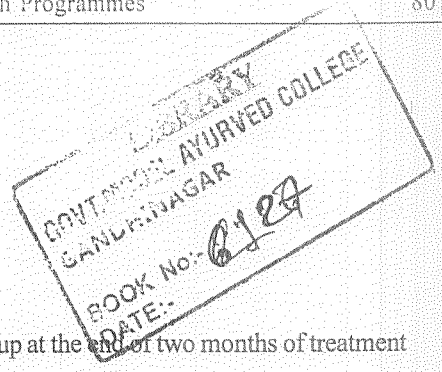
If sputum smear is +ve even after 3 months of the start of treatment in category II patients

Then four drugs (HRZE)3 excluding streptomycin is extended for one more month.



**Category III (Green Box-Low priority)**

Type of patients:
Sputum -ve
Extra-pulmonary not seriously ill
Regimen: 6 months
Intensive phase: 2 (HRZ)3
Continuation phase: 4 (HR)3




- Two smears are examined for follow up at the end of two months of treatment
- Also at the end of treatment (6months)
- If patients become sputum +ve during the treatment he is started on a treatment regimen afresh
- Registered as "others" in category II

**Category IV: Multi-Drug Resistant TB**

Type of patients:
Multidrug resistant TB cases
Regimen: 24 months
Intensive phase: 6 (KOCZEEt)
Continuation phase: 18 (OCEEt)

All drugs are to be administered daily under direct observation by a trained DOT provider accompanied by regular follow up taking smear and culture examination as per the protocol based on international guidelines.

**Multi-Drug Resistant TB**-WHO defines a multi-drug resistant (MDR) strain as one that is at least resistant to Isoniazid and Rifampicin, with or without resistance to other anti-TB drugs

**Extensively Drug Resistant TB**-Cases of TB that are resistant to almost all second line drugs are termed extensively drug resistant tuberculosis (XDR-TB)

Defined as occurring when M. tuberculosis is resistant to

1. At least Rifampicin and Isoniazid (i.e. MDR-TB)
2. Resistant to a Fluoroquinolone
3. Resistant to one or more of the following 2nd line injectable drugs: Amikacin, Capreomycin, Kanamycin.

**DOTS-Plus**-DOTS-Plus for MDR-TB is a comprehensive management initiative build upon 5 elements of DOTS strategy.

Takes into account specific issues, such as use of second-line anti-TB drugs.

Goal : prevent further development and spread of MDR-TB.

Aim of implementation of DOTS-Plus in selected areas with significant level of MDR-TB is to combat an emerging epidemic.

## National Leprosy "Eradication" Programme (NLEP)

The NLRP has been in operation since 1955, as a centrally aided programme to achieve control of leprosy through early detection of cases and DDS (dapsone) mono-therapy on an ambulatory basis.

In 1983 the control programme was re-designated national leprosy "eradication" programme with the goal of eradicating the disease by the turn of the century. The aim was to reduce case load to 1 or less than 1 per 10,000 populations.

To strengthen the process of elimination of leprosy in the country, the first World Bank supported project was introduced in 1983. On completion of this project, the 2nd phase of project with World Bank supports was started in 2001-02 which ended in December 2004.

Components of the programme are as follows-

1. Decentralized integrated leprosy services through general health care system;
2. Capacity building of all general health services functionaries;
3. Intensified information, education and communication;
4. Prevention of disability and medical rehabilitation and
5. Intensified monitoring and supervision.

After introduction of MDT, the recorded case load of leprosy came down from 57.6 cases per 10,000 populations in 1981 to less than one at the national level in December 2005, and the country could achieve the goal of the leprosy elimination at national level as set by the national health policy (2002). 32 states/ UTs achieved the status of leprosy elimination. Only 3 states/UTs viz. Bihar, Chhattisgarh and Dadra and Nagar Haveli are yet to achieve elimination.

**Major initiatives-**

1. More focus has now been given to new case detection than prevalence which only gives the number of cases on record at a point in time. The new case detection rate is the main indicator for programme monitoring.



2. Treatment completion rate been taken as an important indicator, to be calculated by states at yearly basis.
3. More emphasis is being given on providing disability prevention and medical rehabilitation services to leprosy affected persons.

a. Dressing materials, supportive medicines and ulcer kits are provided to leprosy affected persons with ulcers and wounds. These services are also provided to leprosy affected persons residing in self settled colonies.

b. Micro-cellular rubber footwear is provided for protection of insensitive feet. 36 NGOs in the country and 33 Govt. medical college have been strengthened for providing reconstructive surgery services to leprosy affected persons for correction of their disability, thus totaling to 69 centers for conducting reconstructive surgeries in the country.

c. Am amount of Rs.5000 /- is provided as incentive to each leprosy affected person from BPL family undergoing reconstructive surgery in these identified institution to compensate for loss of wages.

d. Support is also provided to government institutions/ PMR centers in the form of Rs. 5000/- per reconstructive surgery conducted.

4. ASHAs have been involved in bring out suspected leprosy cases from their villages for diagnosis and treatment at PHC and follow up of confirmed cases for their treatment completion. To facilitate the involvement of ASHA in the programme, they are being paid incentive money as below:

a. On confirmed diagnosis of case brought by them Rs. 100/-

b. On completion of full course of treatment of the case with on specified time- PB leprosy case- Rs-200/- and MB leprosy case-Rs- 400/-

5. There are 612 self-settled colonies in the country where more than 50,000 leprosy affected persons reside. Free medical facilities like care of ulcers, self-care training, and counseling and MCR footwear are provided to leprosy affected persons residing in these colonies through paramedical workers/NGOs on weekly/ fortnightly basis.
6. Intensive IEC campaign with a theme "towards leprosy free India" has been carried out toward further reduction of leprosy burden in the community, early reporting of cases and their treatment completion, provision of quality leprosy services and reduction of stigma and discrimination against leprosy affected persons. Awareness generation activities are carried out through mass media and local media.

## National AIDS Control Programme (NACP)

National AIDS control programme was launched in India in the year 1987. The ministry of Health and Family Welfare has set up National AIDS Control Organization (NACO) as a separate wing to implement and closely monitor the various components of the programme.

The aim of the programme is to prevent further transmission of HIV, to decrease morbidity and mortality associated with HIV infection and to minimize the social-economic impact resulting from HIV infection.

In India, after the first case of HIV was detected in Chennai in 1986, the virus spread rapidly across the nation in both urban and rural areas. Since then, the HIV epidemic has traveled a long way, establishing itself with the greatest speed in the six high prevalence states of Andhra Pradesh, Maharashtra, Manipur, Nagaland, Karnataka and Tamil Nadu

The natural history of the HIV epidemic has played out in various forms - from the injecting drug use-driven epidemic of the North East seen in Manipur and Nagaland, to the sex work-driven epidemic of the south of India. Since, every country and every government needs to have a solution to deal with such an issue; the government formulated the National AIDS Control Program.

