

CONTENTS

Editorial

1. **AYURVEDA FOR PREVENTION AND CONTROL OF DIABETES**1
**Abhishek Upadhyay*

Review Articles

2. **AYURVEDA FOR IMMUNITY**3
**Ish Sharma*
3. **ROLE AND IMPACT OF YOGA IN PREVENTION AND MANAGEMENT OF NON COMMUNICABLE DISEASES (NCDS)**5
Neelam Verma **Kavita M. Vyas *Veenu Malhotra*
4. **ROLE OF DIET AND LIFESTYLE IN PREVALENCE, PROGNOSIS AND MANAGEMENT OF NON-COMMUNICABLE DISEASES**11
Navdeep Kaur, **Kavita M. Vyas, *Veenu Malhotra*
5. **SWASTHAPANCHAKARMA A HEALTHY WAY TO LIVE LIFE**15
**Tribhuvan Pareek **Sandeep Singh Tiwari*
6. **A REVIEW ON YASHADA A METAL DESCRIBED IN RASA TEXTS**19
**Meghna Vaidya **Abhishek Upadhyay*
6. **CONCEPTUAL STUDY ON AMRUTHIKARANA**25
Naveen Kumar **Meenakshi Arora *Shivali Chopra*
7. **COMPARATIVE STUDY OF RESPIRATORY SYSTEM AS DESCRIBED IN AYURVEDA AND MODERN SCIENCE**28
**Saranjit Singh Datta **Mohinder Pal Singh*
8. **A PRELIMINARY REVIEW OF COMPARATIVE PHARMACOGNOSTICAL, PHYTOCHEMICAL AND ANTI MICROBIAL STUDY OF THE STEM BARK AND HEART WOOD OF DEVADARU (CEDRUS DEODARA ROXB.)**31
Amrita Sharma **Ghanshyam Bahetra *Rashmi Srivastava*
9. **QUALITY AND SAFETY OF AYURVEDIC DRUGS AND FORMULATIONS**34
**Nancy Shahi **Ish Sharma*
10. **AN INTEGRATIVE APPROACH IN DRUG DISCOVERY THROUGH AYURVEDA**37
Navneet Kaur, **P.A.Tiwari, *Tanvi Mahajan*
11. **A REVIEW ARTICLE ON CONCEPTUAL STUDY OF KRIKATIKA MARMA**41
**Sakshi **Pramod Anand Tiwari*
12. **CONCEPT OF AGNI AND ITS MODERN PERSPECTIVE**43
Rainy Sachdeva **Kavita Vyas *Veenu Malhotra*
13. **BEAUTY AND AUTHENTICITY OF TRIDOSHA**48
**Supriya Arora (1st Prize Winning, Ganga Sahey Panday Memorial All India Ayurved essay competition in 2016 organized by Vishav Hindu Parishad.*

To Contributors :-

Contributions to “Amrit Sanchar” are requested to be made in the following format.

★ **AMRIT SANCHAR- A JOURNAL ON AYURVEDA [ISSN: 2278-5531]**

Amrit Sanchar [ISSN: 2278-5531] a journal of Ayurveda is a yearly official publication of Babe Ke Ayurvedic Medical College & Hospital, VPO. Daudhar, Moga Punjab. The soul aim of this journal is to encourage scientific writing among Ayurveda scholars. The online version of the journal can be accessed on institute's website www.babekegroupofinstitutes.com.

★ **SCOPE OF AMRIT SANCHAR**

Following classes of manuscripts are welcomed for publication

- Articles on Fundamental principles of Ayurveda.
- Clinical Research articles providing evidence base to Ayurveda.
- Review articles related to Ayurveda, Yoga, Sidha, Unani & Homeopathy.
- Case reports, Case series, Epidemiological studies.

★ **GUIDELINES FOR PREPARING MANUSCRIPTS**

- Manuscripts can be submitted in word document.
- Manuscript should be prepared in Times New Roman font. Hindi & Sanskrit terms should be in Kruti dev.
- All Hindi/Ayurvedic/Sanskrit terms & Latin Names should be written in Italics.
- Title should be kept in upper case bold in font size 14.
- Headings should be kept in 12 font size bold Sentence Cases
- Manuscript should be prepared in 12 font size.
- Tables/Pictures should be numbered in consecutive order with order of citation in text and should be provided with self explanatory notes.
- Double spacing should be used in every line.
- Spelling & Grammatical errors should be taken care of.
- References with numbering in superscript should be provided in order of citation and should be given at end.
- Article can be shared by maximum four authors.
- Author name, designation, highest qualification, address for correspondence & email id should be provided.
- Authors can submit their manuscripts on college email id bkamritsanchar@yahoo.co.in [Preferably] or on bkamch_daudhar@yahoo.com

Editor

**Babe Ke Ayurvedic Medical College & Hospital, V.P.O. Daudhar,
Distt. Moga (Pb.) 142 053**

Contact No. :- 01636-253088, 94171-12450

AYURVEDA FOR PREVENTION AND CONTROL OF DIABETES

**Abhishek Upadhyay*

Diabetes mellitus, one of the four major lifestyle disorders is undoubtedly the most challenging health problem of 21st century. Long considered a disease of rich societies diabetes is now increasing universally, with the most striking and devastating increase seen in developing countries.¹ The first WHO *Global report on diabetes* demonstrates that the number of adults living with diabetes around the globe has almost quadrupled since 1980 to 422 million and is likely to double in next 20 years. In 2012 alone diabetes caused 1.5 million deaths, out of which 80% of deaths occurred in low and middle income countries like India. India had 69.2 million people living with diabetes as per the 2015 data.¹ Diabetes imposes a large economic burden on the global health care systems and the global economy. It has been estimated that the direct annual cost of diabetes to the world is more than US \$ 827 billion and is expected to continue. Low and middle income countries like India will carry a large proportion of this global health care expenditure burden than high income countries in future.¹

Keeping in view these facts, World Health Day this year focused on diabetes and called for scaling up efforts to prevent, care for and detect the disease to arrest the global epidemic particularly in low and middle income countries where it is hitting the most.²

This year GOI declared “*Rashtriya Ayurveda Diwas*” to be celebrated every year on the auspicious day of *Dhanwantari Jayanti*. Keeping in tune with the theme of World health day and seeing a potential area to focus, the theme for this year was “*Ayurveda for Prevention and control of diabetes*.” “*Mission Madhumeha through Ayurveda*” was also launched on this day in order to popularize *Ayurveda* among masses, to create awareness regarding prevention of diabetes, to screen and provide *Ayurvedic* treatment of diabetes.³

Diabetes in *Ayurveda* is described as *Prameha* with *Madhumeha* as one of its twenty types. *Prameha* is considered as a dreadful disease and is mentioned under eight dreadful diseases (*Ashta mahagadha*)⁴. *Prameha* is *Kapha* dominant *Tridoshic* disorder having ten *dushyas* which means it affects almost every tissue of the body and is responsible for wide range of complications. Diabetes in *Ayurveda* is classified etiologically into *Sahaj* (Genetic cause) and *Apathya nimitaj* (due to Faulty dietary habits) types, *Krishha* (lean) and *Sthula* (obese) types on the basis of morphological presentation

and into twenty types (10-*Kaphaj*, 6-*Pittaj*, 4-*Vataj*) on the basis of *Doshic* dominance.⁵

The key factors responsible for *Prameha* are faulty dietary habits and sedentary lifestyle⁵ along with some genetic predisposition.⁶ These causative factors will result in *Mandagni* (Impaired digestion & metabolism) and generation of *Ama dosha*. This generation of *Ama* occurs at GIT and cellular level. Being liquid in properties *Ama Dosha* when formed in excess will present through urinary symptoms (*Prabhuta Avila Mutrata*). This pathogenesis clearly indicates that it is a metabolic disorder.

Diabetes arising due to poor lifestyle is largely preventable⁷ and a diabetic can achieve good glycaemic control if an individual strictly follows the guidelines mentioned in *Ayurveda*. *Ayurvedic* concept of personalized care (*Prakriti*), daily (*Dincharya/Ratricharya*) & seasonal (*Ritucharya*) codes of conduct, *Dharniya* & *Adharniya vegas* will help an individual to keep his *Doshas* in balance thus maintaining his health. For managing aggravated *doshas* due to dietary indiscretions or seasonal influence, *Ayurveda* also has given the concept of seasonal biopurification which will remove the unwanted vitiated *Doshas* from body and will bring back the *Doshic* harmony.

Ayurvedic dietetics is another great area which is unique and can be utilized for prevention and control of diabetes because it offers the concept of individualized diet on the basis of one's constitution and the qualities of a particular diet article along with other factors to be considered while taking diet like *Matra*, *Desha*, *Kala*, *Samyoga*, *Agni* etc. Diet articles having *Yava*(Barley) as core ingredient are mainly mentioned in the management of *Prameha* in *Ayurvedic* texts which is having low glycaemic index. Along with these certain other areas which can help in bringing down the incidence of diabetes are *Sadvritta* & *Achara Rasayana* (Mental codes of conduct). These can help in combating stress which is an inescapable part of today's world. Stress management helps in better long term glycaemic control in Type 2 DM patients.⁸

Rasayana is another unique speciality of *Ayurveda* which has preventive as well as therapeutic potential in diabetes. Type 2 DM patients are having impaired *Agni* (Hypometabolism) & depleted status of *Ojus* (Immuno-compromised state) which can be countered by *Rasayana* therapy. They can be of great help in pre diabetics also

*Editor & Associate Professor, Department of Kayachikitsa
Babe Ke Ayurvedic Medical College & Hospital, VPO. Daudhar, Distt. Moga (Pb.)*

along with lifestyle modifications in place of metformin. Few of the *Rasayana* drugs which can be used in diabetes and pre diabetes are *Shilajeet*, *Haridra*, *Amla*, *Triphala*, *Ashwagandha*, *Giloy* etc.

Role of exercise cannot be ignored in prevention and management of diabetes as *Ayurvedic* texts have vividly described its role in prevention and management of *Prameha*. References of intensive and moderate exercises like digging of well, *Gadha Vyayama*, *Yojananam Shatam*, *Padaticharya*, *Chankramana*, *Munivartana* & *Bhikshavritti*⁹ (Lifestyle of a Saint) are available in *Ayurvedic* texts which signify how greatly our ancient *Ayurvedic* physicians have utilized the exercise in the treatment of *Prameha*.

The current scenario of diabetes in India is likely to worsen in future. Increased incidence of obesity in adolescents, shift in age of onset of diabetes to a younger age and increased prevalence of diabetes in rural India¹⁰ will pose a huge economic burden on economy of families as well as nation. In order to reduce premature mortality and morbidity from diabetes, many sectors of society have a role to play, including governments, employers, educators, manufacturers, civil society, private sector, the media and individuals themselves.

Ayurveda can be of great help to the world provided its potential is used in a better way. A great deal of political will and strong commitment and zeal of work is required from *Ayurvedic* community for that. More and more programmes on diabetes and its prevention and management through *Ayurveda* must be organized at schools, community level, government and private offices for creating awareness and educating the masses. Early identification of the high risk cases, pre diabetics

and diabetics and aggressive implementation of lifestyle modifications according to *Ayurvedic* principles would help in controlling and managing this dreadful disease. Researches carried out in more organized way are need of the hour to bring a substantial data in support of Role of *Ayurveda* in prevention and control of this continuously rising pandemic.

References

1. Global Report on Diabetes, World Health Organization. Available at <http://www.who.int/diabetes/global-report/en/>
2. World Health Day 2016: Beat Diabetes. Available at <http://www.who.int/campaigns/world-health-day/2016/event/en/>
3. National Ayurveda Day to be celebrated throughout the Country on 28th October. Available at <http://pib.nic.in/newsite/PrintRelease.aspx?relid=152010>
4. Pt. Kashinath Shastri, Dr Gorakha Natha Chaturvedi, Charaka Samhita, Indriya sthana, Chapter 9/8, Part-1, Chaukhambha Bharti Academy, Reprint 2005, p.1004.
5. Pt. Kashinath Shastri, Dr Gorakha Natha Chaturvedi, Charaka Samhita, Chikitsa Sthana, Chapter 6/4, Part-2, Chaukhambha Bharti Academy, Reprint 1998.
6. Pt. Kashinath Shastri, Dr Gorakha Natha Chaturvedi, Charaka Samhita, Chikitsa Sthana, Chapter 6/57, Part-2, Chaukhambha Bharti Academy, Reprint 1998.
7. Global Strategy on Diet, Physical activity and Health, World Health Organization. Available at <http://www.who.int/dietphysicalactivity/en/>
8. Surwit RS et.al; Stress management improves long-term glycemic control in type 2 diabetes. *Diabetes Care*. 2002 Jan; 25(1):30-4.
9. Shusruta Samhita of Shusruta with Nibandhasangraha Commentary. Edited by Vaidya Yadavji Trikamji, Chikitsasthana, Chapter 11/11-12, Chaukhambha Surbharti Prakashan, Varanasi. Reprint 2017.
10. Gupta M, Singh R, Lehl SS. Diabetes in India: a long way to go. *Int J Sci Rep* 2015;1(1):1-2.

AYURVEDA FOR IMMUNITY

*Ish Sharma

Introduction

Ayurveda is a lifestyle & the ancient most medical system of the world, based on unique, objective & practical principles. It is a time-tested knowledge system in prevention, management & cure of many diseases and the origin to most ancient philosophies and medical systems.

Ayurveda's philosophy involves a fine interplay among mind, body and spirit. Any imbalance in this consortium results in physical or psychological ailments. To maintain this harmony, *Ayurveda* believes in the treatment not for just the affected part, but the individual as a whole.

Immunity in *Ayurveda* has been held all important for almost every disease / health state as everyone exposed to a common disease causing agent does not show exactly similar signs & symptoms, by the virtue of specific individual immunity.

Causes of low immunity

Malnutrition General or Specific
Bacteria / viruses
Genetic factors
Erratic life style and food habits
Pollution
Stress

Symptoms of low immunity

Recurrent infections
Low vitality / strength
Early to develop diseases
Easily stressed

Ayurvedic Management

The capacity of the body which resists a disease is called Immunity. In *Ayurveda*, it is known as *Bala* or *Vyadhikshamatva* the efficiency to resist diseases. It encompasses a wider meaning of being resistant to stress, being physically strong and warding off diseases. There are many well known and some unique *Ayurveda* principles to enhance this immune strength. This array comprises of a balanced diet, mindset, lifestyle, detoxifying psycho-physical procedures & herbs.

Diet

The most important is to eat only when hungry & not by wall clock.

Light meals consisting of fibres, grains, vegetables and fruits are good.

Warm food and drinks are better than chilled ones. Milk should not be consumed with salt, fruits, non vegetarian food & alcohol.

Cooking with spices known to strengthen the function -ing of the immune system, including cumin, fennel, coriander, turmeric and ginger improves immunity.

Lifestyle

- Stress decreases immunity by altering hormonal levels so stress bursting through counselling sessions, positive thinking, meditation, *Yoga*, *Pranayam* breathing is of great help.
- Warm oil massage everyday is relaxing & improves WBC production & endorphin release.
- Get enough sleep.
- Outdoor exercises, *Yoga* and walk as a daily routine is helpful. Regular exercise enhances circulation and consistently moves toxins out of the body.

Herbs

Following herbs have evidence based claims to be genuine immunity boosters.

1. Ginger / *Sonth*

Peroxynitrite, formed from the reaction of superoxide and nitric oxide induces cellular and tissue injury, resulting in several diseases such as stroke, Alzheimer's disease, and atherosclerosis. Due to the lack of endogenous enzymes responsible for nitric oxide scavenging activity, finding a specific scavenger is of considerable importance. In a study, the scavenging effects of zingerone from ginger against nitric oxide & intracellular reactive species was examined. Zingerone inhibited the formation of nitric oxide mediated tyrosine nitration through electron donation. The study suggests that zingerone has an efficient nitric oxide scavenging ability, which may be a potent nitric oxide scavenger for the protection of the cellular defence activity against diseases.

2. *Azadirachta indica*/Neem

Neem is a blood purifier and hence is used in all skin troubles as leprosy, psoriasis, eczema etc. It has a marked action on liver, is used in loss of appetite, constipation and belching. It is used as a wormicidal in intestinal

Principal & H.O.D. Deptt. of Rog Nidana

Babe Ke Ayurvedic Medical College & Hospital, VPO. Daudhar, Distt. Moga (Pb.)

worms, is used against malaria, intermittent fever and other paroxysmal fevers, convalescence after fever. Alpha Lipoic acid derived from *Neem* leaves is a newly recognized, natural, co-vitamin and anti-oxidant and it has multiple applications.

3. *Curcuma longa* / Haldi

Haridra has fluoride which is essential for teeth. National Institutes of Health has four clinical trials underway to study curcumin treatment for pancreatic cancer, multiple myeloma, Alzheimer's, and colorectal cancer. A 2004 UCLA-Veterans Affairs study involving genetically altered mice suggests that curcumin, the active ingredient in turmeric, might inhibit the accumulation of destructive beta amyloids in the brains of Alzheimer's disease patients and can also break up existing plaques. A recent study involving mice has shown that *Haridra* slows the spread of breast cancer into lungs and other body parts. Turmeric also enhances the effect of taxol in reducing metastasis of breast cancer. A decoction of the rhizome of *Haridra* relieves the pain of purulent ophthalmia.

4. *Ocimum sanctum* / Tulasi

Anti-oxidant bioassay-directed extraction of the fresh leaves and stems of *Ocimum sanctum* and purification of the extract yielded some compounds and appreciable quantities of eugenol. These compounds show excellent anti oxidant activity. Preclinical and clinical studies have also proven anti-stress and immunostimulant property of Tulsi. In a study, the effect of *Ocimum sanctum* extract

was studied on the noise stress induced changes in albino rats. Pre-treatment with the *Ocimum sanctum* extract brought back the stress-altered values like leukopenia, increased corticosterone level and enhanced neutrophil functions to normal levels indicating the stress alleviating effect of *Ocimum sanctum*.

5. *Tinospora cordifolia*/Giloy

The whole plant and the juice of the leaves are traditionally used in various disorders. *Giloy* is regarded as one of the best psychotropic drug. It also has a direct *Medhya Rasayana* effect, which means that it enhances all aspects of mind power, including comprehension, memory and recollection. It is used in dyspepsia, emesis and intestinal worms and is anti leptotic. The plant is used to improve the immune system and the body's resistance to infections. *Giloy* helps increase the effectiveness of white blood cells and builds up the body's immune system. *Giloy* is also used as an immunomodulator, in obstructive jaundice, hepatic fibrosis, peritonitis, sepsis, edema and arthritis. The anti-inflammatory activity of this plant resembles that of non-steroidal anti-inflammatory agents. Reduction in blood sugar levels has been reported.

Conclusion

Ayurveda has a befitting resolve against the falling general immunity. The dietary and life style principles of *Din Charya*, *Ritu Charya*, *Swasthvrita* and *Achaar Rasayana* hold good and are relevant for today's generation.

ROLE AND IMPACT OF *YOGA* IN PREVENTION AND MANAGEMENT OF NON COMMUNICABLE DISEASES (NCDs)

*Neelam Verma **Kavita M. Vyas ***Veenu Malhotra

Abstract-

Non Communicable Diseases (NCDs) are the leading cause of premature death and disability worldwide. Death rates due to this particular group of diseases are accelerating globally (67.85%), especially in developing countries (28 million each year). It is predicted that NCDs will be causing seven out of every ten deaths in developing countries in next 5-6 years. Indian Traditional Medicine System, like *Ayurveda* and *Yoga*, has the potential to offer solutions to these challenging health issues. Lifestyle related problems have brought with them an increased risk of developing chronic NCDs such as- cardiovascular diseases, obesity, HTN and DM. *Yoga* is an art of righteous living or an integrated system for the benefit of body, mind and inner spirit. *Yoga* balances tripods of life, gets the body & mind benefitted by stimulation of parasympathetic and suppression of sympathetic nervous system and helps in controlled secretion of neurohormones which play an important role in maintenance of health and cessation of diseases. *Yoga* practices like *Asanas*, *Ujjayi Pranayama*, *Bhastrika Pranayama* and *Shatkarma* have been proved to be very beneficial in management of NCDs like DM, PCOS as they help in eliminating the root causes like lack of physical activity, stress and less self control.

Key Words: *Ayurveda*, lifestyle, NCDs, neurohormones, *Pranayama*, premature death, *Shatkarma*, *Yoga*.