Phase-I (1992 - 1999) was implemented across the country with objective to slow the spread of HIV to reduce future morbidity, mortality, and the impact of AIDS by initiating a major effort in the prevention of HIV transmission.

Phase-II (1999 - 2006) was aimed at reducing spread of HIV infection in India and strengthens India's capacity to respond to HIV epidemic on long term basis

Phase-III (2007-2012) was based on the experiences and lessons drawn from NACP-I and II, and is built upon their strengths. Its priorities and thrust areas are drawn up accordingly and include the following:

- Considering that more than 99 percent of the population in the country is free from infection, NACP-III places the highest priority on preventive efforts while, at the same time, seeks to integrate prevention with care, support and treatment.
- Sub-populations that have the highest risk of exposure to HIV receive the highest priority in the intervention programs. These would include sex workers, men-who-have-sex-with-men and injecting drug users. Second high priority in the intervention programs is accorded to long-distance truckers, prisoners, migrants (including refugees) and street children.
- In the general population those who have the greater need for accessing prevention services, such as treatment of STIs, voluntary counseling and testing and condoms, will be next in the line of priority.
- NACP-III ensures that all persons who need treatment would have access to prophylaxis and management of opportunistic infections. People who need access to ART will also be assured first line ARV drugs.
- Prevention needs of children are addressed through universal provision of PPTCT services. Children who are infected are assured access to pediatric ART.
- NACP-III is committed to address the needs of persons infected and affected by HIV, especially children.
- NACP-III also plans to invest in community care centers to provide psycho-social support, outreach services, referrals and palliative care.
- Socio-economic determinants that make a person vulnerable also increase the risk of exposure to HIV. NACP-III will work with other agencies involved in vulnerability reduction such as women's groups, youth groups, trade unions etc. to integrate HIV prevention into their activities

**National AIDS prevention and control policy**-In April 2002, the Government of India approved the National AIDS Prevention and control Policy. The objectives included reduction of the impact of epidemic and to bring about a zero transmission rate of AIDs by year 2007.

1. **Blood safety programme**-NACO is committed to bridge the gap in the availability and improve quality of blood under NACP-III. To achieve these objectives NACO plans to:
   - Raise voluntary blood donation to 90 percent
   - Establish blood storage centers in Community Health Centers
   - Expand external quality assessment services for blood screening
   - Quality management in blood transfusion services
2. **Counseling and HIV testing-** HIV testing is carried out on a voluntary basis with appropriate pre-test and post- test counseling. The basis and objective of testing are to monitor the trend of HIV infection in a population or sub-group; to test blood, organ or tissue for ensuring safety of the recipients and to identify an individual with HIV infection on voluntary testing basis.
3. **STD control programme**- STD control is linked to HIV/AIDS control as behavior resulting in the transmission of STD and HIV are same. HIV is transmitted more easily in the presence of another STD. hence, early diagnosis and treatment of STD is now

recognized as one of the major strategies to control spread of HIV infection.

4. **Condom promotion-** Among the probable source of HIV infection in India. Heterosexual promiscuity constitutes the major route, as almost 87 per cent HIV infections occur due to unprotected and multi-partner sexual contacts. This type of transmission can be prevented by consistent use of good quality condoms.
5. **Behavior surveillance** - To assess the changing pattern of behavior in different risk groups of population, behavioral sentinel surveillances will be instituted initially on pilot basis, which will be expended as per the needs of the programme from time to time.
6. **Targeted interventions-** The basic purpose of the targeted intervention programme is to reduce the transmission of HIV amongst the most vulnerable population.
7. **School AIDS education programme-** The school AIDs education is one of the important activities of NACP that focuses towards student youth to raise awareness level and develop a safe and responsible life-style.

## National Programme for Control Of Blindness (NPCB)

It was launched in year 1976 as a fully centrally sponsored programme and incorporates the earlier trachoma control programme started in year 1968.

**Strategy-**

1. Strengthening service delivery.
2. Developing human resource for eye care.
3. Promoting outreach activities and public awareness.
4. Developing institutional capacity to establish eye care facilities for every 5 lakhs persons.

In 1998-99 and 1999-2000 surveys were conducted and following measure were included on the basis of their finding.

1. To make the programme more successful by strengthening service for other causes of blindness, refractive errors in school children, glaucoma, improving follow-up services of Cataract operated persons and treating causes of blindness.
2. To shift from the eye camp approach to a fixed facility surgical approach and from conventional surgery to IOL (Intraocular lenses) implantation for better quality of post-operative vision in operated patients.
3. To expand the World Bank project activities like construction of dedicated eye operation theatres, eye wards at district level, training of eye surgeons in modern surgery and supply of ophthalmic equipment to the whole country.



4. To strengthen Participation of NGOs and to mark geographic area to avoid duplication of efforts of government units like medical colleges, districts hospitals CHC, PHC etc.
5. To enhance the coverage of eye care services in tribal and other underserved area.

**Objective of the programme-**

1. To reduce the backlog of blindness through identification and treatment of blind;
2. To develop eye care facilities in every district;
3. To develop human resources for providing eye care services;
4. To improve quality of service delivery;
5. To secure participation of voluntary organization in eye care and
6. To enhance community awareness on eye care.

## Pulse Polio Programme (PPI)

With the global initiative of eradication of polio in 1988 following World Health Assembly resolution in 1988, Pulse Polio Immunization programme was launched in India in 1995. Children in the age group of 0-5 years administered polio drops during National and Sub-national immunization rounds (in high risk areas) every year. About 172 million children are immunized during each National Immunization Day (NID).

The last polio case in the country was reported from Howrah district of West Bengal with date of onset 13th January 2011. Thereafter no polio case has been reported in the country (25th May 2012).

WHO on 24th February 2012 removed India from the list of countries with active endemic wild polio virus transmission.

**Objective:** The Pulse Polio Initiative was started with an objective of achieving hundred per cent coverage under Oral Polio Vaccine. It aimed to immunize children through improved social mobilization, plan mop-up operations in areas where poliovirus has almost disappeared and maintain high level of morale among the public.

Since then there is a significant decline in the incidence of poliomyelitis.

Following the success of the polio eradication programme, the next likely diseases for eradication are measles and neonatal tetanus.

**Strategies-**

1. Sustain and maintain high level of routine immunization coverage of infants.
2. Pulse polio immunization-

3. Acute flaccid paralysis (AFP) surveillance- for detect final reservoirs of wild polio virus infection
4. Mop-Up immunization-on **first day** after giving OPV to children in booth of immunization. Gentian Violet mark is made on the finger. On **second day** House to House visit is made and mark "X" for those houses who are not cooperative or which are locked or target child is not immunized by looking at violet mark and mark "P" for those house where target children are immunized or target children are not available. On the **third day** visit is made only for "X" marked houses and target children are immunized and the mark "X" is wiped of and converted into "p".

## National Diabetes Control Programme (NDCP)

Government of India started National Diabetes Control Programme on pilot basis during 7th Five year plan in 1987 in some districts of Tamil Nadu, J & K and Karnataka, but due to paucity of funds in subsequent years this programme could not be expanded further in remaining years.

**Objectives:**

1. Prevention of diabetes through identification of high risk subjects and early intervention in the form of health education.
2. Early diagnosis of disease and appropriate treatment morbidity and mortality with reference to high risk group.
3. Prevention of acute and chronic metabolic, cardiovascular, renal and ocular complication of the disease.
4. Provision of equal opportunity for physical attainment and scholastic achievement for the diabetic patients.
5. Rehabilitation of those partially or totally handicapped diabetes people.

## National Cancer Control Programme (NCCP)

Cancer is an important public health problem with 7 to 9 lakh cases occurring every year. At any point of time, it is estimated that there are nearly 25 lakh cases in the country. Every year about 4 lakh deaths occur due to cancer. 40% of the cancers in the country are related to tobacco use.

Data from population based registries under the National Cancer Registry Programme indicate that the leading sites of cancer among men are cancer of oral cavity, lungs, oesophagus and stomach and among women are cancer of uterine cervix, breast and oral cavity. Cancers namely those of oral and lungs in males and cervix and breast in females account for over 50% of all cancer deaths in India. National Cancer Registry Programme (NCRP):



For data base of cancer cases, National Cancer Registry Programme (NCRP) was initiated in

1982 by ICMR, which gives a picture of the magnitude and patterns of cancer. There are two types of registries; Population Based Cancer Registry and Hospital Based Cancer Registries, which was started in January 1982. The Population-based registries take the sample population in a geographically defined area while the Hospital-based registries take the data from patients coming to a particular health institution. At present we have 21 Population-based registries and 6 Hospital-based registries all over the country.

**Goals & Objectives of NCCP**

1. Primary prevention of cancers by health education especially regarding hazards of tobacco consumption and necessity of genital hygiene for prevention of cervical cancer.
2. Secondary prevention i.e. early detection and diagnosis of cancers, for example, cancer of cervix, breast and of the oro-pharyngeal cancer by screening methods and patients' education on self-examination methods.
3. Strengthening of existing cancer treatment facilities, which are woefully inadequate.
4. Palliative care in terminal stage of the cancer.

Existing Schemes under National Cancer Control Programme (NCCP) as on 1st June 2008 {w.e.f 1st January 2005}:

1. Recognition of New Regional Cancer Centers (RCCs): to enhance the cancer treatment facilities across the country and reduce the geographical gap in the country in the availability of cancer care facilities, New Regional Cancer centers are being recognized. A one-time grant of Rs. 5.00 crores is being provided for New RCC's.
2. Strengthening of existing Regional Cancer Centers: A one-time grant of Rs.3.00 crores is provided to the existing Regional Cancer Centers to further strengthen the cancer care services.
3. Development of Oncology Wing: Government Hospitals & Government Medical Colleges are provided with a grant of Rs. 3.00 crores for the development of Oncology Wing.
4. District Cancer Control Programme: The DCCP will be implemented by a nodal agency, which may be a Regional Cancer Centre or Government Medical College or Government Hospital with radiotherapy facility. A cluster of 2-3 districts are taken up for prevention, early detection, minimal treatment and provision of supportive cancer

care at district levels. A grant-in-aid of Rs. 90.00 lakhs spread over a period of 5 years is provided per DCCP proposal..

5. Decentralized NGO Scheme: A grant of Rs. 8000/- per camp will be provided to the NGOs for IEC activities.The funds are released through a Nodal agency which could be a Regional Cancer Centre or Government Medical College or Government hospital with radiotherapy facilities.

## National Guinea Worm Eradication Programme

India launched its National Guinea –worm Eradication Programme in 1984 with technical assistance from WHO. From the very beginning the progamme was integrated into the national health system at village level. With well-defined strategies, an efficient information and evaluation system inter sectoral coordination at all levels and close collaboration with WHO and UNICEF, India was able to significantly reduce the disease in affected areas.

The country has reported zero cases since august 1996. In February 2000, the International Commission for the certification of Dracunculiasis Eradication recommended that India be certified free of Dracunculiasis transmission.

## National Vector Born Disease Control Programme

The national vector borne disease control programme (NVBDCP) is implemented in the state for the prevention & control of vector borne diseases namely Malaria, Filariasis, Kala-Azar, Japanese Encephalitis (JE), Dengue & Chikungunya.

Out of six vector borne diseases Malaria, Filariasis, Japanese Encephalitis(JE), Dengue & Chikungunya are transmitted by different kind of vector mosquitoes, while Kala–azar is transmitted by sand files.

**Malaria-**

- Malaria is one of the vector-borne diseases.
- Causes highest morbidity and mortality over world.
- Claims around eight lakh deaths
- More than 7 crore cases / year
- In India one of the important cause of Mosquito & Men.

It is caused by infection with parasites of the genus Plasmodium.

Transmitted by certain species of infected female Anopheline mosquito.

**Problem-**

- 100 countries in world are Malarious



- Half in sub-Saharan Africa
- More than 2.4 billion are still at risk

Malaria is a communicable disease caused by the parasite plasmodium. Four species of the plasmodium parasite cause malaria. They are:

- Plasmodium viva
- Plasmodium malariae
- Plasmodium ovale
- Plasmodium falciparum

It is spread to humans by the bite of an infected female anopheles mosquito. Traveling to mosquito- prone areas increases the risk of contracting the disease.

Female mosquitoes are concerned with the transmission of plasmodium whereas male mosquitoes feed only on fruit juice

Symptoms of Malaria appear after 7 to 40 days following a Mosquito bite.

9 to 14 days for Plasmodium (P.) falciparum.

12 to 18 days for P. vivax and P. ovale.

18 to 40 days for P. malariae.

**Symptoms of Malaria :**

1. Fever
2. Chills
3. Sweating
4. Headaches
5. Muscle pains
6. Nausea
7. Vomiting

**In severe malaria :**

1. Confusion
2. Coma
3. Neurological signs
4. Respiratory difficulties

**Diagnosis-**The simple diagnostic method for detection of malarial parasites used is a Microscopic examination of blood smears under the microscope. This method of diagnosis is mostly used in endemic countries.

Collected blood specimen is: Smeared on a glass slide, Stained with special staining Giemsa or Romano sky stain,

**Examined under a microscope:** On microscopic examination, detection and identification of different species of malarial parasite is done.

Thick blood smear examination is done first, as the concentration of parasite is more and on detection of the parasite, a thin film is made and examined under a microscope.

NMCP launched in April 1953- Good results & Substantial reduction of case. NMEP by govt. of India in 1958.

**Drug distribution center & fever treatment depots :** Drug distribution centers are only to dispense the anti-malaria tablets as per NMEP schedules. Fever treatment depots collect the blood slides in addition to the distribution of anti- malaria tablets. About 4.49 lakh such center are functioning all over the country in rural area till 2006.