Introduction- A non-communicable disease is a medical condition or disease that is non-infectious or non transmissible. NCDs can refer to chronic diseases which last for long periods of time and progress slowly. Sometimes, NCDs result in rapid deaths such as seen in certain diseases such as autoimmune diseases, heart diseases, stroke, cancers, diabetes, chronic kidney diseases, Osteoporosis, Alzheimer's disease, Cataracts and others. NCDs are distinguished only by their non-infectious cause, not necessarily by their duration (so should not be incorrectly called as mere chronic diseases as there are certain diseases which are chronic but are infectious e.g. HIV/AIDS)¹. Every year, at least 5 million people die because of tobacco use and about 2.8 million die from being overweight. High cholesterol accounts for roughly 2.6 million deaths and 7.5 million die because of high blood pressure. Risk factors such as a person's background, sedentary lifestyle, stress, environment and altered immunity increase the likelihood of certain NCDs. They include age, gender, genetics, exposure to air pollution, and behaviors such as smoking, unhealthy diet and physical inactivity which can lead to hypertension and obesity, in turn leading to increased risk of many NCDs like cardiovascular disorders (CVD), diabetes mellitus (DM), bronchial asthma etc. most NCDs are considered preventable because they are caused by modifiable risk factors and for that various *Yoga* practices such as *Asanas*, meditation, *Pranayama*, *Shavasana* which reduces stress and regular *Yoga* practice helps in weight management, e.g. *Surya-*

namaskaar, *Naukasana* *Pavanmuktaasana* for obese, *Pranayama* for bronchial asthma.

Yoga is one of the most ancient cultural heritages of India. The word *Yoga* in *Sanskrit* means "to unite" and so *Yoga* can be said to connote a unities discipline. In this sense it is an exercise in moral and mental cultivation that generates good health (*Arogya*), contributes to longevity (*Chirayu*), and the total intrinsic discipline culminates into positive and perennial happiness and peace. In Indian thought, everything is permeated by the supreme universal spirit (*Paramatma* or God) of which the individual human spirit (*Jivatma*) is a part. A *Yogi's* ultimate aim is to be able to attain this "union" with the eternal through certain mental and physical exercises. It is often said that *Hiranyagarbha* (The Cosmic Womb) himself had originally advocated the traditional system of *Yoga*, from which all other *Yoga* schools evolved. But for all extant knowledge of *Yoga* and its practices, such as *Yogasanas* and *Pranayama*, the entire credit goes to *Maharshi Patanjali*. And now *Yoga* has rapidly emerged out of traditional spiritualism, mysticism and cobwebs of mystery, it is now standing as a scientific discipline and its main stream of prospective development being in the direction of health and therapy.

Aims and Objectives

1. To study the prevalence, causes and risk factors of NCDs.
2. To explore the role and impact of *Yoga* in the management of NCDs.

*M.D. Final Year Scholar, ** Assistant Professor, ***Associate Professor,

PG Department of Samhita and Siddhanta, Babe Ke Ayu. Med. College and Hospital, VPO. Daudhar, Distt. Moga (Pb.)

Materials and Methods

The texts of *Yoga, Samhitas* related to *Yoga* were mainly referred for this study. Supportive texts of contemporary sciences were also utilized to comprehend the concepts. References from journals and internet were also considered in the study. Due to altered lifestyle patterns and stress there has been developed a bunch of diseases which can be dealt by the fact that-“Prevention is better than cure.” So, for highlighting this fact as *Yoga* being the key to this prevention technique this study was initiated.

Review on Literature

Prevalence of NCDs: Current global mortality from Non communicable diseases (NCDs) remains unacceptably high and is increasing. Thirty-eight million people die each year from NCDs, mainly from cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes. Over 14 million deaths from NCDs occur between the ages of 30 and 70, of which 85% are in developing countries. The 2012 population estimates from the most recent United Nations Population Division World Population Prospects² are reported in each profile for both total population as well as the population proportion between ages 30 and 70 years. World Bank income group data are based on 2012 Gross

National Income (GNI) per capita, calculated using the World Bank Atlas method³. The 2011 percentage of population living in urban areas was taken from the UN World Urbanization Prospects: The 2011 Revision⁴.

Mortality: Age- and sex-specific all-cause mortality rates were estimated for 2000-2012 from revised life tables, published in World Health Statistics 2014⁵. Total number of deaths by age and sex were estimated for each country by applying these death rates to the estimated resident populations prepared by the United Nations Population Division in its 2012 revision². Causes of death were estimated for 2000-2012 using data sources and methods that were specific for each cause of death⁶. Vital registration systems which record deaths with sufficient completeness and quality (of cause of death information) were used as the preferred data source. Mortality by cause was estimated for all member states with a population greater than 250,000.

Remedies for Cure and Prevention Other than the respective medicinal treatment for the diseased condition of the patient below said measures can be taken to prevent the NCDs⁷

CATEGORY	WHAT CAN BE DONE
Physical Activity	Organize and facilitate structured programs. Help patients set realistic goals. Reinforce importance of exercise. Outline and specify exercise prescription clearly to patient.
Medical Nutrition Therapy(MNT)	A trained nutritionist/Dietician should be the one giving MNT. Reinforce the importance of meal timings and following a healthy diet plan.
Stress Management	Help patient to identify and assess their stress. Suggest simple ways to cope. Refer to specialist/counselors when required.
Overall	Help patients identify barriers to noncompliance. Regularly counsel and motivate patients to comply to non-drug measures.

Yoga for prevention of NCDs: As mentioned in above said categories *Yoga* can be considered as the modality of prevention as all the things like physical activity, stress buster and non drug measures, everything is followed as a whole by it only. Some *Asanas* stimulate sluggish glands to increase their hormonal secretions.

All of these virtues of *Yoga* makes it a systematic methodology for an all round personality development i.e. physical, mental, intellectual, emotional and spiritual build up of a man. Thus *Yoga* is considered as a science of life and the art of living. In contrast to physical exercise, the *Yogic* practices influence various vital

organs and make them more active, probably due to improved microcirculation in vital organs and endocrine glands, resulting into improved metabolic and neuro physiological responses. So, nowadays, *Yoga* is accepted and practiced for fitness in terms of prevention and cure of diseases worldwide⁸.

Yoga its etymology and history: In *Vedic Sanskrit*, *Yoga* (from the root *Yuj*) means "to add", "to join", "to unite", or "to attach" in its most common literal sense. All further developments of the sense of this word are post-*Vedic*. More prosaic moods such as "exertion", "endeavour", "zeal", and "diligence" are also found in Indian epic poetry. There are many compound words containing *Yoga* in *Sanskrit*. *Yoga* can take on meanings such as "connection", "contact", "union", "method", "application", "addition" and "performance". In simpler words, *Yoga* also means "**combined**". For example, *Gunayoga* means "contact with a cord"; *Chandrayoga* has the astronomical sense of "conjunction of the moon with a constellation", *Pumyoga* is a grammatical term expressing "connection or relation with a man", etc. But the same compound is also given a technical meaning in the *Yoga Sutras*, designating the "practical" aspects of the philosophy, i.e. the "union with the supreme" due to performance of duties in everyday life⁹.

The origin of *Yoga* is a matter of debate. There is no consensus on its chronology or specific origin other than that *Yoga* developed in ancient India. Suggested origins are the Indus Valley Civilization (3300-1900 BCE) and pre-vedic Eastern India, the *Vedic* period (1500-500 BCE), and the *Srama?a* movement¹⁰. *Yoga* is one of the six orthodox systems of Indian Philosophy. It was collated, coordinated and systematized by saint *Patanjali* in his classical work- *The Yoga Sutras*, which consists of 185 verse aphorisms. He said *Yoga* is the blocking (*Nirodha*) of mental modifications (*Chitta vritti*) so that the seer (*Drashta*) re-identifies with the (higher) self. *Patanjali's* system has come to be the epitome of classical *Yoga* philosophy.

Bronchial Asthma and its management through Yoga

Asthma is considered to have a multi-dimensional etiology which includes allergy, climatic factors, stress, occupational hazards, endocrinal and emotional factors. Mental stress is known to trigger asthma by stimulating vagus nerve. Pathologically, there is mucosal inflammation, collection of inflammatory mediators, bronchial constriction, air trapping and later on remodeling of airways. Presently, it is difficult to control all the triggers in a patient, so it is better to improve the lung functions by the exercises. Focus should be on expiratory exercises as in bronchial asthma expiration is difficult, so exercises that support expiration are beneficial as forceful exhalation helps to open closed airways

in asthma and prolonged exhalation helps to expel more trapped air in asthma. *Yogasanas* and *Pranayama* for bronchial asthma- *Bhujangasana*, *Shalabhasana*, *Dhanurasana*, *Ardhamatsyendra asana*, *Trikonasana*, *Shavasana*. *Pranayama* being *Anuloma vilom* a deep breathing, *Ujjayi Pranayama* without *kumbhak*, *Nadi-shodhan Pranayama*, *Bhastrika Pranayama* and *Bhramri Pranayama*.¹¹

Diabetes Mellitus and its management through Yoga-

Types of Diabetes- Type 1, where there is no production of insulin and type 2, where the pancreas does not produce enough insulin. The practice of *Yoga* is an effective measure to treat type 2 diabetes, where the causes are attributed to life style and stress. Every organ in system can be affected by diabetes. There could be several associated problems- heart attacks, high blood pressure, diminished vision, kidney infection, brain hemorrhages, decrease susceptibility to all infections leading to abscesses and gangrenes etc. Regular *Yoga* practice can help reduce the sugar level in blood, along with lowering blood pressure, keeping your weight in check, reducing the severity of the symptoms and slowing the rate of progression of disease. It also lessens the possibility of further complications. Stress is one of the major reasons for diabetes. It increases the secretion of glucagon in the body. The consistent practice of *Yoga*, *Asanas*, *Pranayama* and a few minutes of meditation can help reduce stress in the mind and protect the body from its adverse effects. This in turn reduces the amount of glucagon and improves the action of insulin. The practice of *Yoga* is also proven to lose weight and slow the process of fat accumulation. *Suryanamaskar* and *Kapalabhati Pranayama* are some of the most effective *Yoga* processes that aid weight loss as obesity is a major contributing factor for diabetes. The *Pranayama* helps to oxygenate the blood and improves circulation. It also calms mind and gives rattled nerves, some needed rest. The *Asanas* which are effective for diabetes are-*Vajrasana* (relaxes mind), *Setubandhasana* (controls blood pressure, improves digestion and stretches the neck and spine), *Balasana* (great stress buster, calms mind and reduces fatigue), *Sarvangasana* (regulates working of thyroid gland as this gland is responsible for functioning of digestive, nervous and reproductive system also it regulates metabolism), *Mandukasana*, *Halasana* (stimulates thyroid gland, parathyroid and abdominal organs and keeps the hormonal level in check), *Supta Vajrasana*, *Chakrasana*, *Natrajasana*, *Purna Shalabhasana*, *Tiryak Bhujangasana*, *Dhanurasana* and *Uddeyan Bandha*.¹²

Obesity and its management through Yoga- Obesity is becoming a common health hazard and leads to many other diseases like coronary heart diseases, high blood

pressure, diabetes and shorter life span. The main cause of obesity is excessive eating. Weight can increase because of digestive problems. Useful part of the blood is absorbed in blood during the digestion. If there are some problems in this process then it may result in accumulation of fats. If the digestive problem is cured then obesity can be reduced. Regular *Yoga* practice can help in weight management. Firstly, some of the *Asanas* stimulate the sluggish glands to increase their hormonal secretions, then the thyroid gland gets activated which has big effect on body fat metabolism, and as the fat metabolism increases, fat is in turn converted into energy which means patient will loose fat as well as he will have better muscle tone and a higher vitality level. *Yogasanas* for Obesity are- *Paschimottanasana, Saral Hasta Bhujangasana, Sarvangasana, Halasana, Dhanurasana, Veerasana, Trikonasana, Ardha mata-syedrasana, Uttanapadasana, Chakrasana, Ushtrasana, Udarasanchalana* etc. Along with *yogasanas*, *Suryanamaskaar* is very effective for obesity reduction. Also *Pranayama* (*Suryabhedana, Bhrasrika* and *Kapala bhati*), cleansing processes like *Agnisar, Uddiyanbandha, Vaman dhauti, Shankhprakshalana* etc help in reducing the obesity.¹³

PCOS (Polycystic Ovarian Syndrome) and its management through *Yoga*- One in every ten women suffer from PCOS, an emerging lifestyle disorder that is the leading cause of female infertility and also a risk factor for diabetes type-2, cardiovascular diseases, endometrial cancer etc. PCOS is a combination of disorders characterized by excessive androgens production by the ovaries which interferes with the reproductive, endocrinal and metabolic functions. Mostly women know that PCOS is an endocrinal disorder but they are unaware of it that lifestyle also affects it. Obesity and stress both acts as trigger factor for PCOS. PCOS is characterized by Obesity, Anovulation associated with primary or secondary infertility, hirsutism, abnormal menstrual pattern, increased incidence of pregnancy loss and pregnancy related complications. PCOS results of Stress, disturbed HPO axis or hyperandrogenaemia. Insulin resistance is a common finding in PCOS that is independent of Obesity. In today's pattern of lifestyle stress is bound to be generated. So *Yoga* is one of the important refreshing and rejuvenating modalities which can contend and even root out stress completely. *Yoga* helps to regulate the endocrine glands thereby balancing the hormones. *Yoga* aids in keeping ovary and uterus healthy and solves issues like infertility, weight gain and psychological problems. There are many *Yoga* postures, which are good for PCOS, some of important *Yoga* postures are- *Mayurasana*¹⁴ (it rapidly destroys all the diseases of the glands, abdomen etc. and balances the humors of *Vata*

and *Pitta*, stimulates the *Jatharagni* and completely digests the food), *Suryanamaskar* (controls hormonal imbalance, balances HPO axis, brings cortisol level to normal, controls weight, detoxifies and de-stresses the entire system), *Bhujangasana* (exerts pressure on stomach and helps to stimulate ovarian function), *Naukasana* (this posture puts excess pressure on the abdominal region), *Nadishodhana Pranayama* (helps to soothe mind and refreshes brain nerves, lowers the production of stress hormone cortisol which is major cause of visceral adiposity and weight gain thus cures PCOS naturally), *Bhramari Pranayama* (controls all the negative domain such as stress, strain, anxiety, tension, depression etc. so helpful in controlling mood swings), *Bhadrasana* (helps to open up pelvic area and relieves menstrual discomfort).

Stress and its management through *Yoga*- Stress is a general word termed to various mental and bodily pressures experienced by people throughout life. It is only in the last half century that the role of stress in every ailment from the common cold to AIDS has been emphasized, and the mechanisms involved in this process have been studied. The word stress is derived from Latin word 'stringer' which means to be drawn tight. It is defined as a state of psychological and physiological imbalance resulting from the disparity between situational demand and the individual's ability and motivation to meet those needs. Stress can be classified in two types-positive stresses called Eustress another one is negative stress called as Distress. Eustress challenges to adapt and grow while distress can deplete or destroy the energy for life. *Yoga* is an antidote for stress and a potentially powerful complement to living a healthy, balanced life. In *Yoga*, breathing using the diaphragm stimulates the Vagus nerve and helps reduce the stress (Vagus nerve is the main nerve of parasympathetic nervous system, extends from the medulla through the diaphragm to abdomen, and responsible for slowing respiration reducing heart rate, lowering blood pressure stimulating digestive activity). *Yogasanas* for stress are - *Adhomukhashvanasana* (energizes the body and offers relief from indigestion problems, pose is known to relax the body), *Shavasana* (relaxes completely, brings breathing to normal levels and helps to soothe down stress levels), *Dhanurasana* (stress and fatigue buster), *Uttanasana* (helps in preserving proper functioning of nervous system by improving blood supply throughout the body), *Marjarasana* (helps in stretching the spine and toning the muscles and organs of the abdomen).¹⁵

Gastrointestinal tract disorders and their management through *Yoga*- Gastrointestinal (GI) disorders are one of the most common long-term illnesses of the

population. The anorectal complicacy is another associated suffering. Upset of stomach can also be caused by life style factors such as eating too fast or eating on the run, emotional stress, smoking, too much alcohol or caffeine, travel (motion sickness) and medical reasons may be due to gastro esophageal reflux disease. The *Yogic* techniques revive the disorder of the body physiology due to the *Pranic* flush. *Yoga* is the only mean by which one can really expand consciousness by which it can alter the state of mind. The control of hormones and the reflexes of the nervous system are possible. *Yoga* helpful for GI tract disorder are-*Bhramari Pranayama*¹⁶ (improves autonomic functions of the body), *Shankha Prakshalana* (a thorough cleansing technique, by which various metabolic wastes and chemical wastes causing stiffness, lethargy and heaviness such as lactic acid and uric acid are washed away), *Kunjla kriya* (is one of the *Yogic* technique that removes the mental roots of many diseases: hate, jealousy, fear and insecurity. Also it cures acidity and gas in stomach, nausea, food poisoning, indigestion, hyperacidity, asthma, bronchitis, headaches) and *Ashwini mudra* (gives control of the anal muscles and conserves the *Prana* that moves down and escapes the body and turn upwards for spiritual purpose).¹⁷

Hypertension and its management through *Yoga*-

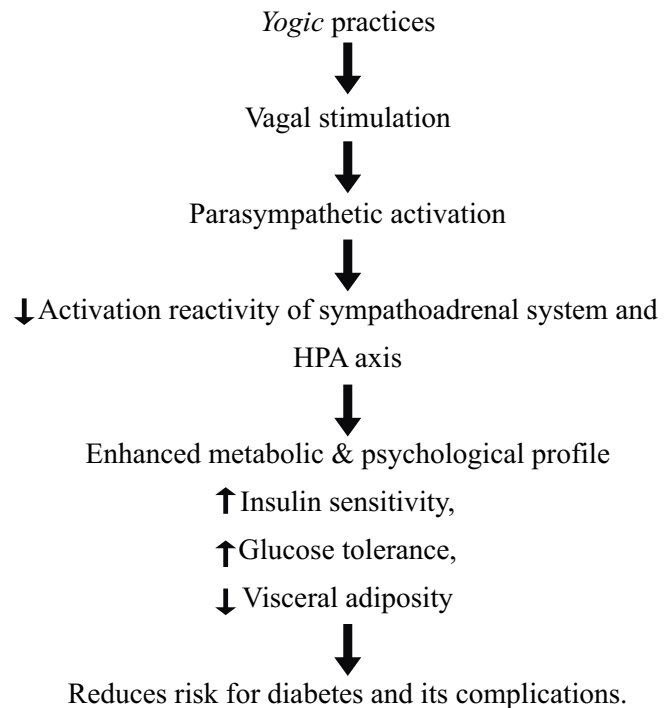
Hypertension is one of the most common lifestyle related disorder and leading cause of morbidity and mortality which occurs when pressure inside the blood vessels is higher than the normal expected values for age and gender due to deposition of cholesterol resulting into hardening of arteries which further leads to increased risk of heart disease, stroke, kidney damage etc. *Yogasanas* and *Pranayama* helpful for this are-*Makarasana, Matsyasana, Vajrasana, Padmasana, Siddhasana, Bhujangasana, Shalabhasana, Anuloma-viloma Pranayama, Bhramari Pranayama* etc. as they reduces fatigue and release all the tension.⁸

Discussion: *Yoga* effects on every cell of the human body bringing about better neuro-effector communication, improves strength and enhances optimum functioning of all organ systems while increasing resistance against stress and diseases with resultant tranquility, balance, positive attitude and equanimity.

In Respiratory Disorders: Scientific basis of using *Yoga* as a therapy in chronic obstructive pulmonary diseases is well established with significant improvements in lung function. *Yogic* cleaning techniques like *Dhautikriya* & *Netikriya* remove excessive mucous secretions, decrease inflammation, reduce bronchial hypersensitivity and thereby increase provocation threshold; while *Kapalabhati*, through forceful

exhalations, improves the capacity to exhale against resistance. Also well performed slow *Yogic* breathing maintains better blood oxygenation, reduces sympathetic activation during altitude induced hypoxia and decreased chemo reflex sensitivity to hypoxia and hypercapnia.

In Type-2 Diabetes Mellitus: *Yoga* acts on Hypothalamic-Pituitary-Adrenal (HPA) axis to reduce cortisol level in plasma. Further, reduces sympathetic nervous system tone and increases vagal activity.



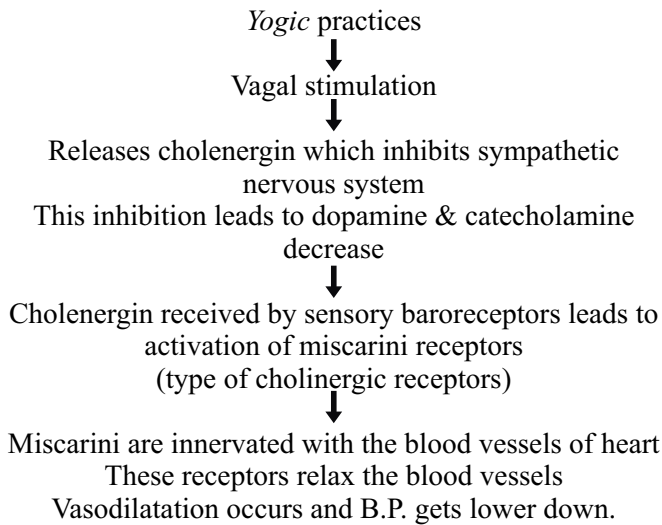
In managing stress: It is well established that stress weakens our immune system. Scientific research in recent times has shown that the physiological, psychological and biochemical effects of *Yoga* are of an anti-stress nature. The stress produces:¹⁸

- An imbalance of the autonomic nervous system with decreased parasympathetic and increased sympathetic activity, Under activity of the gamma amino-butyric acid (GABA) system, the primary inhibitory neurotransmitter system.
 - Increases allostatic load.
 - Scientific research in recent times has shown that the physiological, psychological and biochemical effects of *Yoga* are of an anti-stress nature.
- *Yoga* leads to an inhibition of the posterior or sympathetic area of the hypothalamus resulting in correction of under activity of the parasympathetic nervous system and GABA systems in part through stimulation of the vagus nerves, the main peripheral pathway of the parasympathetic nervous system and reduces allostatic load. Also *Yoga* practices inhibit the

area responsible for fear, aggressiveness and rage and stimulate the rewarding pleasure centers in the fore-brain and other areas leading to a state of bliss and pleasure. Inhibition results in reduction of anxiety, heart rate, respiratory rate and blood pressure.¹⁹

In cardiovascular conditions: *Yoga* helps in regression of coronary lesions, improvement in myocardial perfusion and reduction in systolic and diastolic pressure. Longer duration of *Yoga* practices produces better cardiopulmonary endurance.