Classification of endemic areas-

Reclassification of endemic areas :

- High endemic areas (API more than 2)
- Low endemic areas (API less than 2)

**Area with API more than 2-**

a. spraying(mass)-DDT 2 rounds, 1 g/sq 6 weeks interval
   If resistant to DDT, Malathion, 2 rounds, 2 g/sq meter surface at 6 wks intervals
   If resistant to both, Synthetic pyrethroid 2 rounds, o.25 g/sq surface at 6 wks intervals
b. Entomological assessment: going on 72 zonal teams some strains of anopheles double resistance to DDT & BHC some strains of triple resists to DDT, BHC& Malathion.
c. Surveillance: collection & exam of blood smears every 15 days active & passive surveillance activities are carried out.
d. Treatment: treatment to suspects & radical treatment to all confirmed cases.

BHC is discontinued since 1/04/1997 in view of its adverse environment affects

**API less than 2 (Low endemic areas) :**

a. Spraying-Focal insecticide spray around 50 houses or sometimes entire village need spray (in +ve cases)
b. Entomological: same as API
c. Surveillance: Need active & passive servile operation will carried out vigo.ously every fortnight.
d. Treatment : Detected cases need radical treatment.



e. Follow up - blood smear are to be collected from all positive cases on completion of radical treatment.

**Urban Malarial Schemea**

Introduced in 1971. Reduce malaria transmission in towns.

About 7.4 % of total cases malaria & 10.9 % of deaths due to malaria are reported from Chennai, Vadodara, VishakhaPatanam, Ahmedabad, Kolkata, New Mumbai, Vijayawada etc.

Urban Intensive anti-malarial measures.

- Anti-malarial Month was started in June month to create awareness in community (malaria & prevention)
- Help by World Bank, Malaria Control Project Launched
- By this 100 high endemic dist. selected
- In 1999, Govt. India drop term "National Malaria Eradication Programme" renamed "National Anti-Malaria Programme"
- Activities started in 100 dist. and 19 cities/towns in states of Karnataka, Tamil Nadu, & West Bengal.

**Progress-**

- Reduction in morbidity & mortality due to malaria:
- In 2004, app 650,000 malaria cases were reported in EMCP Districts, which represent a 45 % decline since 1997.

**Goal for the strategic plan 2007-2012-**

- At least 50 % reduction in mortality due to malaria by year 2010 as per national health policy documents 2002
- At least 80% of those suffering from malaria get correct, affordable & appropriate treatment within 24 hours of reporting.
- At least 80 % of those at high risk of malaria get protected by effective preventive measures.

**Kala-Azar**

**Synonyms :** Kala-Azar, black fever, sand fly disease, Dum-Dum fever and espundia.

Leishmaniasis is a disease caused by protozoan parasites of Leishmania and is transmitted by the bite of female phlebotomine sand fly.

This disease is also known as kala-azar, black fever, sand fly disease, Dum-Dum fever.

Human infection is caused by about 21 of 30 species that infect mammals.

These include the L. donovani complex with three species (L. donovani, L. infantum, and L. chagasi

Kala-Azar is now endemic in 31 Districts of Bihar, 4 districts of Jharkhand, 11 districts of west Bengal and 6 districts of Uttar Pradesh, besides sporadic cases in few other districts of Uttar Pradesh. A centrally sponsored programme was launched in 1990-91. This has brought down the incidence and death rate of the disease by 75 per cent by year 2002.

**Strategies-**

1. Enhanced case detection and complete treatment including introduction of PK39 rapid diagnostic kits and oral drug miltefosine for treatment of Kala-Azar cases.
2. Interruption of transmission through vector control
3. Communication for behavioral impact and intersectoral convergence
4. Capacity building
5. Monitoring, supervision and evaluation
6. Research guidelines on prevention and control of Kala-Azar have been developed and circulated to the states.

**Treatment-**

1. Sodium stibogluconate 20mg/kg/day IM/IV for 20 days.
2. Amphotericin-B 1 mg/kg/IV daily or alternate day for 15-20 infusion.
3. Miltefosine 100 mg daily I two divided doses for 4 weeks.

Incentives of an amount of Rs. 100 are being provided to health worker /ASHA for referring a suspected case of Kala Azar & ensure complete treatment after confirmation.

**Vector/Sand fly Control-**

- 75% DDT - 1 kg in 3 gallons of water or
- 50% DDT - 1.5 kg in 3 gallons of water
- 6000 Sq. feet ( 100 mgm/Sq.foot)
- Up to 6 feet from ground level
- If it is resistant, BHC second line of defence.

## Japanese Encephalitis

Encephalitis is an inflammation of the brain tissue due to infection.

Most often caused by viruses that pass into blood stream and then into cerebral spinal fluid, leading to destruction of neural cells and inflammation of brain parenchyma.



Primary or acute encephalitis- May also result from a viral-mediated inflammatory response in the brain following an acute, systemic infection.

Secondary or post-infectious encephalitis- Most important global cause of arboviral encephalitis with > 50,000 cases and 15,000 deaths reported each year.

Only about 1 in 250 JE infections result in symptomatic illness.

Primarily affects children 1 to 15 years of age.

Incubation period is 4 to 14 days.

Symptoms of JE infection-

Most cases asymptomatic

Mild -fever with headache

**Severe infection-**

- quick onset
- headache & high fever
- neck stiffness,
- stupor, disorientation,
- coma, tremors,
- occasional convulsions (especially in infants) and spastic (but rarely flaccid) paralysis.

Treatment-

No effective specific treatment available

Supportive treatment only.

Japanese encephalitis is a disease with high mortality rate and those who survive do so with various degrees of neurological complications.

Prevention of Mosquito Bites.

Prevent mosquito breeding.

JE vaccination is recommended for children between 1 to 15 years of age.

## Dengue Fever

Dengue fever, also known as break bone fever, is an acute communicable disease caused by virus.

Infectious agent: Dengue viruses (categorize into types 1,2,3,4)

Vectors of Dengue Fever-Aedesaegypti, Aedesalbopictus

During 1996, an outbreak of dengue reported in Delhi. Since then dengue has been reported from other states also. In view of this major outbreak of the disease a "Guideline of preparation of contingency plan in case of outbreak/epidemic of dengue/ dengue

haemorrhagic fever" was prepared and sent to all the states. It includes all the important aspects of control measures like identification of outbreak, demarcation of affected area, IEC activities about do's and don't for prevention of dengue, monitoring and reporting etc.

### Lymphatic Filariasis

The disease is endemic in 250 districts in 20 states and UTs. According to recent estimates about 600 million people are exposed to the risk of infection. The National Filarial Control Progamme has been in operation since 1955. The current strategy of filariasis control (Elimination) is based on:

1. Interruption of transmission
2. Control of Morbidity

Interruption of the transmission can be achieved through: Chemotherapy and Vector control.