In hypertension: Stress related hypertension can be easily prevented by *Yogic* practices.



Conclusion: *Yoga* immediately reduces the sympathetic response or stress and relaxes the body and mind. It leads to an inhibition of the posterior or sympathetic area of the hypothalamus and this inhibition results in lower anxiety, lower heart rate, lower respiratory rate and blood pressure. It leads to significant increase in serotonin levels coupled with decrease in the levels of monamine oxidase (MAO), an enzyme that breaks down neurotransmitters, and cortisol due to which the stress gets reduced which is in turn the root cause of majority diseases. The actual solution for global peace is dependent on each and every individual in the society, by attaining inner peace and harmony through *Yogic* practices to heal entire sufferings.

References:

1. Wikipedia: The Free Encyclopedia [Internet], Wikimedia foundation, Inc., Noncommunicable Diseases; [modified 2016 Aug 9 at 04:40]; [cited 2016 Aug 13]; Available from https://en.wikipedia.org/wiki/Non-communicable_diseases
2. World Population Prospects - 2012 revision. New York, United Nations Population Division, 2013.
3. World Development Indicators. Washington, DC, International Bank for Reconstruction and Development/ The World Bank, 2014.
4. World Urbanization Prospects: The 2011 Revision, CD-ROM Edition. New York, United Nations Population Division, 2012.
5. World Health Statistics 2014. Geneva, World Health Organization, 2014.
6. WHO methods and data sources for country-level causes of death 2000-2012. Geneva, World Health Organization, 2014.
7. Paulomi S, Kumaraiah V, Munichoodappa C, Prasanna Kumar KM. Management of children with diabetes mellitus-psycho-social aspects. Int J Diab Dev Countries 2001;21:71.
8. Therapeutic Potential of Yoga; by Dr. Singh Rani, Deptt. of Siddhant Darshan IMS BHU.
9. Sir Williams Monier. Sanskrit-English Dictionary. Edited by Leumann E. and Cappeler C. New Delhi: Munshiram Manoharlal Publishers; 2002.p.804
10. Wikipedia: The Free Encyclopedia [Internet], Wikimedia foundation, Inc., Yoga; [modified 2016 July 22 at 11:45]; [cited 2016 Aug 14]; Available from <https://en.wikipedia.org/wiki/yoga>
11. Nagarathna R, Nagendra HR. Bangalore: Svyasa Publication; 2004. Integrated approach of Yoga therapy for positive health; pp.3.2.7-6.6.1.
12. [cited 2016 Aug 14]; Available from www.diabeteswellbeing.com
13. Management of obesity by Yoga & Diet; by Dr. Sharma Poonam, Deptt. of Dravyaguna IMS BHU.
14. Verse 31 Hatha Yoga Pradipika Chaptr 1P.3 composed by Svamarama Yogi, Verses grouped by Swami Kripalu, edited by Yoganand Michael Caroll.
15. Yog: A Noble Way to Handle Stress; by Dr. Dixit Ritika, Deptt. of Ayurveda, Shubhdeep Ayurveda Medical College & Hospital, Indore, M.P.
16. Mishra .P.K, Tripathy S, Pradhan C.R, Patra B.K & Chandwadkar S. (2008). An Introduction to Yoga; Orissa State Bureau of Textbook Preparation and Production, India; 1-7
17. Lundberg J, Rinder J, Weitzberg E, Alving K (1994). Nasally exhaled nitric oxide originates mainly in the paranasal sinuses. Actaphysiol Scand; 152:431-32.
18. Streeter CC, Gerbarg PL, Saper RB, Ciraulo DA, Brown RP. Effects of Yoga on the autonomic nervous system, gamma-aminobutyric-acid, and allostasis in epilepsy, depression, and post traumatic stress disorder, Med Hypotheses 2012; 78:571-9
19. Desikachar K, Bragdon L, Bossart C. The Yoga of Healing: Exploring yoga's holistic model for health and wellbeing. Int J Yoga Ther. 2005; 15:17-39.

ROLE OF DIET AND LIFESTYLE IN PREVALENCE, PROGNOSIS AND MANAGEMENT OF NON-COMMUNICABLE DISEASES

*Navdeep Kaur, **Kavita M. Vyas, ***Veenu Malhotra

Abstract

Proper diet and life style are important parts of leading a healthy life. They can help to reach and maintain a healthy weight, reduce the risk of diseases and promote mental & physical well being. According to *Ayurveda*, one who takes healthy diet and adopts healthy lifestyle, by following daily and seasonal regime, always remains healthy. Today, wide changes have occurred in food habits and lifestyle due to industrialization and urbanization. Malnutrition, faulty dietary habits, sedentary life style, smoking, alcohol consumption and stress have caused various types of Non Communicable Diseases (NCDs), like DM and IBS. NCDs, all known as chronic diseases, do not transmit from person to person, tend to progress slowly, include endogenous as well as psychic diseases and are highly prevalent globally. In India, every year, around 5.8 million people die from NCDs while 38 million deaths occur due to the same cause, worldwide. Faulty diet and lifestyle may cause genetic mutations or alter disease suppressing effect of genes and hence cause CVDs, Asthma, DM and Cancer. Moreover, if a person continues indulging in causative factors, even medicine cannot improve the prognosis. Hence, only healthy diet and lifestyle modification can help reducing the global burden of NCDs.

Key Words *Ayurveda*, Diet, Life Style, Non- Communicable Diseases (NCDs).

Introduction

Non-Communicable diseases (NCDs) have been traditionally associated with developed countries. However in recent decades, the prevalence of these diseases and their antecedent risk factors has rapidly increased in developing countries, too. These changes are caused to a large extent by dietary changes in relation to socio-economic and living environmental conditions¹. India too illustrates this health transition, which positions NCDs as a major public health challenge of growing magnitude in the twenty-first century. These diseases are driven by forces that include rapid unplanned urbanization as well as globalization of unhealthy diet and lifestyle. For example, 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' or metabolic / physiological risk factors which can lead to cardiovascular disease, an NCD. In terms of attributed deaths, the leading metabolic risk factor globally is

elevated blood pressure (to which 18% of global deaths are attributed) followed by overweight, obesity and raised blood glucose².

Aims & Objectives

- i) Understanding the role of diet and lifestyle in prevalence, prognosis and management of NCDs.
- ii) To aware the society about the risk factors of NCDs including diet and lifestyle, so as to prevent the occurrence of NCDs.

Literary Review

Prevalence of NCDs

NCDs affect people in every corner of the world. of 52.8 million deaths that occur worldwide, 38 million were due to NCDs in 2015. Almost three quarters of NCD deaths-28 million occur in low and middle income countries.16 million NCD deaths occur before the age of 70 years and 82% of these “premature” deaths occur in developing countries².

Table 1: Death Rate due to NCDS

S.No	Disease	Worldwide	India
1	Cardiovascular diseases	17.5 million people	45%
2	Cancer	8.2 million people	12%
3	Respiratory diseases	4 million people	22%
4	Diabetes Mellitus	1.5 million people	3%

*M.D. Final Year Scholar, ** Assistant Professor, ***Associate Professor,

PG Department of Samhita and Siddhanta, Babe Ke Ayu. Med. College and Hospital, VPO. Daudhar, Distt. Moga (Pb.)

These 4 groups of diseases account for 82% of all NCD deaths. In India, the probability of dying between ages 30 and 70 yrs from four major NCDs is 26%³. Also the prevalence of accident and injuries, an NCD, is increasing rapidly in which 93% incidents were due to unnatural causes while only 7% were attributed to natural causes. The rate of mortality among different age groups, due to accidents and injuries, was: 8.2 % (< 14yrs), 62% (15-44yrs), 20% (45-59yrs) and 9.2% (>60yrs). 73% of total deaths occurred among men, with a ratio of 3:1 between men and women⁴. The prevalence of the modifiable behavioural risk factors worldwide are Tobacco accounts for around 6 million deaths every year including the effects of exposure to second-hand smoke. About 3.2 million deaths annually can be attributed to insufficient physical activity. More than half of the 3.3 million annual deaths from harmful drinking are from NCDs.

Determinants of Health Transition

Health transition, where by NCDs are being more & more prevalent, is principally due to combination of demographic and lifestyle changes. Due to socio-economical development, there is a decline in the mortality attributable to infectious diseases and nutritional disorders. As more individuals survive to enter the middle ages, the years of exposure to the risk factors of chronic diseases increase. Simultaneously, urbanisation, industrialisation and globalisation are often accompanied by several undesirable lifestyle alterations in the form of a diet rich in saturated fat, salt and excess calories, decreased physical activity, addictions like tobacco & alcohol and augmentation of psychosocial stress. Thus, the dose and duration of risk factor exposure, both increase resulting in manifestation of large numbers of lifestyle related diseases and their consequences⁵.

Dietary transition

The industrial revolution in the last 200 years, has introduced radical changes in methods of food production, processing, storage and distribution. Economic developments together with recent technological innovations and modern marketing techniques have modified dietary preferences and have consequently led to major changes in the composition of diet. There was a shift towards high fat, refined carbohydrates and low-fibre diet. The dietary transition took place first in the industrialized world. The accelerating factors for the rapid transition include - exposure to the global mass media, shift in occupational structure including the trend from labour-intensive occupation and leisure time activities toward more capital-intensive, less strenuous work and leisure. Often overall nutrient intake adequacy improves with an increasing variety of foods, but the

movement towards more fats, salts, sugars and refined foods quickly moves beyond this more optimal state to one in which diet contributes to rapidly escalating rates of obesity and chronic diseases. Salt-sensitive hypertension or fat-sensitive cardiovascular disorders that may not have been expressed on a traditional diet have become much more prevalent with current dietary changes. This transition is accelerated by a high urbanization rate, which is usually accompanied by decreased physical activity, overweight and obesity. Urbanisation increased labour-force participation of women and it indirectly affected the diet of the family. Whereas the food supply of rural populations comes from its own production, the food supply of urban populations has to be purchased, providing new options, new norms and values. With a monetary economy, comes more store brought and processed foods, rather than fresh animal products and garden produce⁶.

Lifestyle Patterns and Health

Lifestyle refers to the characteristics of inhabitants of a region in special time and place. It includes day to day behaviours and functions of individuals in job, activities, fun and diet. In recent decades, life style, as an important factor of health, is more interested by researchers. Variables of lifestyle that influence health can be categorized in some items: Diet and Body Mass Index (BMI), Exercise, Sleep, Sexual behaviour, Substance abuse, Medication abuse and application of modern technologies. For example, substance abuse like Smoking increases blood cholesterol level with the ratio of high density lipoprotein (HDL) cholesterol to low density lipoprotein (LDL) cholesterol being lower in smokers as compared to non-smokers⁷. Sedentary lifestyle is a major independent risk factor for non-communicable diseases (NCDs) such as hypertension, type 2 diabetes mellitus, obesity and cardiovascular disease, often referred to as 'LifeStyle Diseases' (LSDs) . Factors that contribute to a sedentary lifestyle are:

- Increased use of computers, TV and other 'screens' (tablets and smart phones) for work, school, entertainment and social interaction.
- Online shopping.
- Increased access to motorised transport.
- Urban design not favouring walking or cycling.
- Automated manufacturing processes.
- Reduction in sports activities in schools⁸.

Therefore, campaign for healthy lifestyle among people who smoke, are heavy drinkers of alcohol as well as people who live unhealthy lifestyles is necessary.

Socio-economic impact of NCDs

Death or disability from NCDs in the productive middle ages results in major economic burdens on the affected

individuals, their families and society as a whole. The management of established NCDs is often technology intensive and expensive. Though NCD epidemics usually originate in the upper socio-economic strata, they diffuse across the social spectrum, with the social gradient ultimately reversing and the poor becoming predominantly afflicted. Vulnerable and socially disadvantaged people get sicker and die sooner than people of higher social positions, especially because they are at greater risk of being exposed to harmful products, such as tobacco or unhealthy food, and have limited access to health services⁵.

In low-resource settings, health-care costs for cardiovascular diseases, cancers, diabetes or chronic lung diseases can quickly drain household resources, driving families into poverty. The exorbitant costs of NCDs are—they often include lengthy and expensive treatment.

Non communicable diseases (NCDs) contribute to around 5.87 million deaths that account for 60 % of all deaths in India. India shares more than two-third of the total deaths due to NCDs in the South-East Asia Region (SEAR) of WHO.

Prognosis

Dietary habits and lifestyle pattern play a key role in the prognosis of NCDs. Even if sufferers of NCDs take proper medication, the prognosis of their diseases may be poor until the diet and life style modifications have not been implemented. Like, in case of hypertension (HTN), one should avoid excessive intake of salt. A CVD patient who is involved in the sedentary job, like sitting and working in front of computer whole day, should avoid consumption of fatty foods. If these patients continue eating such foods, even their medicine cannot give optimal effect and the disease may dangerously boost up any time.

Management of NCDs

First of all, for the Prevention and Management of NCDs, the diet habits as well as lifestyle pattern should be focused. Appropriate dietary habits, doing physical activities or adoption of regular exercise practice and least consumption of tobacco & alcohol, is very helpful in treating NCDs. It's important to focus on lessening the risk factors associated with these diseases. Low-cost solutions exist to reduce the common modifiable risk factors (mainly tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol) and map the epidemic of NCDs and their risk factors.

Other ways to reduce NCDs are high impact essential NCD interventions that can be delivered through a primary health-care approach to strengthen early detection and timely treatment. Traditionally, public health approaches to NCD control have been a high risk strategy, targeting persons with high levels of risk

factors and employing interventions to reduce them, usually with drugs and a population strategy which attempts to reduce risk factor levels in the whole community, usually through lifestyle related measures. However, population-based and lifestyle linked strategies are likely to prevent the acquisition or augmentation of NCD risk factors in transitional societies like India, while avoiding the economic and biological costs of pharmacological risk reduction strategies practised in the developed countries.

At the population level, programmes for promotion of a “Health promoting diet” (calories appropriate to the level of physical activity; moderation in the intake of saturated fat, salt, and refined sugar; high intake of fresh fruit and vegetables; fish in preference to red meat in non-vegetarian diets), adequate physical activity and regular exercise are required. These are likely to have benefits for a wide range of NCDs, especially CVD, diabetes, hypertension, and some cancers which are related to saturated fat intake. Tobacco control is a major public health imperative which will provide the largest benefit for NCD prevention.

Whether it is food (production, pricing, labelling) or tobacco (production, sale, advertising) or physical activity (a conducive transport policy which favours urban cycle lanes and curbs vehicular transport as well as provides facilities for leisure time exercise in community playgrounds), active health policy measures are required alongside public health education. An enlightened policy and an empowered community can together stall the advance of the emerging epidemics of NCDs in India.

Government of India initiated an integrated National Programme for Prevention and control of Cancers, Diabetes, Cardiovascular diseases and Stroke (NPCDCS). The focus of the programme is on health promotion and prevention, strengthening of infrastructure including human resources, early diagnosis & management and integration with the primary health care system through NCD cells at different levels for optimal operational synergies⁹.

Discussion

The estimated prevalence of NCDs indicates that the major causative factors for NCDs are dietary habits like more consumption of fat rich diet, junk foods, dairy products and the preservatives as well as lifestyle habits like substance abuse, addiction, less manual work and lack of physical activities, load of stress etc. In case of accident & injuries, prevalence due to unnatural causes is more. In *Ayurveda*, *Prajnaparadha* is considered to be the cause of all diseases as well as unnatural deaths. So, if one follows the rules of *Swasthavritta* and *Sadvritta*, one could protect one's self from the demerits of *Prajnaparadha*. Also the ratio of accident & injuries

is more in men than women because men are more used to driving and so are exposed to risk factors. Sometimes they consume alcohol while driving, that's why they are more vulnerable to NCDs risk.

Global diet is going through a remarkable transition: staple foods are becoming more refined and processed, fat and meat intake is increasing, processed dairy products and other processed foods are being consumed more than before and larger number of meals are eaten outside home, making household more reliant on the food industry, food vendors and markets. So, the dietary as well as lifestyle transition like consumption of alcohol & tobacco, stress and physical inactivity are associated with the escalating trends of NCDs. In *Ayurveda*, even in daily and seasonal regimen, the importance of dietary habits and lifestyle is mentioned.

NCDs mostly affect the middle or young age group which is the most efficient age group. So, with these diseases the productive age group is harmed, in a result a Nation can be harmed in terms of socio economic status. Other than the mortality rate, the rate of DALY (Disability Adjusted Life Years) due to NCDs is also high. DALY is an indicator of burden of disease on a population. It takes into account the disability caused by disease or injury. For example, in case of diabetes, if the complication like diabetic gangrene occurs, then amputation of the leg may be needed to done. DALY also occurs in the case of Ischemic Heart Disease, CerebroVascular Disease, road traffic accidents and alcohol use disorders etc. As NCDs treatment is expensive, therefore the nation could bear a burden in their funding.

In the prognosis of the NCDs, diet and life style play an important role. Such as in osteoarthritis patient, heavy exercise is contraindicated but in case of obesity heavy exercise is recommended. In *Ayurveda*, season wise rules of diet, lifestyle, sleep etc are mentioned. If these rules are not followed, then disease can occur.

According to *Acarya Caraka*, for the treatment of any disease, three steps are to be followed in which one is, to avoid the causative factors¹⁰. Like in case of diabetes, if the patient is taking medicine regularly but he fond of sweets, then the medicine's dose can be increased and further complications may also occur. Therefore, its necessary to give up the causes of NCDs otherwise the prognosis of the disease is worsened. Various studies have shown that the primary determinants of most cancers are life style factors, such as tobacco, faulty dietary habits and infectious agents rather than inherited genetic factors.

For the management of NCDs, three types of approaches were mentioned earlier. These are-

Public Health Strategy- in which every individual should be focussed

Population Strategy- in which mass community should

be focussed

These two strategies are followed in developing countries

Pharmalogical Risk Reduction Strategy followed in developed countries.

List of the treatment mentioned for NCDs

Three ways strategies

Health promoting diet & regular exercise

Health policy measures

Public Health Education

National programmes

Conclusion

NCDs constitute not only a major threat to the health of an individual but also a major challenge for overall development of the country. The four major NCDs are the result of four common shared life style related Modifiable Risk Factors viz. tobacco use, physical inactivity, unhealthy diet and alcohol use which in turn lead to key metabolic or pathological changes like high blood pressure, obesity, high blood glucose and high cholesterol. The NCDs epidemic exacts a massive socio-economic toll throughout the world. It is raising rapidly in lower income countries and among the poor in middle and high income countries. It is important to find cost effective solutions to change unfavourable trends. Diet together with life style should get a major focus in public health policies for combating the emergence of NCDs.

References

1. Afoakwah A. The impact of life style variables and dietary patterns on Non-communicable diseases [Internet]. 2012 [cited 2016, August 9]. Available from: <http://www.academia.edu>
2. Who / Non-communicable diseases [Internet]. [Updated 2015 Jan, cited 2016 August 10]. Available from: <http://www.who.int/media/centre/factsheets>
3. World health organization. Burden of NCDs and their risk factors in India [Internet]. 2014 [cited 2016, August 16]. Available from: <http://www.searo.who.int>
4. Upadhyay RP. An overview of the burden of non communicable diseases [Internet]. 2012 [cited 2016, August 16]. Available from: <http://www.ncbi.nlm.nih.gov>
5. Ready Srinath K. Prevention and control of non-communicable diseases: status and strategies [Internet]. 2003 July [cited 2016, August 11]. Available from: <http://www.icrier.org>
6. Who. Globalisation, diet and non-communicable diseases [Internet]. 2003 [cited 2016, Aug 16]. Available from: <http://www.who.int>
7. DD Farhud. Impact of life style on health [Internet]. 2015 [cited 2016, August 16]. Available from: <http://www.ncbi.nlm.nih.gov>
8. Target Stephen. Sedentary lifestyle [Internet]. 2016 [cited 2016, August 12]. Available from: <http://www.aspetar.com>
9. Kumar S and Kaushik A. Non-communicable diseases: A challenge [Internet]. 2013 [cited 2016, August 8]. Available from: <http://www.iapsmupuk.org>
10. Agnivesa. Caraka Samhita elaborated by Caraka and Drdhabala with Ayurveda-Dipika Commentary by Acarya Cakrapanidatta. Edited by Vaidya Acarya Yadavji Trikamji. Varanasi: Chaukhamba Publications; 2013.p.258 (Ca.Vi.7/14)

SWASTHAPANCHAKARMA - A HEALTHY WAY TO LIVE LIFE

*Tribhuvan Pareek **Sandeep Singh Tiwari

Abstract

The main aim of *Ayurveda* is maintenance of health and treatment of diseases. Health refers to both psychological and physical health. People are suffering from major life style disorders now the days like obesity, stress etc. so some procedures like *Shiroabhyanaga*, *Udvardana* mentioned in *Ayurveda* classics may help one to overcome from these disorders. To maintain health one should follow principles of *Swasthavritta*. *Acharya's* have explained daily regimen and seasonal regimen to follow under *Dincharya* and *Ritucarya*. Various *Panchakarma* procedures are explained in *Dincharya*, which help to fulfill the aims of *Swastharakshana* and pacify diseased conditions. Seasonal regimen also includes some seasonal *panchakarma* like *virechana* in *sharad ritu* etc, which protects a person from *pitta* disorders. Some of the procedures are also very easy like *Kavala*, *Gandusha*, *Anjana* etc which further helps in eradicating disease conditions and even these small procedures can be performed daily. So by contribution of *Swasthavritta* and *Panchakarma*, one can easily lead better and healthy life. In the present articles a brief introduction and benefits of the procedures are explained.

Keywords: Daily regimen, *Panchakarma* procedures, Seasonal regimen

Introduction

Swastha means healthy state and *Vritta* means round or we can say thing which make us go around the good or be good. If a person follows all the rules of *Swasthavritta* he can achieve not only healthy physique but healthy mind also. The goal of medical fraternity is to promote health, to preserve health, to restore health, when it is impaired and to minimize diseases and distress. These goals are embodied in the word "prevention". Action which is aimed at eradicating, eliminating or minimizing the impact of disease and disability is considered as prevention.

As in *Ayurveda* the functions of sensory and motor organs and mind have been given a special importance. *Dincharya* is among the one which guide person how to stay well by following daily routine .How to maintain and preserve health for long time. Whatever is to be done constantly after getting up from bed by the wise that is healthy and desires absence of disorders will all be described¹.

Swasthavritta include daily regimen from morning to evening, good seasonal regimen. and Right conduct .i.e. good social behavior.

According to *Ayurveda Swastha* is defined as:

समदोषः समाग्निसमघातु मलक्रिया ।
प्रसन्नात्मेन्द्रियमनाः स्वस्थ इत्यभिधीयते ॥
(सु.सू. 14/41)

One whose *dosas*, *Agni*, and functions of *Dhatu* and *Mala* are in state of equilibrium and who has cheerful mind, intellect and sense organs is termed as *Svastha* (Healthy)².

When these are not in equilibrium and not performing their functions properly it will lead to a state called disease. Even through the above are functioning properly the bodily activities must not vitiated the above. The mental health is equally important to physical health.

Daily Regimen (*Dincharya*)

In our daily life we are expected to nourish and cherish our sensory organs in order to prevent disease. *Ayurveda* has laid down some ideal ways that preserve the healthy state of each and every sensory organ and the body as whole.

ब्राह्मे मुहूर्ते उत्तिष्ठेणीर्ण निरुप्यन् ।
रक्षार्थमायुषः स्वस्थो जातवेगः समुत्सजेत ॥
(अ.सू.सू. 3/3)

A healthy person should wake up early in the morning after analyzing that food eaten last night has completely digested or not. As minimum pollution early morning enhances the concentration process. It prevents *Aadhyamana*, provide lightness to the body and it gives feeling of joy. *Vishnu smriti*, an ancient Indian text describes *Brahma-muhurtha* as forty eight minutes before sun rise which is the sacred time to rise in the morning³. Hence, rising at *Brahma-muhurtha*, individuals are prescribed to engage in doing all focused activities including meditation⁴. Also, the time of rising in the morning has been believed to influence an individual's performance across the day⁵.

***Danta dhavana* (oral brushing)**

This process is not only useful mechanically, but the medicinal influence of herbs serves as medicine for oral hygiene. (Like *Nimba*, *Madhooaka*, *Khadira*, *arjuna* etc)

*Assistant professor, Department of Panchakarma, **Assistant professor, Department of Rog Nidana,
Babe ke Ayurvedic Medical College & Hospital, V.P.O. Daudhar, Distt. Moga (Punjab)

कनीन्यग्रसमस्थोल्यं सुकूर्चं द्वादशाङ्गुलम् ॥

(अ.सं.सू. 3/14)

Prepared brush for *Dantadhavana* should be twelve *angula* in length and equal to little fingure width.

कषायं मधुरं तिक्तं कटुकं प्रातरुन्धितः ॥

(सु.चि. 24/6)

Nimbu is best among bitters, *Khadira* among Astrigents, *Madhuka* among sweets and *Karanja* is best among punjents.

द्वादशगण्डूषेः मुखशुद्धिं विधीयते ॥ (क्षेमकुतूहलः)

Person who not able to do *Dantadhavana*, the twelve times *Gandusha* to be performed, which helps in *Mukhashuddhi*. It improves *Ruci* in *Aahara*, cleans mouth; it does *Lekhana* of excess *sleshma* present in mouth.

जिहानिर्लेखनः— It is the process in which tongue is scrapped with the help of specific instrument.

मुखवैरस्यदौर्गन्ध्यशोफजाड्यहरं सुखम् ॥

(सु.चि. 24/24)

It removes *Mukhavairasyata*, removes *Dourgandhyata* and gives pleasant felling to Mouth. It stimulate taste perception and increases the salivation (saliva contains salivary amylase lysosome, which acts as bacteriocidal). Increased salivation indirectly enhances the gastrointestinal secretion by cephalic phase, which improves digestion and also increase the threshold level of basic taste perception⁶

गण्डूषधारण (Gargling)

It is the gargling with medicinal decoction. It gives strengthening to Teeth and Gums and offers mouth freshening and healing of mouth ulcers

मुखे संचार्यते या तु सा मात्रा कवलः स्मृतः ।

असंचारे तु या मात्रा स गण्डूषः प्रकीर्तितः ॥

(अ.सं.सू. 32/1)

When mouth is filled with drugs and if they are not moved, it is known as *Gandusha*, Which is done with liquids. When drug are kept in mouth and gargling is done, it is known as *Kavala*. *Kavala* is performed with solid (pastes). 1 kola (5 gms) of powders are also added to The liquid in *Gandusha* and 1 *Karsha* (10 gms) of *kalka* (paste) is used in *Kavala*.

दन्तदाढ्यकरं रुच्यं स्नेहगण्डूषधारणम् ॥

(सु.चि. 24/14)

Holding the gargle of *sneha* removes abnormal taste, foul smell, swelling and stiffness of mouth; provides cheerfulness, firmness to teeth and relish. It gives taste to the food and Prevents dryness of the Throat. It prevents *Danharsha*

In *Mukhdaha*, *Mukhpaka*, *Ghritha* or *Ksheer gandusha* should be done. *Gandusha* done with Honey gives relief in *daha* and excessive thirst. *Kanji Gandusha* removes mala and bad odour from the mouth. *Sajjikshaar*

Gandusha removes *ati sanchaya* of *Kapha*.

Anjana -

It is an application of special medicine in eyes. *Sauveeranajan* is meant for routine eye care even for healthy person.

सुखं लघु निरीक्षेत दृढं पश्यति चक्षुषा ।

मतं स्रोतोअन्जन श्रेष्ठं विशुद्धं सिन्धुसम्भवम् ॥

(सु.चि. 24/18)

Srotoanjana (galena) obtained from *sindhu* is pure and the best. It removes burning, itching and dirt and eliminates watering and pain of eyes; provides brilliance and vision and tolerance to wind and the sun and prevents eye diseases. Therefore one should apply collyrium regularly.

दाहकण्डूमलघ्नं च दृष्टिक्लेदरुजापघ्म् ।

तेजोरूपावहं चेत् सहते मारुतापो ॥

(सु.चि. 24/16)

Anjana karma helps to remove Mala of eyes, removes *Daha*, *Kandu* also. It improves Vision, gives strength and protect from harmful Sunlight and Air.

It prevents infectious and non-infectious type as well as topical blockade and occulding pathologies. *Air pollution is the main reason for early cataracts, the daily practice of Anjana is useful to sustain the transparent channel of vision.*

Nasya

It is a process of medication through nose. It maintains the olfactory perception as well as potentiates the CNS in the necessary condition. It nourishes the vital organs situated above the collar bone. Prevents premature graying and falling of hairs. *Pratimarsha nasya* one should take daily.

प्रतिमर्शस्तु नस्यार्थं करोति न च दोषवान् ।

नस्तः स्नेहान्गुलिं दघातप्रातनिशि च सर्वद ॥

(24/20)

Nerve endings are seen on cribiform plates of ethmoid bone, *Nasya dravya* triggers the nerve ending and send the message to CNS and initiates the normal physiological functions of the body.

Dhoomapana : (Prayogika Dhoomapana)

It is the inhalation of fumes of medicinal preparation. It prevents the disease of upper and lower respiratory tract.

नरोधूमोपयोगाश्च प्रसन्नेन्द्रियवाङ्मना ।

द्वढकेश द्विजश्मश्रुः सुगन्धिविशदाननः ॥

(सु.सू. 40/15)

It gives *prasannata* to *Indriya Vani* and *Mana*. *Kesha*, *Danta*. Mustache and Beard become strong, mouth becomes *Sugandhita* and *Nirmala*.

When Dhumapana Dravya are lightened with fire, it releases the smoke and even CO₂, Carbon atom in CO₂ has the tendency to stimulate the respiratory centre present in brain stem this may trigger the normal

physiology function of respiratory system.

Dis-infective action of *Dhumapana Dravya* like *Haridra*, *Gugglu* and *Vacha* cleanses the respiratory tract, oral cavity and Pharynx⁷.

Vyayama (exercise)

The work involving exertion of the body is known as “*Vyayama*”. After doing this one should press the body gently.

The activities which is pleasant for *sharira* and *Mana* and provide *sthirata* and *bala* to body is known as *Vyayama*. These exercises should be done according to strength age etc of a person.

Sound mind exists in sound body. As daily exercise prevents disease like diabetes, heart attack etc. These diseases occur mainly due to sedentary life style and not spending sufficient calories at an initial stage followed by altered glucose metabolism and deposition of cholesterol.

It provide lightness to body, gives strength for work, improves Jatharagni, maintains Dosha and also gives power to overcome from Dukha. Psychiatrist also prefers exercise ranging from simple walking to brisk exercise in some condition like stress and strain.

According to Acharya Sushruta, enemies will be not able to vanquish or defeat the person who performs vyayama regularly. Vardhakya (old age) does not attract him quickly and the muscle of his body becomes strong. It makes the body beautiful even of those people who are deficient in age, physique and qualities. The person, who performs daily exercise, can digest unhealthy and improperly cooked food without any kind of difficulty⁸. Acharya Charak mentioned that avoidance of physical exercise lead to Prameha vyadhi (diabetes mellitus)⁹. Acharya Sushruta also mention that vyayama (physical activity) is best for reducing sthulta (obesity)¹⁰.

Chamkramana ie. Walking. (*laghu vyayaam*) (su.chi. 24) It is indicated in *Durbal* and *Krish* people. People, who cannot perform exercise, should do *chamkramana*.

Abhyanga

It is the Oleation of whole body before bathing followed by rubbing the body with medicated powder .Bathing activate and nourishing the skin texture. *Using bathing soaps for bathing purposely silently cause much harm to the skin by eliminating the essential oil from the skin leading to xerosis of the skin, which may invite secondary infections. Remove Atinidra, Daha, Shram nasaka, It is Pmusatvwardhana, Raktprasadna, It helps in Agni deepana also. (cha.sutra 5/94)*

A healthy person should apply aromatic vata nashaka taila to body. In winter season with oil of ushna property and in summer season with cold potency oils.

Shiroabhyanga

शिरोगतास्तथा रोगाच्छिरोअभ्यंगोपकर्षति ।
केशानां मार्दवं देर्घ्यं बहुत्वं सिग्ध्र्द्रुषणताम् ॥

(सु.चि. 24 / 25)

Massage on the head eliminates diseases of head, provides softness, length, luxuriance, gloss and blackness in hairs, satiety in head, charm on face, saturation in sense organs and refilling of vacant head.

Madhuka, Kshirasukla, Sarala, devadaru, Laghu-panchmula these should be taken in equal parts and oil expressed mechanically should be cooked with paste and decoction therefore. This cooling oil should always be used for massage on head.¹¹

Karnatarpan (Su. Chi. 24/29)

It is the procedure of applying Medicated oil to ear in a systematic manner. It helps in all *vatika karna rogas*, cures *Manyastambha, Hanustambha*, prevents *Badhirya*. Filling ear (with oil) removes pain in jaw, carotid region, head and ear.

Padabhyanga

Padabhyanga helps in removing dryness and crak foot, helps in removing *pada supti*, it removes tiredness of body, Helps in all *vatika* disease, *padstabdhta*. It is also helpful in disease like sciatica. Helps in improving vision

दृष्टिसंयुक्त पाद निबन्धनाडि प्रसादनाद ॥

(अ.ह.सू. 2 / 25)

In classics *nadi* shows its relation between *Pada* and *Drishti*, so it can be assumed that *abhyanga* to *pada* will show its effect on *Drishti*.

Udavartana

उद्वर्तन कषायादि चूर्णैः गात्रोदघर्षणाम् ॥

(अ.ह.सू. 2 / 25)

It means scrapping of all parts of body without adding *sneha* with *churna*.

Benefits

उद्वर्तनं वातहरं कफमेदोविलापनम् ।
स्थिरीकरणमद्धानां त्वक्प्रसदकरं परम् ॥

(सु.चि. 8 / 51)

Udavartana helps to pacify *Kapha, meda* and *Vata dosha*. It provides *sthirata* to body, and improves skin texture. Rubbing with a brick piece stimulate tactile heat, cleanses opening of blood vessels and removes itching and allergic rashes.¹²

उदघर्षणं त्विष्टिकया कण्डूकोठविनाशनम् ॥

(सु.चि. 56)

It is also helpful in *Kotha* and *Kandu*. It is also helpful in *Santarpana janya vyadhi* like *Prameha* and *Sthoulya*.

Utsadan

संस्नेह कल्केन उदघर्षणम् उत्सादनम् ॥

(उल्लहण)

It is the scrapping of whole body with *Snehayukta churana*. It gives good lusture to skin and removes dirt from superficial part of skin. *Udavartana* and *utsadana* both comes under *Bahaya sneha*. Rubbing body with Kalka dravya (*utsadana*) imparts the effect similar to *Abhyanga*¹³

Powder massage enhances the hepatic circulation which may releases the enzymes which induce the gluconeogenesis and lypolysis by this it helps to overcome the cholesterol level.

Seasonal regimen

Ayurveda gives a clear picture regarding changes that occur in atmosphere as well as in the individual during different seasons and about the measures to be taken to cope-up with those changes. It facilitates proper digestion, metabolism and excretory processes. The dietary pattern should be followed adjusted according to the season and edibles available at that time.

Hemant rutu/ Sisira rutu

Due to cold, it closes heat outlets in the skin. This accumulated heat increase digestive power, which results in more food demand. *Aahar rasa* should consist of *Madhur*, *Amal* and *Lavan rasa*. Fat, meats preparation wines made of wheat, sugar, milk, oil and black grams one should take. *Daily oil Abhyanga to elevate vata. Specific Vihara to be followed like, Hot water bath to be taken, Exposer of bright sunlight once a day* etc. Same procedure to be followed in *Sisira*.

Vasant rutu

Sun shine liquify accumulated *kapha*. This starts vitiating the digestive power of a person. One should not take heavy *Madhura*, *Amla*, *Lavana rasa bhojan*. Drinks like *Drakshaasva*, *shunti*, weak wines diluted with honey. Day time sleep is strictly prohibited. *Kapha* should be removed in beginning of *rutu*. *Strong emetics and nasal medication should be done. Udavartana should be done to remove fat from the body.*

Greeshma rutu

Sun heat is on extreme. Direct exposure to sunlight one should avoid. Otherwise excess body fluid loss takes place. *Madhura*, *Amla*, *Lavan rasa* with easily digested food should be taken. Intake of cold liquids should be more. *Wines are prohibited as they produce Anemia and loosening in the joints and inflammation in different parts of the body. Healthy person should take bath only with cold water.*

Varsha

In this season vitiating of *Tridoshas* will take place. *So in the beginning person must be given emetics, purgatives, Enemas, in order to clean large intestine. Old starchy*

grain, corns must be taken as food. *Panchkola to be taken to increase digestive power*, curd diluted with water and salt to be taken. Water must be added to wine before drinking. *And day sleep should be avoided.*

Sharad rutu

Accumulated *pitta* get its place. In order to counter act it one should use *ghrita prepared with bitter tasting herbs like tikta ghrita or mahatikta ghrita. Raktamokshana and purgatives must be administered. Hamsodaka is explained in Ayurveda. It helps to reduce body weight and help in maintaing vata in its normal condition.*

Conclusion

Although *Swasthavritta* is a vast field to discuss and many *Panchakarma* procedures are also explained. The general procedures like *Gandusha*, *Anjana*, *Abhyanga*, *Udavartana*, can be practice daily to prevent from several disease. One shouldn't suppress natural urges. As they displace *doshas stahna* by their *vruddhi*. But, on the other hand one should suppress their *Mansik Vegas* to make themselves free from all mental disorders. (*Caraka Sutrasthana*⁷)

References

1. *Susruta Samhita*, by Priyavrat Sharma, volume 2, chaukhambha Visvabharti, Varanasi, reprint year 2010, chapter 24, page 490
2. *Susruta Samhita*, by Priyavrat Sharma, volume 1, chaukhambha Visvabharti, Varanasi, reprint year 2010, chapter 15, page 172
3. Dutt MN. *Vishnumrti*. Delhi: Parimala Publication; 1997.
4. Swami Sivananda. *The Science of Pranayama*. Himalayas, India: A Divine Life Society Publication; 1997.
5. Rama B. *Astanga Sangraha of Vagbhata*. Varanasi: Chaukhambha Visvabharathi; 2006. Chapter: 3, page: 34.
6. *Swasthavritta sudha*, by dr Kashinatha samgamdi, *Ayurveda sanskriti hindi pustaka bhandara, jaipur, pratham sanskrana, page 22*
7. *Swasthavritta sudha*, by dr Kashinatha samgamdi, *Ayurveda sanskriti hindi pustaka bhandara, jaipur, pratham sanskrana, page 35*
8. *Ambikadutta Shastri, editor, Sushruta Samhita, Chaukhamba Sanskrit Sansthan, Varanasi, 2007. p.108*
9. *Brahmanand Tripathi, Ganga Sahay Pandey, editor, Charak Samhita, Charak Chandrika Hindi commentary, Chaukhamba Surbharti Prakashan, 2007.p.355*
10. *Ambikadutta Shastri, editor, Sushruta Samhita, Chaukhamba Sanskrit Sansthan, Varanasi, 2007.p.107*
11. *Susruta Samhita*, by Priyavrat Sharma, volume 2, chaukhambha Visvabharti, Varanasi, reprint year 2010, chapter 24, page 490
12. *Samhita*, by Priyavrat Sharma, volume 2, chaukhambha Visvabharti, Varanasi, reprint year 2010, chapter 24, page 498
13. *Swasthavritta sudha*, by dr Kashinatha samgamdi, *Ayurveda sanskriti hindi pustaka bhandara, jaipur, pratham sanskrana, page 35*

A REVIEW ON YASHADA - A METAL DESCRIBED IN RASA TEXTS

*Meghna Vaidya **Abhishek Upadhyay

Abstract

Yashada is a potent therapeutic molecule used in *Rasa Chikitsa* classified as *Putilauha* in *Dhatu Varga*. In ancient *Rasa* texts it is described by the name '*Rasaka Satva*' or '*Kharpara Satva*'. The earliest description by the name '*Yashada*' is found in '*Bhava Prakash*' followed by other texts written after it. *Yashada* is the 24th most abundant element in the earth's crust placed as first element in group 12 of the periodic table. It is also an essential mineral of exceptional biological and public health. Present article aims at comprehensive review of *Yashada Dhatu*.

Key Words *Yashada, Ayurveda, Dhatu, Zinc, Rasa Shastra* .