The strategy of lymphatic filriasis elimination is through :

1. Annual Mass drug Administration (MDA) of single dose of anti-filarial drug for 5 years or more to the eligible population.
2. Home based management of lymphoedema cases and up scaling of hydrocele operation in identified CHCs/ district hospitals/ medical colleges.

### Chikungunya Fever

Chikungunya fever is a debilitating non-fatal viral illness, re-emerging in the country after a gap of three decades. Govt. of India is continuously monitoring the situation. Guidelines for prevention and control of the disease have been prepared. For carrying out proactive surveillance and enhancing diagnostic facilities for chikungunya, the 137 sentinel surveillance hospitals involved in dengue in the affected states also carry out chikungunya teats. The diagnostic kits are provided through National Institute of Virology, Pune, by the central government.

### Methods of Control

**Integrated Vector Management (IVM) :** Ideally, malaria vector control activities should be part of a broader vector control management program. IV Mentails the use of a range of biological, chemical and physical interventions of proven efficacy, separately or in combination, in order to implement cost-effective control and reduce reliance on any single intervention. Combinations of a number of methods will compensate for the deficiencies of each individual method. It includes safe use of insecticides and management of insecticide resistance. Rotation of insecticides may be done so as to prolong their effectiveness. It is based on the premise that effective vector control is not



the sole preserve responsibility of the health sector but requires the collaboration of various public and private agencies and community participation.

### Anti-larval Measures

**1. Elimination of breeding places (Source Reduction) :** It includes permanent measures such as-

- Filling of low lying places where water may accumulate.
- This is particularly important for controlling breeding of Anopheles.
- Weekly emptying of household collections of water, particularly to prevent breeding of Aedes.
- Covering drains, ditches, cess pools and sewers near the houses, where Culex breeds.
- Removal of vegetation on shores of slow moving streams where A. fluviatilis breeds.
- Removal of water plants such as Pistiastratiotes and water hyacinth, manually or by herbicides, checks the breeding of Mansonoides.

**2. Larvicidals:** The breeding of mosquitoes can be reduced by a variety of physical, chemical and biological methods. Residual effect of larvicides varies considerably with the water quality. The higher dosages are indicated for polluted water. Larvivorous fish are widely used in urban areas, peri-urban areas and freshwater bodies in rural areas. Following methods are being used to control larval stage.

**3. Mineral oils:** Kerosene, diesel, fuel oil and malariol are used for this purpose. These oils form a thin layer over water, thereby cutting off the oxygen supply to larvae and pupae. They also have probably a direct toxic effect on them. Larvae die within 1-2 hours of application of crude oil. The quantity of oil needed is 40 to 90liter per hectare (one hectare = 10,000 sq m).

**4. Paris green (copper acetoarsenite) :** It is used to kill surface feeding anopheline larvae. It is dusted at the rate of 840 g/ha (one hectare = 100000sq m) of surface. There are no hazards to human beings and livestock at this concentration. Paris green is sprayed over water as dust. This dusting is not effective against culex larvae which are bottom feeders. However, special granular preparations of Paris green are available which are effective against these also.

**5. Synthetic insecticides:** The most effective larvicides are organ phosphorus compounds like chlorpyriphos, fenthion and Abate, which quickly hydrolyse in water.2 Abate is the least toxic of these and is very effective at a concentration of1 ppm. Organochlorine compounds like DDT and HCH are no longer used as larvicides because of the associated effects like water contamination and emergence of resistant vector strains.

6. Biological control: Following methods are in use as vector control measures—

- Larvivoros fish have been successful and widely used biological control agent against mosquitolarvae in the top water. Two fish namely Gambusia affinis and Poeciliareticulata, (common guppy)have been extensively used for mosquito control in the urban malaria scheme in India under the

  National Anti Malaria Program. Gambusiaisa surface feeder, hence it is suitable for feeding on both anophelines and culicines

- Use of biocides: The bacterium Bacillus thuringiensis israelensis(Bti) and B. sphaericus produce toxins which are very effective in killing mosquito and black fly larvae after ingestion. The toxins formulation may be used in water or for the irrigation of food crops to control vector.

- Insect growth regulators (IGRs). These are chemical compounds that are highly toxic to mosquito larvae by preventing their development into adults. Their use has generally been limited due to high cost and poor operational acceptability, but may be useful where other compounds cannot be used.

**Vector control methods**

**Antiadult measures :**

- Indoor residual spraying with
  -Orgeno chlorine compound:DDT
  -OP-compounds : Malathion, Fenitrothion
  -Carbamate : Propoxur
  -Synthetic pyrethroids : Deltamethrin
- Space spray : Pyrithrum
- Out door space spray : Malathion, Pyrethrum

**Antiarval measures :**

- Larviciding with Petroleum oils, Temephos, Fenthion, etc.
- Biological Control
  -Use of larvivorous fish (Gambusia affinis and Pecilia reticulata)
  - Use of biocides : Bacillus thuringiensis

  Source reduction by environmental management : Drainage/Filling/flushing/ change of salinity

**Anti-adult Measures**

**Killing :** The mosquitoes are killed in two ways by contact poisons:

1. Space spray: Space spraying has been defined as the destruction of flying mosquitoes by contact with insecticides in the air.
2. Indoors residual spraying (IRS): IRS is the application of insecticides to the inner surfaces of dwellings, where endophilic anopheline mosquitoes often rest after taking a blood meal. The main purpose of IRS is to reduce the survival of malaria vector(s) entering houses. DDT has comparatively long residual efficacy (6 months or more) against malaria vectors and plays an important role in the management of vector resistance.



**Prevention of Mosquito Bites**

1. Use of repellents: Diethyl toluamide (deet) and butylethyl propanediol applied on clothes repels Culex for 6-13 hours. Others in use are DMP, indalone, dimethylcarbate and ethyl hexanediol. They are applied to the exposed parts of the body.
2. Preventing entry into houses: Mosquito-proof wire gauze (6 mesh) is used for this purpose on doors, windows and ventilators.
3. Sleeping in mosquito nets: (6 mesh) and using veils, socks and gloves, etc. as necessary.

In regard to wire gauze and mosquito nets, it should be ensured that the number of holes should be at least about 25 per sq cm (i.e. 5 holes or 5mesh per cm). It is preferable to use a net with 6mesh per cm (15 mesh per inch).

**Flies :** Though less important than mosquitoes as vectors of disease, the flies have a large variety of species. They may be divided into two groups, the biting and non biting flies. The biting flies include sand fly, tsetse fly, black fly and deer fly. Of these the sand fly is the most important. The common example of a non biting fly is the domestic fly.

The sand flies are responsible for the transmission of Kala Azar (P. argentipes), oriental sore (P. papatasii and P. sergenti) and sand fly fever (P. papatasii and P. punjabensis).