Introduction

Ayurveda, whose origin dates back to *Vedic* period and having the oldest written scriptures in the form of *Vedas* itself, was evolved over the centuries into a comprehensive medical system having a strong dominance of plant based medicines. *Rasa Chikitsa* rather extraneous to *Ayurveda* before 9th century was evolved by the *Sidhas* who used metals, minerals and their compounds as their drug materials. While the first use of the mercury and its compounds was mentioned in *Charaka*¹ and *Shusruta Samhitas*² but their omnipotence in all kind of ailments was first propounded in *Rasa* texts. With time, inorganic substances were increasingly incorporated into the *Ayurvedic materia medica*. These new man made drugs were obtained from minerals and metals after their extensive chemical and metallurgical processing converting these inorganic substances into wonder molecules having therapeutic properties. It completely differed from alchemy whose sole aim was to find magic substances that would transmit base metals into novel ones. *Rasa chikitsa* prospered in the hands of *Rasa Vaidyas* 9th century onwards. *Rasa Vaidyas* developed a great expertise in the preparation of a number of compounds of mercury and converting the minerals into

Bhasmas. *Rasa chikitsa* is based on *Rasa, Maharasa, Uprasa, Sadharan rasa, Dhatus, Ratna, Upratna* and some other inorganic compounds. *Dhatus* are further classified into *Shudha Lauha, Putti Lauha and Mishra Lauha*.³ *Yashada* is one of the *Putti Lauhas*⁴ described in *Rasa* texts having great therapeutic properties and chemically it is Zinc. Zinc also known as Spelter is a metallic chemical element. It is the first element in group 12 of the periodic table. It is the 24th most abundant element in the earth's crust and has five stable isotopes. Zinc is an essential mineral of exceptional biologic and public health importance. Zinc deficiency affects about 2 billion people in the developing world and is associated with many diseases.⁵

According to *Ayurveda Aushadha Guna Dharma Shastra*, in a very destructive war between *Deva* and *Asura*, from the body of three *daityas*, two types of '*Kharpara*' were given rise to, *Jasada* and *Savaka*. Among these *Jasada* is to be used for *Rasayna karma*. In ancient *Rasa* texts '*Yashada*' is known and described by the name '*Rasaka Satva*' or '*Kharpara Satva*'.⁶ The earliest description of *Yashada* is found in *Bhava Prakasha* followed by *Ayurved Prakasha* and others. A brief historical description of *Rasaka Satva/Kharpara Satva/Yashada* is as follows.

Table -1: Historical Background of *Rasaka & Kharpara Satva*

S. No.	Reference	Mineral	Classification	Satva Description
1	<i>Rasarnava</i> ⁷	<i>Rasaka</i>	<i>Mrittikakara, Gudabha Pashanabha</i>	<i>Kutilaprabha</i>
2	<i>Rasendra Chudamani</i> ⁸	<i>Rasaka</i>	<i>Dardura, Karvellaka</i>	<i>Hiraka sannibham</i>
3	<i>Rasa Darpana</i> ⁹	<i>Rasaka</i>	<i>Mrittikabha (Shreshtha) Gudabha (Madhyama) Pashanbha (Adhama)</i>	<i>Vangabham</i>
4	<i>Brihat Ras Raj Sunder</i> ¹⁰ (BRRS)	<i>Rasaka</i>	<i>Peeta, Krishna, Rakta</i>	<i>Sisopmama</i>
5	<i>Rasendra Purana</i> ¹¹ (RP)	<i>Kharpara</i>	-	
6	<i>Rasendra Chintamani</i> ¹²	<i>Kharpara</i>	-	<i>Naga Rupa</i>

*Associate Professor, Department of Ras Shastra, **Associate Professor, Department of Kaya Chikitsa, Babe ke Ayurvedic Medical College & Hospital, V.P.O. Daudhar, Distt. Moga (Punjab)

S. No.	Reference	Mineral	Classification	Satva Description
7	<i>Rasa Kamdhenu</i> ¹³	Rasaka	Mrittikabha (Shreshta) Gudabha (Madhyama) Pashanabha (Adhama)	Naga rupa
8	<i>Ayu. Aushadh guna Dharm Shastra</i> ¹⁴	Kharpara Jasada	Jasada , Savaka	-
9	<i>Rasamritam</i> ¹⁵	Rasaka	Mrittikabha, Gudabha,	-
10	<i>Brihat Ras Raj Sunder</i> ¹⁶	Kharpara	Pashanabha Jasada, Shavaka, Dardura	-
11	<i>Rasa Ratna Samucchaya</i> ¹⁷	Rasaka	Karvellaka Dardura, Karvellaka	-

Table 2: Historical Background of Yashada

S. No.	Reference	Description
1	<i>Madanpal Nighantu</i> ¹⁸	Only name is mentioned
2	<i>Bhavaprakasha</i> ¹⁹	Paryaya and Guna
3	<i>Ayurved Prakasha</i> ²⁰	Paryaya, Guna, Vikarshanti, Shodhana and Marana like Vanga
4	<i>Ras Tarangini</i> ²¹	Paryaya, Grahya-Agrahya lakshana, Shodhana, Marana, Matra, Guna and Therapeutic uses
5	<i>Rasamritam</i> ²²	Paryaya, Guna, Shodhana, Marana
6	<i>Brihat Ras Raj Sunder</i> ²³	Matra, Guna, Anupana, Vikara, Vikara shanti and Marana

Synonyms of Yashada²⁴

Yashada is described by various names in Ayurvedic texts like Yasada, Jasada, Ranga Sadrisha, Ranga-sankasha, Shwetapatra, Ritihetu, Bangasadrisha, Kharparaja, Girija, Rasaka Satva, Kharpara Satva.

Other names of Yashada - Ruhatutiya, Sange Bastri, Tasadira, Shahaja

Commercial name of Yashada - Spelter

Attributes

- ❖ It is placed in category of Dhatu (Fifth in sequence)
- ❖ Ayurveda Prakasha characterizes Pittal to be Upadhatu of Yashada.
- ❖ In various texts Yashada is classified under Dhatu, Putiloa, Trivanga, Triloha.
- ❖ Graha- Bhauma is attributed to Yashada through Ara.
- ❖ In chemistry Zinc is a shining white metal with bluish grey lusture which becomes superficially tarnished in moist air.
- ❖ It possesses a crystalline structure.
- ❖ Strongly electropositive.
- ❖ Soluble in dilute acids and insoluble in water.

Concentration of Zinc in Human body²⁵

Total Zinc content is about 2 gm, out of which 60% is in skeletal muscles and 30% is in bones. Highest concentration of Zinc is seen in hippocampus area of brain and prostatic secretion.

Storage and Excretion²⁶

Zn is stored in skeletal muscles, bones, prostate, liver etc. In liver, it is stored in combination with a specific protein called metallothionein. Zinc is excreted through pancreatic juice and to a lesser extent through sweat.

Daily requirement of Zinc²⁷

- ❖ Adults - 10mg / day
- ❖ Children - 10 mg / day
- ❖ Pregnancy and lactation - 15 -20 mg / day

Occurrence²⁸

Zinc makes up about 75ppm (0.0075%) of the earth's crust making it the 24th abundant element there. Soil contains 5-770ppm of Zinc with an average of 64ppm. Seawater has only 30ppb Zinc and the atmosphere.

contains 0.1-4µg/m. The element is normally found in association with other base metals such as Copper and Lead in ores. Zinc is a Chalcophylle meaning the element has low affinity for oxides and prefers to bond with Sulphides. Sphalerite which is a form of Zinc Sulphide is the most heavily mined Zinc containing ore because its concentration contains 60-62 % Zinc.

Major Ores of Zinc²⁸:-Calamine(Anhydrous carbonate), Zinc bloom (Hydrous carbonate), Sphalerite (Zinc Sulphide), Zinc blende (Sulphide), Zincite (oxide).
Other minerals of Zinc:- Smithsonite (Zinc carbonate), Hemimorphite (Zinc silicate) ($Zn_4Si_2O_7$) ($(OH)_2 \cdot H_2O$), Wurtzine (Zinc sulphide), Gostarite ($ZnSo_4 \cdot 7H_2O$)
 The mineral found in massive deposits in the largest tonnage occurs usually with high Iron impurity content. This ore is also known as Marmatitic Zinc and it may have as much as 10% Iron with Zinc being only 40-45% in the concentrate.

Resources²⁸

Identified world Zinc resources are total about 1.9 billion tones. The common Sulphide mineral is Sphalerite found in vein type deposits. Large deposits are in Australia, Canada, USA, Mexico, Peru & Central Asia with the largest reserves in Iran.

In Indian Sub Continent - Nepal, Burma, Kashmir, Sikkim

- ❖ Punjab - Zinc Sulphide with Surma
- ❖ Gadhwal - In Copper mines.
- ❖ Kangra - Zinc Sulphide with Surma
- ❖ Shimla - Near Subathu in Lead mines.
- ❖ Bengal - Hazaribagh with Lead and Copper
- ❖ Madras - Smithsonite with Lead sulphide

Grahya Agrahya Lakshana²⁹

Commercially quality of *Yashada* varies from place to place depending upon the quality and quantity of impurities contained. Keeping this in mind, *Rasa Acharyas* had mentioned some qualities of *Yashada* to be considered while taking *Yashada* for medicinal purpose.

Table 3: Grahya Lakshana of Yashada

<i>Samujjawala</i>	Uniformly glistening
<i>Snigdha</i>	Unctuous to touch
<i>Mridula</i>	Soft
<i>Nirmala</i>	Without visible Impurities
<i>Drutdrava</i>	Easy to Melt
<i>Mahabhara</i>	Too Heavy
<i>Bharadhya</i>	Appearing light but too heavy
<i>Shweta varna</i>	Clean
<i>Dantura</i>	Toothed

Table 4: Agrahya Lakshana of Yashada

<i>Kathina</i>	Hard
<i>Kathin drava</i>	Requires extra effort for melting
<i>Ruksha</i>	Dry, Roughened surface
<i>Ruksha Prabha</i>	Dull lusture
<i>Laghu</i>	Light weight
<i>Malina</i>	Dirty appearance with visible impurities
<i>Khara</i>	Like ruksha
<i>Chitra</i>	With visible impurities
<i>Neela prabha</i>	Bluish appearance

Table 5: Grades of Zinc in accordance with Purity (industry)

Grade	Purity
Special High grade	99.99%
High grade	99.95%
Intermediate	99.5%
Brass special	99%
Prime western	98%

Shodhana of Yashada

Shodhana is a term used for the process of purification. The impure Zinc is not recommended for internal use as it may cause *Rakt pitta*, *Sheeta*, *Agnimandya* and *Dhatunasha*. Therefore its purification is highly essential before therapeutic use. (*Arka Prakasha*)³⁰

Specific Facts Regarding Shodhana of Yashada

- ❖ *Rasa Ratnakara* specified that *Swarnadi* have to be heated and *Naga- Vanga* have to be melted.³¹
- ❖ *Rasendra Chintamani* specified that melting has to be done for *Puti lauhas* during *Shodhana*.³²
- ❖ *Rasayana Sara* has mentioned to carry out *Samanya Shodhna* before *Vishesh Shodhana*.³³
- ❖ *Rasendra Purana* described that *Yashada* is to be melted using *Khadira kashtha*.³⁴

Table 6: Yashada Shodhana according to various Classics

S.No.	Reference	Media	Method
1	<i>Rasendra Chintamani</i> ³⁵	<i>Samanya for Dhatus: Taila- Takra- Gomutra- Kanji- Kulatha Kwatha</i>	Quenching 7 times each
2	<i>Bhaishajya Ratnavali</i> ³⁶ (BR)	Churnodaka	Quenching 7times each
3	<i>Ras Tarangini</i> ³⁷	<i>Yashada- Churnodaka Nirgundi swarasa Godugdha. Samanya for all Dhatus: Kanji- Takra- Kulath Kwatha- Gomutra-Til taila</i>	Quenching 7 times 7 times 21 times 3 times each
4	<i>Rasendra Purana</i> ³⁸	<i>Yashada - milk, Yashada - Arka Dugdha, Yashada-Triphala kwatha, Kumariswarasa Karivara Salila (Elephant's urine)</i>	Quenching 21 times 3 times Quenching 7 times each
5	<i>Rasa Tantra Sara Evam Siddha Prayoga Samgraha</i> ³⁹	<i>Godugdha</i>	Quenching 21 times

Marana of Yashada

The *Marana* word is derived from original Sanskrit root 'Mri' which means to die. In this process metals and minerals are subjected to various experiments so as to convert them into such a form so that it cannot be converted back to its original form. As the original form of metals and minerals is irresistibly changed, the word *Marana* 'Process of killing' is used.

Table -7: Marana of Yashada in various Classical texts

S. No.	Text	No. of Processes	Inter Mediate Process	Media/ Bhavna	Chakrika drying	Samputa	Type and No. of Puta
1.	<i>Ayurveda Prakasha</i> ⁴⁰	1.	1/4 th <i>Apamarga panchanga Churna</i>	-	-	-	Till Red hot and self cool.
		2.	<i>Haridra+ Yavani and Silajatu+ Apamarga ash</i>	-	-	-	Till metal is converted to ash
		3.	<i>Chincha Twaka Bhasma+ Bhallataka</i>	-	-	Alternate layers with <i>Yashada</i>	-
		4.	<i>Hartala(1/4th, 1/8th or 1 part)</i>	<i>Nimbu swarasa or Kumari swarasa</i>	<i>Atpa shoshita</i>	<i>Peepal twak churna</i>	7 <i>Gajaputa</i>
		5.	-	<i>Hartala (1/4th, 1/8th or 1 part) +Arka ksheera</i>	<i>Atapa soshita</i>	<i>Peepal twak churna</i>	-
2.	<i>Ras Tara-ngini</i> ⁴¹	1.	Equal part <i>Shudha Parada +Nimbu swarasa +Shudha Gandhaka</i>	-	<i>Churna Form</i>	-	-

S. No.	Text	No. of Processes	Inter Mediate Process	Media/ Bhavna	Chakrika drying	Samputa	Type and No. of Puta
		2.	With <i>Nimba</i> stick-Ash + 1/4 th <i>Hartala churna</i>	-	<i>Churna</i> form	-	- Till Red hot
		3.	1/4 th <i>Apamarga Panchanga churna</i>	-	-	-	+ self cool for one day
		4.	Equal part <i>Nimba patra swarasa</i>	-	-	-	-
3.	<i>Rasendra Purana</i> ⁴²	1.	1/4 th <i>Shuddha Parada</i> + <i>Shudha Gandhaka</i>	<i>Nimbu Swarasa</i> or <i>Kumari Swarasa</i>	-	<i>Parada Gandhaka</i> paste	1 <i>Gajputa</i>
4.	<i>Rasa Amritam</i> ⁴³	1	<i>Bhanga</i> + <i>Posta</i>	<i>Kumari Swarasa</i>	-	-	700 ^o c maintained for 1 hr. (7-10 <i>Putra</i>)
5.	<i>Ras Tantra Sara Evam Siddha Prayoga Samgraha</i> ⁴⁴	1.	Fresh <i>Palash mula</i> ash, Keep <i>Shudha Parada</i> 1/4 th in ash- <i>Mandagni</i> (3hr.)	<i>Kumari Swarasa</i>	20 <i>Tola</i> each	-	20 <i>Gajaputta</i>
		2.	4 parts <i>Posta dana (Bhanga)</i> strong heat (6hrs.)	<i>Kumari Swarasa</i> (12 hrs)	-	-	7 <i>Gajaputta</i>
		3.	Equal part <i>Nimba patra Swarasa</i> immersion Covered & strong heat for three hours.	<i>Kumari swarasa</i>	<i>Atapa Shoshita</i>	-	3 <i>Gajaputta</i>

Pharmacological and Therapeutic actions of *Yashada Bhasma* according to *Ayurvedic classics* (Table-8)

Reference	Rasa	Virya	Guna	Pharmacological actions	Therapeutic uses
<i>Rasamritam</i> ⁴⁵	<i>Kashaya Tikta</i>	<i>Sheeta</i>	<i>Sheeta</i>	<i>Kaphapittahrita</i>	<i>Chaksushyaparam Prameha, Pandu, Shwasa</i>
<i>Rasendra Puran</i> ⁴⁶	-	-	-	<i>Param Chakshushya</i>	<i>Meha, Pandu, Shwasa</i>
<i>Ras Tarangini</i> ⁴⁷	<i>Kashaya, Katu</i>	<i>Sheeta</i>	<i>Sheeta</i>	<i>Kaphapittashamaka Shleshmakalasan kochaka.</i>	<i>Pandu, Prameha, Kasa, Shwasa, Ratriweda, Kampavata Nashak.</i>
<i>Bhav Prakasha</i> ⁴⁸	<i>Tuvara, Tikta</i>	<i>Sheeta</i>	<i>Sheeta</i>	<i>Kaphapittahrit Chakshushya</i>	<i>Prameha, Pandu, Shwas</i>
<i>Brihat Ras Raj Sunder</i> ⁴⁹	<i>Tuvara, Tikta</i>	<i>Sheeta</i>	<i>Sheeta</i>	<i>Chakshushya</i>	<i>Prameha, Pandu, Shwasa</i>
<i>Siddha Bhesaja Manimala</i> ⁵⁰	<i>Tikta, Kashaya</i>	<i>Sheeta</i>	<i>Sheeta</i>	<i>Kaphpittanashak</i>	<i>Shwas, Kasa, Netra peeda Halimaka, Prameha</i>

Medicinal Uses of Zinc

- ❖ Integral part of several metalloenzymes in the body including Carbonic anhydrase, S-ALA dehydrase.
- ❖ Role in wound healing.

- ❖ Required for protein biosynthesis as RNA polymerase contain Zinc.
- ❖ Has antioxidant activity.
- ❖ Zinc containing protein Gusten in saliva is important for taste sensation.

Dose of *Yashada Bhasma* according to different Ayurvedic classics

❖ <i>Rasamritam</i> ⁵¹	-	1-2 Rati (120-240mg)
❖ <i>Rastarangini</i> ⁵²	-	1/2-1 Ratti (60-240mg)
❖ <i>Rasendra Purana</i> ⁵³	-	2 Gunja(240mg)
❖ <i>Brihat Ras Raj Sunder</i> ⁵⁴	-	2 Ratti(240mg)
❖ <i>Rasayana Sara</i> ⁵⁵	-	2Gunja(240mg)

Anupana (Vehicle specificity) according to therapeutic applications (Table-9)

1	<i>Purana Goghrita</i>	<i>Netrya(RP,BRRS)</i>
2	<i>Tambula</i>	<i>Prameha(BR,RP,BRRS)</i>
3	<i>Mahish ghrita</i>	<i>Prameha(RP)</i>
4	<i>Agnimantha</i>	<i>Agnikara(RP,BRRS)</i>
5	<i>Trisugandhi</i>	<i>Tridoshaghna(RP,BRRS)</i>
6	<i>Tandulodaka+ Kharjura</i>	<i>Pitta Jwara, Raktatisara (RP,BRRS)</i>
7	<i>Pippali + Sita</i>	<i>Raktatisara(RP), Vamana, Atisara(BR)</i>
8	<i>Jeera+ Mishri</i>	<i>Vanti ,Atisara(BRRS)</i>
9	<i>Laung+Ajwain</i>	<i>Sheeta Jawara(BRRS)</i>

Conclusion

Zinc essentiality was established in 1934 for experimental animals and in 1961 for humans⁵⁶ but in Ayurvedic therapeutics Zinc in the form of '*Rasaka Satva*' and then *Yashada* is being used for centuries. It has got unique therapeutic properties and is used as *Rasayana* as well as to cure many diseases such as *Prameha*, *Pandu*, *Netra Roga*, *Vrana* etc. Its complete therapeutic profile as explained in various *Rasa* texts yet needs to be explored in terms of current scientific parameters

References

1. Pt.Kashinath Shastri, Dr Gorakhnath Chaturvedi, *Charak Samhita, Chikitsasthana*, 1/4/22-24, Chaukhambha Bharti Academy, Varanasi, Reprint 1998. p.56
2. Kaviraj Dr Ambikadutt Shastri, *Shusruta Samhita, Sutra Sthana*, 38/62, Chukhambha Sankrit Sansthana, Varanasi, 12th Edition 2001. p.145
3. Siddhinandan Mishra, *Rasa Ratna Samucchya*, Chapter 5 verse 1, Chaukhambha orientalia, Varanasi, Edition 2011. p.141.
4. Siddhinandan Mishra, *Ayurvediya Rasa Shastra, Dhatu Prakrana*, Chaukhambha orientalia, Varanasi, 14th Edition. 2004. P.495
5. <http://en.m.wikipedia.org/wiki/Zinc>
6. Siddhinandan Mishra, *Rasa Ratna Samucchya*, Chapter 2 verse 157, Chaukhambha orientalia, Varanasi, Edition 2011. p.58.
7. Dr Indradev Tripathi, *Rasarnavanama Rasatantram*, Edited by Dr SK Dikshit, Chapter 7 verse 28,29,36, Chaukhambha Sanskrit Series office, Varanasi, 4th Edition 2001. P.90-91.
8. Siddhinandan Mishra, *Rasendra Chudamani*, Chapter 10 verse 110,121, Chaukhambha orientalia, Varanasi, 1st Edition 1984. p.160&162.
9. Bhajandas Swamidadupanth, *Rasadarpana*, Nath Pustak Bhandar, 3rd Edition. p.202.
10. Siddhinandan Mishra, *Brihat Rasa Raj Sunder*, Chaukhambha Orientalia, Varanasi, p.120
11. Pt. Shri Ram Prashad Sharma, *Rasendra Purana*, Khemraj Shri Krishna Das Prakashan, Mumbai, Edition 2013.
12. Siddhinandan Mishra, *Rasendra Chintamani*, Chapter 5 verse 137, Chaukhambha Orientalia, 1st Edition 1990.p.111
13. Gulraj Sharma & Dr Santosh kumar Sharma, *Rasa kamdhenu*, Chaukhambha orientalia, 2nd Edition 1999.
14. Vaidya Panchanan Gangadhar Shastri Gune, *Ayurvediya Aushadha Guna Dharma Shastra*, Chaukhambha Sanskrit Pratishthana, Edition 2014.
15. Dr Devnath Singh Gautam, *Rasamritam, Lauhvigyaniyadhyaya*, verse 22, Chaukhambha Subharti Prakashan, 1st Edition, p.54.

16. Siddhinandan Mishra, *Brihat Rasa Raj Sunder*, Chaukhambha Orientalia, Varanasi, p.120
17. Siddhinandan Mishra, *Rasa Ratna Samucchya*, Chapter 2 verse 42, Chaukhambha orientalia, Varanasi, Edition 2011. p.56.
18. Dr JLN Shastri, *Madanpal Nighantu, Swarnadi Varga/12*, Chaukhambha Orientalia, 1st Edition 2010.p.470
19. Brahma Shankar Mishra & Sh Rupa Lalaji Vaishya, *Bhava Prakash Purvardha, Dhatvadi varga*, Chaukhambha Sanskrita Bhawan, 2013. p.606.
20. Gulraja Sharma Mishra, *Ayurveda Prakasha*, Chapter 3 verse 182, Chaukhambha Bharti Academy, Varanasi, Reprint2007.p.380.
21. Kashinath Shastri, *Rasa Tarangini*, Chapter 19 verse 84-145, Motilal Banarasi das, Varanasi, 11th Edition. 1979. p.473-483.
22. Dr Devnath Singh Gautam, *Rasamritam, Lauhvigyaniyadhyaya*, verse 9, Chaukhambha Surbharti Prakashan, 1st Edition, p.52.
23. Siddhinandan Mishra, *Brihat Rasa Raj Sunder*, Chaukhambha Orientalia, Varanasi, p.79-80
24. Siddhinandan Mishra, *Ayurvediya Rasa Shastra, Dhatu Prakrana*, Chaukhambha orientalia, Varanasi, 14th Edition. 2004. P.580.
25. Dr AC Deb, *Fundamentals of Biochemistry*, Chapter 27, Water & Mineral Metabolism, New Central Book Agency,Kolkata. p.443
26. Dr AC Deb, *Fundamentals of Biochemistry*, Chapter 27, Water & Mineral Metabolism, New Central Book Agency, Kolkata.p.444
27. Dr AC Deb, *Fundamentals of Biochemistry*, Chapter 27, Water & Mineral Metabolism, New Central Book Agency, Kolkata.p.443
28. <http://en.m.wikipedia.org/wiki/Zinc>
29. Siddhinandan Mishra, *Ayurvediya Rasa Shastra, Dhatu Prakrana*, Chaukhambha orientalia, Varanasi, 14th Edition. 2004. P.583.
30. Dr Indradev Tripathi, *Arka Prakasha*, Chapter 10 verse 26, Krishana Das Academy, Varanasi, 1st Edition, 1995. P.161
31. Dr Indradev Tripathi, *Rasa Ratnakar*, Chapter 8 verse 2, Chaukhambha Amarbharti Prakashan, 1st Edition 1984. P. 57
32. Siddhinandan Mishra, *Rasendra Chintamani*, Chaukhambha Orientalia, Edition 2011
33. Pt. Shyam Sunder Acharya Vaishya, *Rasayansara, Dhatushodhanmaranprakrana*, verse 5, Krishna Das Academy, 6th Edition. 1997. P. 188
34. Siddhinandan Mishra, *Rasendra Chintamani*, Chaukhambha Orientalia, Edition 2011
35. Siddhinandan Mishra, *Rasendra Chintamani*, Chaukhambha Orientalia, Edition 2011
36. Siddhinandan Mishra, *Bhaishajya Ratnavali*, Chapter 3 verse 249, Chaukhambha Surbharti Prakashan, 1st Edition, 2005. p.65.
37. Kashinath Shastri, *Rasa Tarangini*, Chapter 19 verse 98-103, Motilal Banarasi das, Varanasi, 11th Edition. 1979. p.475-476.
38. Pt. Ram Prashad Sharma, *Rasendra Purana*, Khem Raj Shri Krishna Das, Edition 2013
39. Rasatantra Sara Evam *Sidhayoga Sangraha, Part 1, Dhatu Prakrana*, Krishana Gopal Ayurveda Bhavna, Ajmera, 21st Edition. 2012. p. 47
40. Gulraja Sharma Mishra, *Ayurveda Prakasha*, Chapter 3 verse 155-159, Chaukhambha Bharti Academy, Varanasi, Reprint 2007. p.375.
41. Kashinath Shastri, *Rasa Tarangini*, Chapter 19 verse 104-119, Motilal Banarasi das, Varanasi, 11th Edition. 1979. p.477-478.
42. Pt. Ram Prashad Sharma, *Rasendra Purana*, Khem Raj Shri Krishna Das, Edition 2013
43. Dr Devnath Singh Gautam, *Rasamritam, Lauhvigyaniyadhyaya*, verse 18-19, Chaukhambha Surbharti Prakashan, 1st Edition, p.52.
44. *Rasatantra Sara Evam Sidhayoga Sangraha, Part 1, Dhatu Prakrana*, Krishana Gopal Ayurveda Bhavna, Ajmera, 21st Edition. 2012. p. 47
45. Dr Devnath Singh Gautam, *Rasamritam, Lauhvigyaniyadhyaya*, verse 16, Chaukhambha Surbharti Prakashan, 1st Edition, p.52.
46. Pt. Ram Prashad Sharma, *Rasendra Purana*, Khem Raj Shri Krishna Das, Edition 2013
47. Kashinath Shastri, *Rasa Tarangini*, Chapter 19 verse 120-124, Motilal Banarasi das, Varanasi, 11th Edition. 1979. p.479.
48. Brahma Shankar Mishra & Sh Rupa Lalaji Vaishya, *Bhava Prakash Purvardha, Dhatvadi varga* verse 33, Chaukhambha Sanskrita Bhawan, 2013. p.606.
49. Siddhinandan Mishra, *Brihat Rasa Raj Sunder*, Chaukhambha Orientalia, Varanasi, p.120
50. R. Kaladhar Bhatta, *Sidhbheshajamanimala*, Chapter 2 verse 310, Chaukhambha Krishna Das Academy, 3rd Edition, 2003. p. 92
51. Dr Devnath Singh Gautam, *Rasamritam, Lauhvigyaniyadhyaya*, verse 16, Chaukhambha Surbharti Prakashan, 1st Edition, p.55.
52. Kashinath Shastri, *Rasa Tarangini*, Chapter 19 verse 125, Motilal Banarasi das, Varanasi, 11th Edition. 1979. p. 480.
53. Pt. Ram Prashad Sharma, *Rasendra Purana*, Khem Raj Shri Krishna Das, Edition 2013
54. Siddhinandan Mishra, *Brihat Rasa Raj Sunder*, Chaukhambha Orientalia, Varanasi, p.120
55. Pt. Shyam Sunder Acharya Vaishya, *Rasayansara, Dhatushodhanmaranprakrana*, verse 215, Krishna Das Aca., 6th Edition. 1997. P. 256
56. Nazanin Ruhani et.al; *J Res Med Sci* 2013 Feb;18(2):144-157

CONCEPTUAL STUDY ON *AMRUTHIKARANA*

*Naveen Kumar **Meenakshi Arora ***Shivali Chopra

Abstract

During the development of *Rasa Shastra* a number of important Pharmaceutical procedures are evolved for conversion of mineral drugs into suitable absorbable form. The *Bhasmas* are the unique preparations of metals and minerals used in *ayurveda*. *Marana* is most important pharmaceutical process used for conversion of metal into fine ash form which is similar to *Rasibhava* state. After the *Marana* process *Bhasmas* of *Abhraka*, *Louha*, *Tamra* pass through special process called "*Amrutikarana*". This process is done to remove the remnant *Doshas* which might be present in the *Bhasma* after *Marana*. In the present paper, an attempt is done to review and put forth the concept of *Amrutikarana*.

Key words: *Amrutikarana, Shodhana, Marana, Abhraka, Louha, Tamra.*

Introduction

Rasashastra is a most important and popular branch of *Ayurveda* developed in medieval period. It deals with the knowledge related to Alchemy. The master drug of this ancient science is *Parada*. *Bhasmas* of mineral drugs prepared after going through different *Samskaras*¹ like *Shodhana*, *Marana*, *Amrutikarana* which abolish the toxicity of the drug and brings about the physical and chemical changes in the drug, thus enhance their therapeutic efficiency. *Shodhana* is done mainly for eliminating specific impurities so that drugs becomes detoxify and also becomes brittle in consistency².

After *Shodhana* process *Marana* is performed. It is a process in which metals and minerals after *Shodhana* are triturated with Juices/*Kwatha* of the Specific drugs, then after *chakrika* formation and drying subjected to specific *Putas* to obtain *Bhasmas*.

In *Bhasmas* after carefully preparation their remains some toxic particles which are harmful to the body. In such circumstances the *Bhasma* is subjected to further

Process termed as *Amrutikarana*. It is assumed that after *Amrutikarana* *Bhasma* attains nectar like properties. This process is specifically indicated in reference only to *Abhraka*, *Louha*, *Tamra* *Bhasmas*. References related to *Amrutikarana* process are available in *Rasa* texts like *Rasatarangini*, *Rasamrutha*, *Anandakanda*, *Rasendra Chintamani*, *Rasayansara*, *Ayurveda Prakash*, *Bruhat Rasaraja Sundara*, *Rasa Jala Nidhi*.

Acharya Sadanand Sharma, author of *Rasatarangini* defines *Amrutikarana* as a process which removes the remnant *doshas* present in the *Bhasmas* remains after *Marana* process³.

In text book *Anandkanda* process *Amrutikarana* is included under 5 *Samskaras* of *Abhraka*⁴.

In *Ayurveda Prakash* in context of process *Amrutikarana* it is process by which the *Aruna Bhasma* loses its colour, but the properties get enhanced⁵.

Acharya Yadavji Trikamaji says that it removes bad effects of *Tamra*⁶.

Table No 1: Process *Amrutikarana* explained in different texts are as follows.

Name of text	<i>Abhraka</i>	<i>Tamra</i>	<i>Loha</i>
<i>Rasa rattan samuchaya</i>	-	+	-
<i>Anandakanda</i>	+	+	+
<i>Rasatarangini</i>	+	+	-
<i>Rasa chintamani</i>	+	-	-
<i>Bruhat Rasaraja Sundra</i>	+	-	-
<i>Rasayansara</i>	-	+	-
<i>Arogya Prakash</i>	+	-	+
<i>Rasa Jala Nidhi</i>	+	-	+
<i>Rasamrutha</i>	-	+	-

*Lecturer, Department of R.S.B.K, Shiv Shakti Ayurvedic Medical College, Mansa.

Lecturer, Department of Kayachikitsa, *PG Scholar, Department of Moulik Siddhant, Babe Ke Ayurvedic Medical College & Hospital, VPO. Daudhar, Dist. Moga (Pb.).

Table No 2 :Process of *Abhraka Amrutikarana* explained in various texts are as follows:

Reference	Ingredients	Procedure
<i>Rasa tarangini</i> <i>Taranga</i> 10/68-69	<i>Abhraka Bhasma</i> - 10 parts <i>Goghrita</i> 8 parts <i>Triphala kwatha</i> - 16 parts	Heated in the <i>lohapatra</i> till all the liquid part(<i>ghrita</i> and <i>kwatha</i>)burnt off.
<i>Rasa tarangini</i> <i>Taranga</i> 10/70	<i>Abhraka Bhasma</i> - 10 parts <i>Goghrita</i> 12 parts <i>Kumara swarasa</i> - 16 parts	Heated on mild fire till liquid part is burnt off.
<i>Arogya prakash</i> Chapter 2/136-137	<i>Abhraka Bhasma</i> - 10 parts <i>Goghrita</i> 6 parts <i>Triphala kwatha</i> - 16 parts	Heated on mild fire till liquid part is burnt off.
<i>Arogya prakash</i> Chapter 2/138	<i>Abhraka Bhasma</i> - 1 parts <i>Goghrita</i> 16 parts	Heated on mild fire
<i>Arogya prakash</i> Chapter 2/139	<i>Abhraka Bhasma</i> - 1 parts <i>Goghrita</i> 1 parts	Heated in <i>lohapatra</i> .
<i>Rasa chintamani</i> 4/32-33	<i>Abhraka Bhasma</i> - 1 parts <i>Goghrita</i> 1 parts	Heated in <i>lohapatra</i> .
<i>Ananda kanda kriyakaranavishranti</i> 7/91-92	<i>Abhraka Bhasma</i> - 10 parts <i>Goghrita</i> 8 parts <i>Triphala kwatha</i> - 16 parts	Heated in the <i>lohapatra</i> till all the liquid part (<i>ghrita</i> and <i>kwatha</i>)burnt off.

Table No 3: Process of *Tamra Amrutikarana* explained in various texts are as follows:

Reference	Ingredients	Procedure
<i>Rasa Ratan Samuchaya</i> 5/54-55	<i>Tamra Bhasma</i> -100gm <i>Amlaswarasa</i> Q.S <i>Suranakanda</i> -1	Triturated with <i>Amla swarasa</i> , kept in the <i>suranakanda</i> wrapped with the mud smeared cloth, dried and subjected to <i>Gajaputa</i>
<i>Rasa tarangini</i> 17/37-39	<i>Tamra Bhasma</i> -1 part <i>Gandhaka</i> -1/2 part <i>Panchamruta</i> -1 part	Triturated all in <i>khalva</i> , <i>chakrikas</i> were made, dried and subjected to <i>Gajaputa</i> for three times.
<i>Rasa tarangini</i> 17/40-42	<i>Tamra Bhasma</i> -1 part <i>Gandhaka</i> -1/2 part <i>Nimbu swarasa</i> -Q.S <i>Suranakanda</i> -1	Triturated with <i>Nimbu swarasa</i> , made into bolus, then kept into <i>Surankanda</i> , smeared with mud ,then subjected to <i>Gajaputa</i>
<i>Rasa tarangini</i> 17/43-44	<i>Tamra Bhasma</i> <i>Kumara swarasa</i> Q.S	Triturated with <i>kumara Swarasa</i> , dried, <i>Shrav samputa</i> , then subjected to <i>Varahputa</i> for eight times.
<i>Rasa mruthalohavijaniyam</i> 45/46	<i>Tamra Bhasma</i> <i>Nimbu Swarasa</i>	Triturated well, kept in <i>Surankanda</i> , subjected to <i>Gajaputa</i> .
<i>Anand kanda kriyakaran vishranti</i> 4/55-56	<i>Tamra Bhasma</i> -5 part <i>Shveta kacha</i> -1 part <i>Tankana</i> -1part	All ingredients triturated, kept in between <i>Abhrakapatra</i> , then kept in <i>Musha</i> and subjected to heat.
<i>Anand kanda kriyakaran vishranti</i> 4/57-58	<i>Abhrakapatra</i> -Q.S <i>Tamra Bhasma</i> <i>Nimbu Swarasa</i> -Q.S <i>Surankanda</i>	Triturated with <i>Nimbu swarasa</i> , made into bolus kept inside <i>Surankanda</i> . It is covered with mud cloth and subjected to <i>Gajaputa</i> for 3times.

Table No 4: Process of *Loha Amrutikarana* explained in various texts are as follows:

Reference	Ingredients	Procedure
<i>Ayurveda Prakash</i>	<i>Loha Bhasma</i> -1 part <i>Triphala Kwatha</i> -2parts	Together heated on moderate fire till all liquid evaporates.
<i>Anand kanda</i> <i>Kriya karan vishranti</i> 5/56	<i>Loha Bhasma</i> -1part <i>Goghrita</i> Q.S.	Heated in <i>lohapatra</i> till all liquid part evaporates.
<i>Bruhat Rasaraja Sundara</i>	<i>Loha Bhasma</i> -1part <i>Goghrita</i> Q.S.	Heated in <i>lohapatra</i> till all liquid part evaporates.
<i>Bruhat Rasaraja Sundara</i>	<i>Loha Bhasma</i> -1part <i>Goghrita</i> 1 part <i>Triphala Kwatha</i> -Q.S.	Heated in <i>Tamrapatra</i> using iron ladle till all liquid part evaporates.
<i>Rasa Jala Nidhi</i> vol 3-1,	<i>Loha Bhasma</i> -5 pala <i>Triphala kwatha</i> -Q.S. <i>Goghrita</i> -equal to <i>kwatha</i> <i>Sita</i> equal to <i>Bhasma</i>	<i>Loha Bhasma</i> is heated along with the <i>Kwatha</i> and <i>ghrita</i> . When the liquid evaporates completely, equal amount of <i>Sita</i> is added.
<i>Anand kanda</i> <i>Kriya karan vishranti</i> 5/61-63	<i>Loha Bhasma</i> -5 pala <i>Triphala kwatha</i> -Q.S. <i>Goghrita</i> -equal to <i>kwatha</i> <i>Sita</i> equal to <i>Bhasma</i>	<i>Loha Bhasma</i> is heated along with the <i>Kwatha</i> and <i>ghrita</i> . When the liquid evaporates completely, equal amount of <i>Sita</i> is added.

Discussion

Process of *Amruti karana* is performed after Marana to remove remaining *Doshas*. It is explained in *Rasa texts* only after 13th century. The term *Amruti karana* is used by *Rasatarangini*, *Ayurveda Prakash* and *Anand Kanda* only. Definition of *Amruti karana* is explained in some texts to enhance the safety and efficacy of the *Bhasma*. In *Rasaratana Samucchaya* term *Amruti karana* is not given but in context of *Tamra* Marana a process involving the *Mrita Tamra* is used which removes the eight impurities of *Tamra Bhasma*. *Amruti karana* is a special procedure described only for *Bhasmas* of *Abhraka*, *Tamra* and *Loha*. It is evident that the process of *Amruti karana* is described for *Bhasmas* which requires more number of *Putra* to attain *Bhasmas lakshanas*. Excess heat increases the *Ushna* and *Rukshata* in the *Bhasma* which hampers the *Rasayan* properties of *Bhasma*. To retain properties of *Bhasma* it is treated with *Triphala* and *Goghrita* during process of *Amruti karana*. *Triphala* is included under *Lohamar kagana* and also it is used as media for *Shodhana* and Marana of *Abhraka* and *Loha*. It might assist to remove the remnant impurities and enhance the quality of *Bhasma*. Frying on mild heat is described for *Abhraka* and *Loha Bhasma*, where as for *Tamra Bhasma* *Putra* is described. In some texts *Surana kanda* is used to place the bolus of *Tamra Bhasma*. It may be used in place of

Shrava Samputa because of its larger surface area. The studies conducted on *Amruti karana* of *Tamra Bhasma* showed decrease in the percentage of copper, Mercury, Sulphur, Lead in *Marita Bhasma*. There was also reduction of particle size and crystalline structure with *Amruti karana*⁷. *Ayurveda Parkash* has specifically mentioned *Tamrapatra* for *Amruti karana* of *Loha*, but heating a mineral in *Tamra* vessel is claimed to be poisonous.

Conclusion

Amruti karana is a special procedure to remove the remaining impurities in the *Bhasma*. It is specifically described for *Abhraka*, *Tamra* and *Loha Bhasmas*. It is claimed to remove toxic particles and compounds thereby enhances the properties of *Bhasma*. Various methods of *Amruti karana* are described for drugs.

References

1. *Charaka Samhita* by Ram Karan Sharma & Vaidya Bhagwan Dass published by Chowkambha Sanskrit Serie office, Varanasi. Vol-2nd, Reprint 2009, page No- 58.
2. Sharma Shri Sadananda, *Rasatarangini*, translated by Shastri Kashinatha, published by Motilal Banarasi dass, New Delhi, edition 11th, Reprint 2004.

COMPARATIVE STUDY OF RESPIRATORY SYSTEM AS DESCRIBED IN AYURVEDA AND MODERN SCIENCE

*Saranjit Singh Datta

**Mohinder Pal Singh

Abstract

The process of respiration has been described in various *ayurvedic* texts but its vivid description is not available as a whole. The different parts of respiratory tract, organs and their functions are found in the description of *pratyanga sharir*, *srotas*, *kosthanga*, *prana vata*, *udana vata*, *rakta dhatu*, *rasa dhatu* and diseases of *nasa*, *kantha*, *prana vaha srotas* etc. *Sharangdar* in *purva khanda* has given a vivid description of respiration (sh.pu. 5/52) According to him *prana vata* is responsible for respiratory act and because of the activity of *prana vata* which is situated in the brain, a nectar like substance is consumed through the act of respiration and this substance nourishes the whole body, *jiva* (blood) and *jatharagni*. This nectar like substance is nothing but the oxygen. According to modern also it is the oxygen which is inspired within the body from atmosphere and carbon dioxide is exhaled out. In this article an attempt has been made to comparatively study the functional anatomy and physiology of respiratory system as it is described in *ayurveda* and modern science.