**Fly Control Measures**

**Elimination of breeding places:**

1. Sanitary disposal of wastes such as refuse (especially garbage), horse litter and dung, human excreta and sullage water.
2. Food sanitation such as keeping all foods in wire gauze or glass cupboards and containers with well fitting lids.
3. Tight packing of manure in trenches or pits to kill larvae by heat.
4. Provision of cement lined tanks or floors for stocking cow dung so that larvae cannot burrow in the soil to pupate.
5. Breeding is prevented by filling cracks and crevice son the walls and removing any stone or rock piles.

6. The adults are killed by indoor residual spray insecticides like DDT and lindane in concentrations of 1-2 and 0.25 g per square metre respectively.
7. Repellents used on clothes or applied to skin such as deet, DMP, etc. are effective against bites.

**Prevention of entry:** Making the houses fly proof, especially the kitchen and latrines, by putting wire gauze screens in doors and windows.

**Trapping:** Using a Balfour fly trap made of wire gauze in which the flies enter through a slit to sit on the bait but cannot come out.

**Manual killing:** Fly swatters are useful devices to kill flies.

## National Rural Health Mission (NRHM)

This programme was launched on April 5, 2005 for a period of 7 years (2005-2012).it is operational in the whole country with special focus in 18 states.

**Objective-**

- The main aim is to provide accessible, affordable, accountable, effective and reliable primary health care, and bridging the gap in rural health care through creation of a cadre of ASHA (accredited social health activist).
- By making necessary changes in the basic health care delivery system the mission adopts a synergic approach by relating health to determinants of good health viz. nutrition, sanitation, hygiene and safe drinking water.
- It also brings the Indian system of medicine (AYUSH) to mainstream of health care.
- The mission will be instrument to integrate multiple vertical programme along with their funds at the district level e.g. RCH, NVBDCP, RNTCP, IDD.

**Plan of action to strengthen infrastructure-**

1. Creation of ASHA for each 1000 population. ASHA must be resident of village, women (married/widow/divorced) age25-45, education up to 8th class, having communication skills and leadership quality.
2. Strengthening sub- centers by:

   a) Supply of essential drugs both allopathic and AYUSH.

   b) Provision of male worker and additional ANMs wherever needed
3. Strengthening PHCs by-
   - Adequate and regular supply of essential drugs and equipment.
   - Provision of 24 hours.service in at least 50% PHCs by including an AYUSH practitioner.



   - Following standard treatment guidelines.
4. Strengthening CHCs for first referral care by-
   - Making all CHCs as 24 hours first referral units, including posting of an anesthetist.
   - 2. Setting up new norms for infrastructure, staff, equipment, management etc.
5. District health mission, state health mission, and mobile medical unit.

## All the Upcoming National Health Programmes

**Acute Respiratory Disease Control Programme :** Taken up as a pilot project in 14 districts in 1990.Since 1992 implemented as a part of CSSM and later with RCH.

**Aims-**

1. To reduce mortality rate in children due to ARI 20% by 1995 and 40% by 2000
2. Strategies-
   - To ensure standard case management of pneumonia in children under 5 years by training medical and health personnel.
   - To train peripheral health staff to recognize and treat cases of pneumonia
   - To promote timely referral of severe pneumonia by the peripheral health staff & community
   - To improve maternal knowledge about home management of coughs and cold & recognize early danger signs of seeking appropriate care
   - To promote immunization, exclusive breast feeding in first 4-6 months, proper weaning &vitamin A administration.

## Reproductive and Child Health Programme

Reproductive and child health approach has been defined as "people have the ability to reproduce and regulate their fertility, women are able to go through pregnancy and child birth safely, the outcome of pregnancies is successful in terms of maternal and infant survival and wellbeing, and couples are able to have sexual relations, free of fear of pregnancy and contracting disease".

**Highlights of the programme-**

1. Integration of all interventions related fertility regulation, maternal and child health and reproductive health.
2. Services to be provided are client oriented, demand driven through decentralized participatory process and target free approach

3. Up-gradation of facilities : creation of First referral units
4. Provision of specialist services for STD and RTI
5. Provision of outreach services for vulnerable groups

The RCH programme has integrated these services and the major intervention are essential obstetric care, 24 hour delivery services at PHCs/CHCs, emergency obstetric care, medical termination of pregnancy, prevention of reproduction tract infection(RTI) and sexually transmitted diseases(STD) and district surveys.

**Essential obstetric care-**

1. Early registration of pregnancy within 12 weeks.
2. Provision of minimum three antenatal checkups by ANM or medical officers to monitor progress of the pregnancy and detect any risk/ complication so that appropriate care including referral could be taken in time
3. Provision of safe delivery at home or in an institution.
4. Provision of three postnatal checkups to monitor the postnatal recovery and to detect complication.

**24 hour delivery services at PHCs/CHCs-** To promote institutional deliveries, provision has been made to give additional honorarium to the staff to encourage round the clock delivery facilities at health centers.

Complication associated with pregnancy are not always predictable, hence, emergency obstetric care is an important intervention to prevent maternal morbidity and mortality.

**Medical termination of pregnancy-** MTP is a reproductive measure that enables a woman to opt out of unwanted or unintended pregnancy in certain specific circumstances without endangering her life, through MTP Act 1971. The aim is to reduce maternal morbidity and mortality from unsafe abortions.

**Prevention of reproduction tract infection (RTI) and sexually transmitted diseases (STD)**-Under RCH programme, the component of RTI/STD control is linked to HIV and AIDS control. NACO provides assistance for setting up RTI/STD clinics up to the district level.

## Universal Immunization Programme

In May 1974, the WHO officially launch a global immunization programme, known as expended programme on immunization (EPI) to protect all children of the world against six vaccine- preventable diseases, namely- diphtheria, whooping cough, tetanus, polio, tuberculosis and measles by the year 2000. EPI was launched in India in January 1978.



The Indian version, the universal immunization programme, was launched on the November 19, 1985 and dedicated to the memory of smt. Indira Gandhi.

The Govt. of India launched its EPI in 1978 with the objective of reducing the mortality & morbidity resulting from vaccine- preventable diseases of childhood, and to achieve self-sufficiency the production of vaccines.

| | |
|---|---|
| **A) For infants** | |
| **At birth (for institutional deliveries)** | BCG and OPV-0-dose |
| **At 6 weeks** | BCG (if not given at birth)<br>DPT-1,OPV-1& Hepatitis B-1 |
| **At 10weeks** | DPT-2,OPV-2& Hepatitis B-2 |
| **At 14weeks** | DPT-3,OPV-3& Hepatitis B-3 |
| **At 9 Months** | Measles |
| **B) At 16-24 month** | DPT & OPV |
| **C) At 5-6 years** | DT |
| **D) At 10 & 16 years** | TT (Tetanus Toxoid ) |
| **E) For pregnant Women** | |
| Early in pregnancy | TT-1 or Booster |
| One month after TT-1 | TT-2 |

**Strategies-**

1. 100% coverage of expectant mothers with 2 doses of TT
2. At least 85% coverage of infants with 3 doses of DPT, OPV, and one dose each of BCG and Measles by 2000. Although the target was 100% immunization of children but agreed that when coverage reaches a figure of 80% or more.