Introduction

Respiration is the process by which the oxygenated air i.e. *Suddha vayu* is inhaled (*nishavas*) and simultaneously the deoxygenated air is exhaled (*ucchvas*). The process of respiration and ventilation is very beautifully mentioned by *sharangadara* which is closely related to the modern physiological description of respiratory system. According to him the *prana vata* situated at *nabhi*, after reaching the proximity of heart, comes out through the throat to consume a nectar like substance called '*vishnupadamrta*' from the atmosphere and after consuming this nectar of atmosphere it reenters the body speedily and thereafter nourishes the whole body, *jiva* and also *jatharagni*. Thus for understanding completely the respiratory system physiology one should get through the description regarding the function of *prana vata*, *udana vata*, *sadaka pitta*, *avalambaka kapha*, *phupphusa*, *prana vaha srotas* etc.

According to modern science also the goals of respiration are to provide oxygen to the tissues and to remove carbon dioxide. For achieving these goals, respiration can be divided into four major functions:-

1. Pulmonary ventilation which means the inflow and outflow of air between the atmosphere and lung alveoli.
2. Diffusion of oxygen and carbon dioxide between the alveoli and the blood
3. Transport of O₂ and CO₂ in the blood and body fluids to and from the body tissue cells.
4. Regulation of ventilation and other aspects of respiration.

Functional anatomy of respiratory system

The respiratory system and the gastrointestinal system are closely linked by evolution as the respiratory system

grows out of the gastrointestinal system during the development of the fetus in the womb. This linkage can easily be seen in the shared connections in the two systems. The mouth, tongue, nasal cavities and esophagus are involved in both respiration and eating. In essence, the respiratory system consists of a series of tubes for conduction of air, then distribution of that air to the remotest corners of lungs and finally the exchange of gases at the capillary level. In *ayurveda* the *shvasa-prasvasa kriya* is related to the *pranavaha srotas* which can be compared to the respiratory tree that comprises very essential part of respiratory system as per view of modern science. This respiratory tree consists of following structures which are described in various contexts in *ayurveda*:-

1. Nose (*nasika*)
2. Nasal cavity (*nasaa randhras*)
3. Naso pharynx (*nasaa saptapadha*)
4. Mouth cavity (*mukhavivara*)
5. Throat (*kantha*)
6. Pharynx (*grasanika*)
7. Larynx (*swaryantra*)
8. Trachea (*klomanadi*)
9. Bronchi (*apasthmbh*)
10. Right and left bronchi (*vaama and dakshina swaasa naalaas*)
11. Terminal bronchioles (*anthima swasa nalikaas*)
12. Alveolar ducts (*swasana kosika*)
13. Alveolar sacs (*vaayu koshaas*)
14. Pulmonary alveoli (*phuphuseeya vayu kosha*)
15. Lungs (*phupphus*)

The part of the tree from bronchus to alveoli is called bronchopulmonary tree. The tree is divided into 23 generations in three zones viz.

*Assist Prof., ** Professor, Department of Kriya Sharir
Babe Ke Ayurvedic Medical College & Hospital, VPO. Daudhar, Distt. Moga (Pb.)

1. Conductive zone (*vaataprayaana mandalam*)
2. Respiratory zone (*swasana mandalam*)
3. Transitory zone (*vaayu parivrtthana mandalam*).

Nasika (nose)

According to *sushruta nasaa* is one in number and he has described *nasa* under *pratyangas*. In the context of *bahirmukha srotas acharya sushruta* said that there are 2 openings in *nasa* which could be taken as *nasachidra* (nostrils)¹ *Acharya charaka* has also described two orifices in *nasa* which could be related to *nasacidra* (nostrils)². In *sushruta uttartastra* and under the description of *nasasosha* there is mention of *nasa srotas*. The region from nose to throat which is like english letter's has been described by *arundutta* as *phanakriti marga*.

Mukhavivara (mouth cavity)

Sushruta has described it as *vaktra* and according to him it is the seat of *prana vayu*. Within this *vaktra* the *prana vayu* moves.¹

Kantha (throat)

Kantha is the part of upper respiratory tract (*shvasana path*) and its lower part is attached to *swarayantra* (larynx). According to *sharangdhara kantha* is the passage through which the *asuddha vayu* gets out of the body and the air which is designated as *vishnupaadamrita* or the *amberpiyusha* (O₂) gets inside the body and supports life (*ayu*)³.

Klomanadi (trachea)

Vayu after entering through *mukha* and *nasika* passes through the *klomanadi*, *apastambha* and finally reaches the *phupphusa*. *Gananath sen* has termed *klomanadi* as *swaspranali*.

Apastambha (bronchi)

The *apastambha* are the two (right and left) *vata* carrying *nadis* on the both sides of the chest.

Phupphusa (lungs)

Charaka has not mentioned *phupphusa* as a *kostaanga* but *acharya sushruta* has described *phupphusa* as one of the eight *kostangas*. *Phupphusa* are in pairs but *sushruta* has not described it in pleural form. On the left and inferior aspect of heart are *pliha* and *phupphusa*, while on the right side are *yakrit* and *kloma*¹.

Arundutta has described the position of *phupphusa*, *kloma* and *yakrit* on right side of the heart. According to *sharangdhara* in the left side of the body *phupphusa*, *pliha* and in the right side *yakrit* is situated. Some scholars have considered *phupphusa* as *udanavayudhar* and function of *udana vayu* is *ucchavas* which clearly relates the role of *phupphusa* to respiration. *Sushruta*

has used two different terms to mean left and right lungs- *phupphusa* for left lung and *kloma* for right lung. This conclusion is drawn because of the fact that the term *phupphusa* has not been used in its pleural form.

Prana vaha srotas

Pranavaha srotas is one of the most important systems regulating many of the vital activities of the body. As the *srotas* are named according to the substance or the element they carry, the *prana vaha srotas* carry *prana* in them. The word *prana* is derived from the *sanskrit* root 'An' with a prefix 'pra'. An means to breath, to live⁴. One of the meaning of root 'pra' is to fulfill⁴, where as one of the meaning of 'Na' is the nasal. Thus the whole word *prana* means the fulfillment through the nasal part, which is necessary for the prolongation of life. *Acharya chakarpani* in their commentary have described *prana-vaha srotas* as the channels which carry *vata* named *prana* in them⁵. In other words, the organs of the body which carry *prana vayu*, its assimilation and transportation to other parts of the body and elimination of *vayu rupa mala* constitute the *prana vaha srotas*.

Charaka has described the *mool asthana* of *prana vaha srotas* as *hridaya* (heart) and *mahasrotas* (alimentary canal)² where as *sushruta* stated *hridaya* (heart) and *rasavaha dhamani* (blood vessels) as *mool*. *Charaka* has considered *hridaya* and *mahasrotas* as *mool* because nutrients are obtained from *anna (ahara)* through alimentary canal and heart is responsible for circulation of *annarasa* and *prana vayu* and both *anna* and *prana vayu* have been considered as *prana*. The *prana vaha srotas* is being correlated with the respiratory system by most of the recent authors on the basis of similarity in the features of *prana vaha srotodusti* with symptoms of respiratory system diseases. *Acharya charaka* has described the *pranavaha srotodusti laksana* as⁵

Atishrushtam: Prolonged respiration

Atibadham: Too restricted respiration

Kupitam: Painful or exacerbated dyspnoea

Alpalam: Breathing with interruption

Abheekshanam: Continuous breathing or continuous dyspnoea

Sashabdham: Auscultatory sounds like *ronchi*, crepitation etc.

Sasholam: Painful respiration

All these symptoms of *prana vaha srotas* show similarity with various respiratory diseases like *swasa*, *kasa* etc. But on careful observation one can find that these symptoms are related to rate and rhythm of respiration only which in turn are controlled by nervous system. These respiratory symptoms might be because of disturbance in respiratory system organs, cardiovascular organs or nutritional deficiency due to alimentary system organ abnormality and involvement of nervous system.

This might be the reason of considering *hridaya* and *mahasrotas* as the *mool* of *prana vaha srotas*. As the *prana vaha srotas* carries *prana vata* all the activities of which are governed by nervous system, so *pranavata* stands for nervous system also⁶. Thus *prana vaha srotas* should not be studied only with the correlation of respiratory system but it must be studied in context to nervous system, cardiovascular system and gastrointestinal tract also.

Shvasana prakriya (Art of respiration)

In *shwas kriya* two phases *prana* and *apana* are given. *Acharya charaka* while explaining characters of *aatma*⁵ has described *prana* as inspiratory phase and *apana* as expiratory phase. *Nisvasa* is the name given by *vaga-bhata* to inhalation of air through nose. According to him inhalation is due to *prana vata*. *Prasvasa* is exhalation. Act of respiration comprises inhalation and exhalation. According to *sharangdhar* the *prana vayu* moves between *nabhi* through interior of heart, *kantha* and exterior and then again back to heart and then entire body. Thus this can be taken as the alternate flow of gases between exterior and body as explained by the modern science. *Sharangdhar* has explained that the *prana vata* from umbilical region after touching *hritkamala* goes out through *kantha*, then it reaches *vishnupada* and after drinking amber *piyusha* (O₂) speedily comes back (*punarayati vegatah*). Then this *prana vayu* carries out the function like *prinana*, *jivana* and stimulates *jatharagni*. Here the word *nabi* (umbilical region) explains the participation of diaphragm and abdominal muscles in the process of ventilation. '*spristvahritakamalantaram*' word indicates the gaseous exchange at the alveoli after which the impure air comes outside through the *kantha* (*nasopharynx*). Here the word '*hritakamalar*' could be synonymous for lungs as *amberpiyush* word is used for oxygen. This *Sharangdhars* verse about respiration explains all the four basic components of respiration as described in contemporary sciences as:

- Ventilation - Exchange of respiratory gases between atmosphere and lungs.
- Diffusion - Exchange of gases between lungs and blood
- Perfusion - Circulation of blood to all the body cells.
- Cellular respiration or metabolism - By *prinana* of *Jatharagni*.

Ayurveda considers that the *prana vata* situated in *murdha* (brain) controls the process of inspiration by stimulating inspiratory group of neurons, by active dilatation of chest where as the *udana vayu* is responsible for expiration. Thus the activity of *prana* and *udana vata* refer to nervous regulation of ventilation. In *sadyovrana prakaran Srikantadutta* has considered *phupphusa* as raktadhara⁷ which shows that the *phupphusa* are highly vascular organ, as it is well known that it can accommodate blood two times of its normal capacity ie. 900 ml

blood⁸. *Sharangadhara* also explains *dhatu poshana* or tissue nourishment through *vayu* "*pusnanti chanisham vayoha samyogatasarvadhatubhi*". *Sira and dhamani* (veins and arteries) spread throughout the body after arising from *nabhi* (heart) and supply air to the *dhatu* constantly⁵ and because of the combination of *vayu* and *sharir* (body) *ayu* (life) is existing⁵. *Dhamanis* also carry *rasa dhatu* all over the body and fill it with air⁵. In *pranavaha srotas mool*, external *prana dravya* (*anna, vayu*) is converted into *absorbable* form and then it is transported with *rakta* throughout the body "*prano hi raktam anudhavati*". All the above explanations suggest about the transportation of gases through circulation of blood and supply of oxygen to tissues.

Shwasa Kriya dar (rate) In *Varahopnishad*, *Kanthopanishad* and *Shatpathbrahmana* the total number of respirations are given 21,600 per day⁹ which works out to be 15 per minute which is very close to the present day normal average 16- 18 per minute for healthy adults.

Conclusion

On the basis of above discussion it can be clearly understood that the respiratory system physiology is very well described by *ayurvedic* scholars and could also be understood in view of modern physiology. Right from birth to death *swasuchhava kriya* is one of the utmost sign of life. The *shwasa kriya* is one of the main functions of *prana vata*. *Pranavaha srotas* means the channel, which carries the external air into the body to sustain the life. But *pranavaha srotas* should not be studied only with the correlation of respiratory system but it must be studied in context to other major systems like nervous system (regulation of respiration) cardiovascular system (transportation of *prana*) and alimentary canal as the diseases of *pranavaha srotas* like *shwasa, hikka* have their origin in *mahasrotas*.

References

1. Murthy SRK. *Sushruta samhita* vol.1, English translation publishers chowkhambha orientalia, varanasi, reprint edition, 2008.
2. Sharma RK and Dash B. *charak samhita* (with English translation and critical exposition based on chakrapani dutts *Ayurveda dipika*) vol 1, 2, 3, 4 chowkhambha sanskrita series, varanasi, sixth edition, 2000.
3. Murthy SRK *sharangadhara samhita* English translation Choukhambha orientalia, varanasi, reprint edition 2009.
4. Sir Monier williams sanskrit English dictionary, new edition, Marwah publications New Delhi.
5. Yadavji Trikamji Acharya, *charak samhita Ayurveda* Deepika vyakhyan, chaukhamba surbarti prakashan, varanasi 2013.
6. Patwardhan k. Human physiology in *Ayurveda*, chowkhambha orientalia, varanasi, India Jaikrishnadash *Ayurveda* series no.134, first edition, 2005
7. Murthy SRK *Madhava Nidana* of *Madhavakara* English translation chowkhambha orientalia, varanasi 2009.
8. Guyton C. Text book of medical physiology, eighth edition 1991.
9. Vaidya Ranjeetrai Desai, *Ayurvediya kriya sharir*, shri vaidhyanath Ayurveda bhavana limited, Ilahabaad, 2013.

A PRELIMINARY REVIEW OF COMPARATIVE PHARMACOGNOSTICAL, PHYTOCHEMICAL AND ANTI MICROBIAL STUDY OF THE STEM BARK AND HEART WOOD OF *DEVADARU (CEDRUS DEODARA ROXB.)*

*Amrita Sharma **Ghanshyam Bahetra ***Rashmi Srivastava

Abstract

Devadaru is a well known tree for its therapeutic and ornamental value. The study has been undertaken to study the efficacy of the stem bark of the same tree in comparison to the heart wood. For this the phytochemical and pharmacognostical study will be done of the stem bark and heart wood of the cedrus tree and the antimicrobial study will also be performed on the same for the comparison on the grounds of the antimicrobial activities of the stem bark of *Devadaru*.

Introduction

Devadaru also known as 'Himalayan Cedar'. A favourite abode of ancient Indian sages who were devoted to Lord Shiva. 'Deodar' (*Cedrus deodara*) is used with stones, mud etc for the construction of 'pherols' (traditionally built earth quake proof houses) (Chopra, et al. 1997) & is Used for *Ganesh Pooja* (Khedkar, 1997).

In vedic and Indian literature, *Devadaru* tree has been an important tree, in *Atharva veda* it is described by the name *Bhadra*. In *Kalpasastra* by the name *Daru*. It is also described in *Shaunik Atharveda Samhita*, *Kaushik sutra*, *Patanjal mahabharya*. In *Ramayana*, *Mahabharata* also there are hymns on it.

In European and other literatures also the *Devadaru* tree with the name of *Cedrus* is a tree for worship. In Britain, Ireland and France, people worshiped in the oak tree groves called druids (Deru/vid). In Europe it is noted since iron age (600 BC 43 A.D.). Its historical use to construct the religious temples and in landscaping around the temple was found tremendously.

In *Ayurvedic* literature *Devadaru* is one of the herbs mentioned by different groups in *Bruhatryis*, *Anuvasanopaga dashaimani*^[1], *Stanya shodhana dashaimani*^[2], *Katuskanda*^[3], *Kashay skanda*^[4], *Katuvarga*^[5], *Eladi group*^[6], *Vachadi group*^[7], *Vata-samshamana varga*^[8], *Eladi gana*^[9], *Rodhradi gana*^[10], *Vatagna gana*^[11]

Scientific Classification^[12,13]

Kingdom	:	Plantae
Phylum	:	Tracheophyta
Division	:	Pinophyta
Class	:	Pinopsida
Order	:	Pinales
Family	:	Pinaceae
Genus	:	<i>Cedrus</i>
Species	:	<i>C. deodar</i>

Botanical description^[14]

Devadaru is large evergreen tree upto 80m height and girth about 15m, with spreading branches and attractive dark green foliage. Leaves are needle like 2.5-4cm long, 3 sided, clustered at the end of short branchlets. Wood strong, oily, aromatic, heart wood light yellowish-brown to brown in colour; Sap wood white. Male and female cones on the same tree; seeds winged, 6 mm long, pale brown, wing 2.5 cm across, triangular and rounded. Flowering and fruiting Sept-Nov.

Distribution^[15]

It is widely distributed in north west Himalayas from Kashmir to eastwards in Jammu and Kashmir, Himachal Pradesh, Uttaranchal and Uttar Pradesh states between 1500-3000m. Also found in the hilly terrain of Afghanistan and Pakistan.

Properties and action^[16]

Rasa Panchaka

Rasa : Tikta,

Guna : Laghu, Snigdha,

Virya : Ushna,

Vipaka : Katu

Karma : Vatahara, Kaphahara, Dushtavrana Shodhaka.

Therapeutic Uses

Vibandha, *Adhmana*, *Shotha*, *Tandra*, *Hikka*, *Jvara*, *Prameha*, *Pinasa*, *Kasa*, *Kandu*, *Krimi*, *Kushtha*, *Amavata*, *Raktavikara*, *Sutikaroga*.

Useful Parts are the Leaves, bark, Heartwood, Oil, Resin.

Aims and Objectives

- To review the updated classical and recent literature regarding *Devadaru*.
- To carry out the pharmacognostical study of *Devadaru* to authenticate the sample.
- To study the sample physio-chemically and phyto-chemically for its chemical composition.
- To do a comparative antimicrobial study of the

*3rd Year M.D. Scholar, ** Professor & HOD,

P.G. Deptt. of Dravyaguna, Babe Ke Ayurvedic Medical College and Hospital, VPO. Daudhar. Dist. Moga (Pb.),
*** Deptt. of PG Studies in Dravyaguna, R.G Govt. P. G. Ayurvedic College Paprola (HP).

heartwood and stem bark of *Devadaru*

● **The main aim of the present study:**

To know whether there is any similarity in phytochemical properties of heart wood & stem bark. To find the consequent possibility of using stem bark for medicinal purposes that can do waste management and save the tree from becoming endangered.

Material and Methods

Materials

The useful parts of devadaru heart wood and stem bark will be taken and their powder will be studied for macroscopic and microscopic characters.

The selected drug is collected from their native habitat from the forest range of mleodganj /dharamshala, Distt. Kangra (himachal pradesh) and will be authenticated.

Processing and Preservation of sample

The collected drug will be sorted out for foreign matter, washed properly, dried in shade and preserved.

Method

Quality evaluation

Quality evaluation of the trial drug *Devadaru* (*Cedrus deodara*. roxb.) will be done on the principle of triple "P" based protocols:

- Pharmacognostical
- Physio-chemical
- Phytochemical

Pharmacognostical Study

(i) **Macroscopic study:-** Macroscopic characters of *C. Deodara* heart wood and stem bark and its powder will be evaluated using organoleptic methods. The organoleptic characters will be checked based on the Sight for the colour, shape and size, Touch for the texture and fineness, Smell for odour and Taste for Rasa.

Microscopic study

i) *Heart wood and stem bark*

Dried Heart wood and Stem bark sample will be soaked overnight in distilled water, T.S will be taken and photomicrography will be done after proper staining and mounting.

(ii) **Powder Microscopy:-** Powder of the heart wood and stem bark will be studied microscopically and photomicrography will be done after proper staining and mounting.

Microchemical Tests

Some micro-chemical tests will be performed to detect starch grains and lignified elements.

- Test for starch grains will be done with iodine drops.
- Test for the fibers (lignified elements) will be done with phloroglucinol and hydrochloric acid.

a) Foreign matter

It includes stones, soil, dust and other inorganic contaminants. As the sample will be collected personally, cleaned and washed thoroughly till its free from foreign matter.

b) Loss on drying

Procedure:

1gm of the drug sample will be taken in a pre-weighed dried petre dish. It will be dried in an oven at 105°C until reaching a constant weight. The petre dish will be self cooled and weighed immediately. The weight loss *i.e.* loss on drying will be calculated and expressed as % w/w.

c) Total ash

Procedure :

2gm of the drug will be accurately weighed and taken in a pre-weighed silica crucible. It will be incinerated in muffle furnace at a temperature 450°C, then cooled and weighed. From the weight of the residue obtained, the ash value will be calculated and expressed as % w/w.

d) Acid insoluble ash

Procedure :

The ash obtained will be boiled for five minutes with 25ml of dilute hydrochloric acid. The insoluble matter will be collected on an ash less filter paper and washed with hot water, then incinerated to constant weight. The percentage of acid insoluble ash will be calculated with reference to an air dried sample.

e) Water soluble extractive (WSE)

Procedure :

5gm sample in 100ml of distilled water will be kept overnight. Stirred and filtered. 25ml of the filtrate will be taken in already weighed evaporating dish. Place evaporating dish on a water bath. Dried in an oven, till cooled and weighed immediately. The percentage of water soluble extractive will be calculated and expressed as % w/w.

f) Alcohol soluble extractive (ASE)

Procedure :

The method adopted for this experiment was same as that of water soluble extract but by using ethanol instead of water. Percentage of methanol soluble extract will be calculated and expressed as %w/w.

Qualitative Phytochemical

Qualitative Phytochemical screening of plant extract.

● Test for Alkaloids

Dragendorff's Test: To 1 ml of the extract, 1 ml of Dragendorff's reagent will be added (Potassium Bismuth iodide solution). An orange-red precipitate will indicate the presence of alkaloids.