## National Nutritional Programmes - IDD, Vitamin A Prophylaxis, Mid Day Meal, Anemia Control Programmes

The governments of India have initiated several large scale supplementary feeding programmes and programmes aimed at overcoming specific deficiency diseases through various ministries to combat nutrition.

**1) Vitamin -A prophylaxis Programme-** This programme was launched by the ministry of health and family welfare in 1970. On the basis of technology developed at national institute of nutrition, Hyderabad.

This programme has been initiated to prevent night blindness by giving vitamin-A

It is short term, simple technology based on 6-9 months and liberated slowly.

Administer a single massive dose of 2,00,000 IU of vitamin-A in oil orally every 6 month to preschool children (1 to 6 yrs.) and half that dose (1,00,000 IU) to children between 6 month to 1 year of age.

This programme implemented through peripheral health worker.

**2) Prophylaxis against nutritional anemia-** Nutritional anemia is a disease syndrome caused by malnutrition in its widest sense. It has been defined by WHO as "a condition in which the hemoglobin content of blood is lower than normal as a result of a deficiency of one or more essential nutrients, regardless of the cause of such deficiency". Iron deficiency anemia is the most widespread micronutrient deficiency affecting all age groups irrespective of gender, cast, creed and religion. It was launched by govt. of India during the fourth five year plan.

This programme consists of distribution of iron and folic acid tablets to pregnant women and young children (1-2yrs).

Mother and child health care centers in urban areas, primary health centers, in rural areas and ICDS project are engaged in implementation of this programme.

The technology for the control of anemia through iron fortification of common salt has been developed at national institution of nutrition, Hyderabad.

**3) Iodine Deficiency Disorder Programme-** Indian Govt. launched this programme in 1962. Initially it started in Himalaya belt region with objective of identification of the goiter endemic area to supply iodized salt in place of common salt and to assess the impact of goiter control measures over a period of time.

In 1986 IDD programme re-strengthened with objective to replace the entire editable salt by Iodide salt in a phased manner by 1992.

**4) Special Nutrition programme-** This programme was started in 1970 for the nutritional benefits of children below 6 years of age, pregnant and nursing and is in operation in Urban areas, tribal areas and backward rural areas. The supplementary food supplied about 300 kcal and 10-20 gms of protein per child per day.

The beneficiary mother receives daily 500kcal and 25 gms protein. This supplementary is provided to them for above 300 days in a year.

The main aim of the special programme is to improve the nutrition status of target group. This programme is gradually being merged into the ICDS programme (integrated child development services)

**5) Balawadi nutrition programme-**This programme is under ministry of social welfare it was started in 1970 for the benefit of children in the age group 3-6 years in rural areas.



This programme is implemented through balawadi which also provide preprimary education to the children. The food supplement provides 300 kcal and 10 gms of protein per day per children.

**6) ICDS programme-**Integrated child development service programme was started in 1975 in ministry of social welfare.

Under this programme beneficiaries are preschool children below 6 yrs pregnant and lactating women. This programme provided supplementary nutrition, vitamin- A prophylaxis , iron and folic acid distribution.

Anganwadi Worker- it will provide this service at village level. Each Anganwadi unit covers a population of about 1000. A network of Mahila Mandals has been built up in ICDS project areas to help Anganwadi worker in providing health and nutrition services. The work of Anaganwadi is supervision is done by the child development project officer.

**7) Mid –day meal progamme-**This is also known as school lunch programme. It has been in operation since 1961 through out the country under the ministry of education.

The objective of this programme is to attract more children for admission to schools and retain them so that literacy improvement of children.

**Principles of Mid-day meal formulation-**

1. The meal should be supplement and not a substitute to the home diet.
2. The meal should supply at least 1/3rd of the total energy requirement and half of the protein need.
3. The cost of the meal should be reasonably.
4. The meals should be such that it can be prepared easily in schools, no complication cooking process should be involved.
5. As for as possible, locally available foods should be used, this will reduce the cost of the meal
6. The menu should be frequently changed to avoid monotomy.

A. mid-day school meal -

| **Food stuff** | **Gm/day/child** |
|---|---|
| Cereals and millets | 75 |
| pulses | 30 |
| Oil and fats | 08 |
| Leafy vegetables | 30 |
| Non- leafy vegetables | 30 |

# CHAPTER 28 Vaccines

**Bacille Calmette-guerin (BCG) Vaccine**

**Type-** Live bacterial, lyophilized

**Composition-** Bovine strain Danish-1331(BCG strain). Minimum of 0.1 to 0.4 million bacilli/dose

**Diluent-** normal saline

**Schedule-** primary –at birth, if not given within or < 12 month

**Post primary-** after mantoux test

Booster- none

**Administration-**

**Dose-** 0.05 ml for < 1 month, 0.1 fro >1 month

**Route-** strictly intradermal

**Site-** Upper left arm just above the insertion of deltoid

**Unwanted reaction-** prolonged ulceration, local abscess, sinus, and lymphadenitis

**Contraindication-** Symptomatic HIV infection, immunodeficiency, pregnancy, generalized eczema,

**Special precautions-** only tuberculin syringe and needle is used. Correct intradermal injection is given. No other injections are given for 6 month to that arm. Unused reconstituted vaccine is discarded after 6 hours or the end of the session whichever is earlier, protect the vaccine from direct exposure to sunlight

**Storage-** 2 to 8 ° C

**Protective value-** 15-20 year up to 80 percent

**Availability-** freeze- dried powder form along with diluents- normal saline vial of 10 doses (1 ml= 1mg)

**Oral Polio Vaccine- (OPV)**

**Type-** live trivalent

**Composition-** Type 1:3,00,000 tissue culture infection doses (TCID) 50
Type 2:1,00,000 tissue culture infection doses (TCID) 50
Type 3:3,00,000 tissue culture infection doses (TCID) 50
Magnesium chloride is used as a stabilizer



**Schedule-**

**Primary-** 4 doses completed before 6 month

**Additional -** 2 doses

1st dose at 12-18 month with DPT vaccine

2nd dose at 5th year DT vaccine

**Administration-**

**Dose-** 2 drops

**Route-** oral

**Site-** mouth

**Unwanted reaction-** almost nil

**Contraindication-**Symptomatic HIV infection, immunodeficiency. (In immunodeficiency, inactivated poliovirus vaccine (IPV) is preferred)

**Special precautions-** hot milk, food or water is withheld for half an hour, cold- chain is maintained, vaccine is administrated in cool place, potency is monitored by Vaccine vial monitor (VVM).

**Storage-**2 to 8 ° C

**Protective value-** Lifetime

**Availability-**2 ml (20dose) vial with dropper.

**Diphtheria- Pertussis-tetanus Vaccine (DPT)**

**Type-**Triple antigen containing Diphtheria toxoid + Killed whole cells of the organism that causes Pertussis

**Composition-** each 0.5 ml contains

**Diphtheria toxoid-**20 Lf (limit of flocculation)

**Tetanus toxoid-** 0.5 Lf

**Pertussis killed-** 20,000 million

**Adjuvant:** Aluminum phosphate- 2.5 mg preservative- thiomesol-0.01 percent.

**Schedule-**

**Primary-** 6, 10 and 14 week of age

Booster- 18 month- DPT, 5 year (school entry)- DT only

**Administration-**

**Dose-** 0.5ml

**Route-** deep intramuscular

**Site-** outer mid-thigh (infants), outer upper arm, Gluteal region in old child.

**Unwanted reaction-** mild local, fever, rarely convulsions

**Contraindication-** anaphylactic reaction to previous dose, progressive neurological disease

**Special precautions-** never freeze, shake the vial to mix before vaccination

**Storage-**2 to 8 °C

**Protective value-**Durable

**Availability-**10 ml vial

**Measles Vaccine**

**Type-** live attenuated, freeze-dried

**Composition-** 1000TCD 50 Edmonston- Zagreb (EZ) strain per 0.5 ml

**Schedule-**

**Primary-** 1 dose in 9 month in non-endemic area

6th and 9th in endemic area risk group

**Booster-** Nil, infants vaccinated below 9 month deserve another dose at 12th month.

**Administration-**

**Dose-** 0.5 ml

**Route-** Subcutaneous

**Site-** upper arm/ outer mid-thigh

**Unwanted reaction-** mild fever and rash, rarely toxic shock syndrome (TSS), anaphylaxis

**Contraindication-** Pregnancy, untreated active TB, immune disorder

**Storage-2 to 8 °C**

**Protective value-** Lifetime

**Availability-** Vial with powder and separate diluent

**Tetanous Toxoid Vaccine**

**Type-** Toxoid monovalent, inactivated Toxin

**Composition-** Tetanus toxoid

**Schedule-**

**Route-** Apart from DTP and DT, 2 doses of TT given at 10th and 16th year.

**Pregnancy** – 2 dose in first pregnancy, 4 to 6 week apart

1 dose in second pregnancy, if within 3 year.



**Administration-**

**Dose-** 0.5 ml

**Route-** Intramuscular (IM)

**Site-**Outer upper arm

**Unwanted reaction-** mild local pain

**Contraindication-** H/O previous allergy, acute and severe infections

**Storage-**2 to 8 ° C, never freeze. Withstands up to 37° C

**Protective value-**20 year

**Availability-**Liquid in vials/ ampule

**Hepatitis B Vaccine**

**Type-** Monovalent antigen, plasma derived vaccine

**Composition-** 20 micrograms of 22 nm surface antigen particles (HBsAg) per ml

**Schedule-**

Primary- 3 doses at 0, 1, and 6 month

Booster- every 5 year

**Administration-**

**Dose-**0.5 mlfor children < 10 year, 1 ml for >10 year

**Route-** Intramuscular (IM)

**Site-**Outer mid-thigh/ outer upper arm

**Unwanted reaction-** rarely local redness and fever

**Contraindication-** hypersensitivity to previous dose

**Special precaution-** not administered to gluteal region, as the response is poor

**Storage-**2 to 8 ° C, never freeze.

**Protective value-**95 percent for 5 year

**Availability-** Cloudy Liquid in single / multi dose

**Rabies Vaccine- Beta Propiolactone (BPL)**

**Type-** Inactivated nervous tissue vaccine

**Composition-** fixed virus grown on sheep brain

**Schedule-**

**Primary-**daily for 7 to 10 days

**Booster-**Ifpassive immunization is given, three additional post- primary doses on 10th, 20th and 90th day is recommended.

**Administration-**

**Dose-** 2-5 ml daily for 7 -10 days depending upon wound type

**Route**-Deep subcutaneous using 1.5 inch long needle

**Site**-Anterior wall of abdomen around the umbilicus

**Unwanted reaction**- Severe, even fatal reactions, local allergic reactions, neuroparalyasis

**Contraindication**- Nil

**Special precaution**- different sites are chosen for each injection

**Storage**-room temperature

**Protective value**- 6 month

**Availability**-Now BPL vaccine is replaced more safe and potent cell cultured vaccine

**Rabies Vaccine- Cell Cultured Vaccine**

**Type**- Cell cultured- human diploid cell culture vaccine

**Composition**- inactivated rabies virus, flurry low egg passage strain

**Schedule**-

Primary -0, 3, 7, 14, 28 day

Started- as soon as possible after exposure

Booster 90th day

**Administration**-

**Dose**- 1 or 0.5 ml dose dependent of age, sex and weight

**Route**- Intramuscular

**Site**- Deltoid region

**Unwanted reaction**- local redness, fever

**Contraindication**- Nil

**Special precautions**- To be used immediately after reconstitution

**Storage**-2 to 8 ° C, should not be freeze

**Protective value**- 15 day to 3 month

**Availability**- ampoule with sterile water and syringe

**DTP+HEP B+HIB**

**Type**- Pentavalent, freeze –dried

**Composition**- Diphtheria, Tetanus, Pertussis, Hepatitis B, Haemophilus Influenza B

**Schedule**-

Primary- 6, 10, 14 week of age (before 6 year of age)

Booster- None



**Administration**-

**Dose**- 0.5 ml

**Route**- Intramuscular (IM)

**Site**- outer mid-thigh

**Unwanted reaction**- Local inflammation, mild fever

**Contraindications**- severe reaction to previous dose

**Special precautions**- not given at birth and after 6 year, used within 6 hour of reconstitution

**Storage**- 2 to 8 ° C

**Protective value**- Not known

**Availability**- 2 dose vial

**Chemical in Public Health**

**Phenol**

**Identification**- Phenol (Carbolic Acid)

**Nature**- Dark oily liquid with aromatic smell, crude phenol is mixture of phenol and cresol

**Action**- chemical disinfectant, two percent of phenol destroys and inhibits the growth of harmful microbes by coagulating the protoplasm of bacteria

**Uses**- Used as disinfectant and deodorant (> 10%)

Used on inanimate objects and excreta

Used as deodorant (10%)in toilets and for mopping floors(5%)

Pure phenol is used as a standard to compare the germicidal activity of disinfectants.

**Dettol**

**Identification**- Dettol

**Nature**- Chloroxylenol- Antiseptic (used on living tissue)

**Action**-Active against gram +ve but not on gram –ve bacteria, inactivated by organic matter

**Uses**- To clean wound and ulcers. 5% is used for general disinfection of – instruments, plastic equipment (contact period 15 minute)

**Savlon**

**Identification**- Savlon

**Nature**- disinfectant- Quanternary ammonium compound

Combination of Cetavlon and Hibitane