● **Test for Saponins**

Small quantity of Alc. and Aq. extract will be taken separately and 20 ml of distilled water will be added and shaken in a graduated cylinder for 15 minutes lengthwise. A 1 cm layer of foam will indicate the presence of Saponins.

● **Test for Glycosides**

Legal Test:

The extract will be dissolved in pyridine and add sodium nitroprusside solution. The formation of pink red to red colour will shows the presence of glycosides.

● **Test for Phenolic Compounds and Tannins**

Test solution mixed with basic lead acetate solution. Formation of white precipitates will indicate the presence of tannins.

● **Test for Flavonoids**

Shinoda's Test: The alcoholic and aqueous extract of powder treated with magnesium foil and concentrated HCl give intense cherry red color will indicate the presence of flavonoids.

● **Test for Triterpenoids**

Noller's Test: Dissolve two or three granules or tin metal in 2 ml thionyl chloride solution. Then add 1 ml of the extract into test tube and warm, the formation of pink colour will indicate the presence of triterpenoids.

● **Test for Fixed Oils and Fats**

Spot Test: Press a small quantity of extracts between the filterpaper. Oil stains on the paper indicates the presence of fixed oils.

Phytochemical Analysis

Chromatographic study such as H.P.T.L.C will also be done to check the compounds in stem bark and heart wood. Any similarity found will be correlated.

Antimicrobial Study

It will be done on E.coli and Aspergillus niger and zone of inhibition for the aqueous and ethanolic extract of stem bark and heart wood will be studied on the bacteria and the fungi for 24 hrs. at 35 degree temperature. The results will be noted.

Result and Discussion

As per the findings if we are able to find any similarities in the presence of compounds in the stem bark and its role in the antimicrobial activity, we will be able to promote use of *twaka* (stem bark) instead of *kashtha* (heart wood).

It will save the tree from being endangered. It will open up the way to use the stem bark which is thrown as waste wherever its been used for making furniture, house or other ornamental purposes there by doing waste management.

It will also prevent adulteration in many of the *Ayurvedic* formulations where instead of *Devadaru* other woods like *Sarala*, *Sagaun* tree's heart wood are used to prepare medicines thereby, giving more efficacious results of *Ayurvedic*.

References

1. Charaka Samhita, Ram Karan Sharma & Vaidya Bhagwan Dash, Chowkambha Sanskrit Series office, Varanasi. Reprint: 2008; Vol- 1; 94.
2. Ibid; pp.92
3. Charaka Samhita, Ram Karan Sharma & Vaidya Bhagwan Dash, Chowkambha Sanskrit Series office, Varanasi. Reprint: 2008; Vol- 2; 298-299
4. Ibid; pp.302-303
5. G.D. Singhal & Colleagues, Susruta-Samhita Ancient Indian Surgery, Chaukhamba Sanskrit Pratishthan, Delhi. Reprint: 2007; Vol: 1; 347
6. Ibid; pp.312
7. Ibid; pp.313
8. Ibid; pp.323
9. Vagbhata's Astanga Hridayam, Translation: Prof. K. R. Srikantha Murthy, Chowkhamba Krishnadas Academy, Varanasi. Reprint: 2009; Vol-1; 206
10. Ibid; pp. 204
11. Ibid; pp. 200
12. http://en.wikipedia.org/wiki/Cedrus_deodara (Accessed on 25 Feb 2014)
13. The IUCN Red List of Threatened Species, Cedrus deodara. <http://www.iucnredlist.org/details/42304/0> (Accessed on 25 Feb 2014)
14. Database of Indian Medicinal plants used in Ayurveda Vol 7; Print: 2005; CCRAS, Dept of AYUSH, Ministry of Health and Family Welfare Government of India, New Delhi. Pp.72
15. Ibid; pp. 72-73
16. Department of ISM, MoHFW, Government of India. (2001 Reprint)). *The Ayurvedic Pharmacopoeia of India*. New Delhi: NISCOM (CSIR). p.47.

QUALITY AND SAFETY OF *AYURVEDIC* DRUGS AND FORMULATIONS

*Nancy Shahi ** Ish Sharma

Abstract

Ayurveda is the ancient most system of medicine. More than 70% of Indian population uses *Ayurvedic* drugs in some form. Their high cultural acceptability is due to the experienced safety and efficiency over centuries of use. Because of their unique effects and relatively low side effects, this medicine has been gaining popularity all over the world. Alike all other industrial products, pharmaceutical product is always subjected to have highly regulated Quality Control. The increasing use of these products worldwide and the growth of *ayurvedic* drugs industry have led to increasing concern regarding their safety. Quality is conformance to requirement and meeting stated as well as implied needs of customer. Quality control is a challenge to ensure safety, efficacy, and batch-to-batch consistency of *ayurvedic* products due to the complexity of phytochemical constituents.

To ensure both safety and efficacy of herbal medicines, implementation of and adherence to good agricultural and collection practice (GACP), good plant authentication and identification practice (GPAIP), Good manufacturing practice (GMP) before and during the manufacturing process, and Good laboratory practice (GLP) in analysis are necessary which are ethically delivered to the subjects as per Good Clinical Practices.

To protect the health of consumers, the quality and safety of herbs and herbal products must be ensured. To date, the toxicity, genotoxicity, and tumorigenicity of many herbal products have not been fully studied. The current paper plans to discuss the essential components of GMP, GCP, GLP.

Keywords- Good Clinical Practices (GCP), Good Manufacturing Practices (GMP), Good laboratory practice (GLP), Quality Control.

Introduction

Ayurveda is the ancient most system of medicine. More than 70% of Indian population uses *Ayurvedic* drugs in some form. Their high cultural acceptability is due to the experienced safety and efficiency over centuries. In its origin *Ayurveda* was carefully and systematically developed. As a result, it is now being confirmed by measures of many scientific parameters. It not only provides medical cure for diseases, but its holistic approach use unique principles of diet, life-style, detoxification, meditation and therapeutics to balance and enrich all aspects of the physiology and psyche. In light of these past and present aspects of *Ayurveda* the system's potential for promotion of health and wellness is well-acknowledged.

Ayurveda treatments, somehow, of late have come under attack for several reasons. Unethical companies are under scrutiny for the production of adulterated medicines while some of its practitioners have indulged in illegal practices. All these events led the department of AYUSH, Ministry of Health and Family Welfare, Government of India, to implement a National Pharmacovigilance Program for *Ayurveda*, *Unani*, and *Siddha* systems of medicine, in order to systematically monitor adverse drug reactions (ADR).

Pharmacovigilance is defined as 'the detection, assessment, understanding, and prevention of adverse effects of drugs or any other possible drug related

problems'. This definition plainly covers the objectives of the AYUSH program and its coverage area as per the WHO guidelines.

The spirit of pharmacovigilance is vibrant throughout *Ayurveda's* classical literature. The *Brihatrayi* and *Laghutrayi* repeatedly emphasize the major goals of pharmacovigilance, to improve patient care and safety during treatment, and thus to promote rational use of medications. These are recurrent themes of *Ayurvedic* pharmacology (*Dravyaguna*), pharmaceuticals (*Rasa Shastra and Bhaishjya Kalpana*), and therapeutics (*Chikitsa*). It is probable that these basic principles of *Ayurveda* gave rise to the common belief that *Ayurvedic* medicines are safe.

The *Ayurvedic* literature gives details of drug-drug and drug-diet incompatibilities based on elaborately described qualitative differences in ingredients or quantitative proportions. These factors undoubtedly prevent the onset of many otherwise unfortunate reactions.

Quality control

Alike all other industrial products, pharmaceutical product is always subjected to very stringent and highly regulated Quality Control. The whole purpose of these tests is to confirm and re-confirm Quality, Purity, Efficacy and Safety in Use of any pharmaceutical product. One of the major drawbacks in popularization

*PG Scholar, Deptt. of Samhita and Siddhant **Professor & H.O.D. Of Rog Nidan,
Babe Ke Ayurvedic Medical College & Hospital, VPO. Daudhar, Distt. Moga (Pb.)

of plant based drugs is the inconsistent quality of the formulated preparations.

In India, we have over 8500 licensed *Ayurvedic* medicine manufacturers. Over 80% of the medicinal plants requirements by *Ayurvedic* industry are obtained from wild collection from forests and waste lands. The trader organizes collection of medicinal plants through children and women in these forest areas who many times can not differentiate between related plant species. Therefore many times manufacturing units receive substituted or adulterated plant materials.

Most of these *Ayurvedic* medicine manufacturers are based on organoleptic characters and this can definitely be deceptive many a times since crude drugs are received in dry form and in many cases in broken condition like small pieces of barks, roots and rhizomes, powders of leaves and flowers etc. Therefore, by making it mandatory for traders to supply the crude drugs with certificate of analysis and quality, this problem can be overcome in a big way.

Another major problem faced is of non-homogeneity of the materials mixture of mature and immature plant species are received which is difficult to separate.

Pharmacognostic evaluation thus becomes difficult. Microscopic examination of several samples and that too in dried condition of broken plant part is very difficult and not practical method of quality control testing.

With this basic understanding of problems in performing quality control, there is a lack of standardization of raw material and manufacturing processes. Another point related to hurdles in this, is a fact that *Ayurvedic* product is made from varied sources of raw materials which are of plant, mineral and animal origin. These raw materials can be tested for quality control and quality assurance by highly sophisticated analytical instruments like HPTLC (High Performance Thin Layer Chromatography). But a final product containing number of various plant materials, minerals, and animal products renders it difficult to prepare quality control master files for finished product, which is either polyherbal or many times herbo-mineral type.

WHO Guidelines for quality standardized herbal formulations standardization and quality control parameters for herbal formulations are based on following fundamental parameters:

1. Quality control of crude drugs material, plant preparations and finished products.
2. Stability assessment and shelf life.
3. Safety assessment, documentation of safety, based on experience or toxicological studies.
4. Assessment of efficacy by ethnomedical information and biological activity evaluations.

Good store house for storage of herbs.

- Proper ventilation, free from dampness
- Adequate space for different type of material.

Steps involved for proper storage of raw materials

1. Identification by naked eyes.
2. Cleaning of herbs flowers, fruits etc may be cleaned.
3. Washing of crude drugs- like stem, barks, roots, leaves, stems may be done with potable water.
4. Drying of crude raw herbs.
5. Removal of microbes from raw herbs.

Sterilization of raw herbs can be done by using various methods

1. Dry heat sterilization
2. Steam sterilization
3. Sterilization by radiation like UV Rays.
4. Chemical methods Gaseous sterilization.

Always avoid

1. Storing in open spaces
2. Using inappropriate packing materials
3. Mixing of under approval and rejected lots.
4. Storing the material for long periods
5. Keeping the material within abnormal heat and moisture.

Distribution Records

Records of sale and distribution of each batch of *Ayurveda* drugs shall be maintained in order to facilitate prompt and complete recall of the batch, if necessary. The duration of record keeping should be the date of expiry of the batch.

Good manufacturing practices

GMP are the practices required in order to conform to the guidelines recommended by agencies that control authorization and licensing for manufacture and sale of food, drug products, and active pharmaceutical products. These guidelines provide minimum requirements that a pharmaceutical manufacturer must meet to assure that the products are of high quality and do not pose any risk to the consumer or public.

Good manufacturing practice guidelines provide guidance for manufacturing, testing, and quality assurance in order to ensure that a drug product is safe for human consumption.

Practices are recommended with the goal of safeguarding the health of consumers and patients as well as producing good quality medicine, or active pharmaceutical products.

GMP guidelines are a series of general principles that must be observed during manufacturing. When a company is setting up its quality program and manufacturing process, there may be many ways it can fulfil GMP requirements. It is the company's responsibility to determine the most effective and efficient quality process. The quality is built into the product and GMP is the most essential part of ensuring this product quality.

Good clinical practice (GCP)

GCP enforces tight guidelines on ethical aspects of a clinical study. High standards are required in terms of comprehensive documentation for the clinical protocols record keeping, training, and facilities, including computers and software. Quality assurance and inspections ensure that these standards are achieved. GCP aims to ensure that the studies are scientifically authentic and that the clinical properties of the investigational product are properly documented. GCP guidelines include protection of human rights for the subjects and volunteers in a clinical trial. It also provides assurance of the safety and efficacy of the newly developed compounds. GCP guidelines include standards on how clinical trials should be conducted; define the roles and responsibilities of clinical trial sponsors clinical research investigators.

Conclusion

In conclusion, in order to ensure consistency in the Herbal Materials and ensure uniformity of Ayurvedic Products, it can be recommended to follow measures given below

1. Ensure authentic plant materials Quality checks on inventories/vendor validation.
2. Undertake proper sampling to ensure homogeneity of the materials.

3. Undertake quality control tests as per specification.
4. Ensure compliance of process and product parameters Process standardization.
5. Undertake microbiological tests to ensure complete absence of all pathogens.
6. Ensure complete documentation of all raw materials used along with quality control tests and production parameters quality control master file.

References

1. https://googleweblight.com/?lite_url=https://nccih.nih.gov/health/ayurveda/introduction.html.
2. https://googleweblight.com/?lite_url=http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3117316
3. https://googleweblight.com/?lite_url=https://www.hindujagruiti.org/hinduism/ayurveda-part-rich-hindu-heritage/quality-control-quality-assurance-ayurvedic-drugs-need-problems.
4. http://googleweblight.com/?lite_url=http://www.pharmatutor.org/articles/who-guidelines-for-quality-standardized-herbal-formulations
5. [www.ijrap.net, php › uploads › 1189- PDF](http://www.ijrap.net,php%20uploads%201189-PDF)
6. https://googleweblight.com/?lite_url=https://en.m.wikipedia.org/wiki/Good_manufacturing_practice
7. https://googleweblight.com/?lite_url=https://en.m.wikipedia.org/wiki/Good_clinical_practice.
8. https://googleweblight.com/?lite_url=https://www.hindujagruiti.org/hinduism/ayurveda-part-rich-hindu-heritage/quality-control-quality-assurance-ayurvedic-drugs-need-problems.

AN INTEGRATIVE APPROACH IN DRUG DISCOVERY THROUGH *AYURVEDA*

*Navneet Kaur, **P.A.Tiwari, ***Tanvi Mahajan

Abstract

Indian healthcare system consists of medical pluralism and *Ayurveda* is still predominant amongst them. Drugs which are derivatives of natural resources have great importance in terms of their potency for management of multiple disorders. In early days of pharmacology, therapeutic drugs were often discovered from medicinal plants as part of folk remedy. But now these days, the conventional drug discovery process become extremely expensive, riskier and critically insufficient. Drug discovery strategies based on natural products and traditional medicines are re-emerging as attractive options. A reverse pharmacology approach inspired by traditional medicine and *Ayurveda* can offer a smart strategy for new drug candidates to facilitate discovery process and also for the development of rational synergistic botanical formulations. The knowledge and experimental database of traditional herbal medicine can offer a keyhole for new drug discovery and development. The plant species mentioned in the ancient text of these *Ayurveda* and other Indian systems of medicines may be explored with the modern scientific approaches for better leads in the health care. A salient feature of this approach is the combination of knowledge learnt from traditional or folk medicine and modern parameters to provide better and safer lead in drug discovery.

Keywords: Drug discovery, reverse pharmacology, *Ayurveda*, pharmaceuticals.

Introduction

Drug discovery plays an important role for the growth of any pharmaceutical industry and also to the society. Drug research began its carrier when chemistry had reached a degree of maturity which successfully exploited and provided the blockbuster drugs. Further during half of 20th century drug research began shaping up and was developed by several new technologies, the concept of targeting enzymes as drug targets came into existence that led to designing of enzyme substrate which carries drug discovery process to its best. But now these days, Industry is facing serious challenges as the drug discovery process has become extremely expensive, riskier, time consuming and critically insufficient. Post marketing failure of blockbuster drugs due to high resistance and a serious innovation deficit are major concerns of big pharmaceuticals. Consequently, there has been a remarkable shift in favor of single to multi-targeted drugs especially for polygenic syndrome based on knowledge from traditional *Ayurvedic* medicine. The endeavor to study well documented findings would facilitate not only identification of candidate drug but also understanding of their molecular mechanisms. Using current technology and genomics, proteomics and metabolomics, scientists now move in opposite direction to that used in conventional drug development known as reverse pharmacology.

Role of Ayurveda

Throughout history man has searched for remedies to fight against diseases. Ancient civilizations had comprehensive treatise where herbs or mixtures of them represented the corpus therapeutic to alleviate and treat diseases. One of these compendiums is the Indian *Ayurveda* which has been used for thousands of years. India has about 45000 plant species; medicinal properties have been assigned to several thousands. About 2000 are found in literature; indigenous systems commonly employ about 500-700. Drugs derived from natural product resources, especially those in plant kingdom, are of immense importance in terms of their potential applications for management of a multiplicity of human disorders. Reverse pharmacology when coupled with observational therapeutics, pharmacoepidemiology and systems biology would enhance and complement the new drug discovery process. The active phyto-molecules will also provide novel scaffolds for medicinal chemists to enhance efficacy and reduce toxicity. Reverse pharmacology thus has emerged as a trans-disciplinary approach to pursue bedside observations back to laboratory bench for new drugs. This approach can be cost-effective and fructify the leads from natural *Ayurvedic* products. Some successes of these are listed below;

Drug	Active Component	Action
<i>Adhatoda Vascica(Vasa)</i>	Vasicine	Bronchodilator, Oxytotic
<i>Andrographis Paniculata (Bhuinimb)</i>	Andrographolide	Hepatoprotector

*P.G Scholar, **Professor, ***Assistant professor,

Deptt. Rachna Sharir, Babe Ke Ayurvedic Medical College and Hospital, VPO. Daudhar. Distt. Moga (Pb.)

Drug	Active Component	Action
<i>Asparagus Racemosus (Shatavari)</i>	Shatavrin-?	Anti- Abortifacient
<i>Bacopa Monneri (Brahmi)</i>	Baccosides	Improve Memory
<i>Butea Frondosa (Plasha)</i>	Palasonin	Anthelminitic
<i>Boerhavia Diffusa</i>	Boervinones	Hepatoprotector
<i>Cyperus Rotundus</i>	Monoterpenes, Sesquiterpenes	Antipyretic
<i>Centella Asiatica (Mandookparni)</i>	Asiaticosides	Skin Disease, Psychotropic
<i>Curcuma Longa (Haridra)</i>	Curcumin	Antiinflammatory
<i>Holarrhena Antidysentrica (Kutaj)</i>	Conessine	Antidysenteric
<i>Picrorrhiza Kurroa (Katuka)</i>	Picroside, Kutcoside	Hepatoprotector
<i>Psorelea Corylifolia (Bakuchi)</i>	Psoralen, Bakuchiol	Antileucoderma, Antibacterial

Drug discovery: Ayurveda approach

With the introduction of western scientific methods, many *Ayurvedic* drugs and other Indian plants with alleged curative properties, soon come under some sort of scrutiny. There are success stories, though the number is certainly not commensurate with long period of research activity. This may be due to disorganized, thinly-spread non-focused efforts because concentration is on "one drug- one disease" theory. Development of standardized, safe and effective *Ayurvedic* formulations with proven scientific evidence can provide an economical alternative in several disease areas. Still some pro's and con's need attention for improvement of drug discovery from *Ayurveda*. In *Ayurveda*, specific protocol has been given for better quality control for herbal preparations. Different methods for drug collection, preservation and pharmaceutical processing were mentioned for better quality and efficacy of drug. Because *Ayurvedic* drugs become more effective in action by enriched factors of favorable habitat, season of collection, methods of preservation, quality of storage vessels and proper concentration of Rasa, Guna, Virya, Vipaka, Prabhav etc. e.g. roots and barks are always collected from dry lands; Fruits, flowers & leaves are from marshy lands; tree and shrubs from temperate land. The scientific rationale of recommendation to collect

particular plant in specific season is based on so many interesting evidences. It is observed that those parts of plants do have more medicinal potency in the suggested collection season and always they grow faster after collection of useful part. But modern researchers do not follow these protocols, that's why they fail to lead drug discovery process because it was observed that, *Ayurveda* drugs are more potent if they are used in that particular state as mentioned in text. There is need to collaborate *Ayurveda* protocols with modern parameters to evaluate the successful outcome.

Future prospective for reverse pharmacology

Natural products, besides being source of leads for a number of drugs, play an important role in the industrial drug synthesis. This is because of presence of a wide chemical diversity in natural products which enable them to be starting materials for several stereospecific reactions. Latest example would be osteltamivir (tamiflu) which is the only cure available for treatment of swine flu. Shikimic acid is the active component, highly present in *Calophyllum Apetalum* and *Araucaria excelsa*. However, *Ayurveda* has great approach for new drug discovery some of traditional medicines used for a particular system are listed below:

Anti inflammatory

Drug	Component
<i>Withania somnifera</i>	Withanolides
<i>Boswellia serrata</i>	Boswellic acid
<i>Berberis aristata</i>	Berberine
<i>Curcuma longa</i>	Curcumin
<i>Commiphora mukul</i>	Guggulsteron
<i>Azadirachta indica</i>	Nimbidin
<i>Embelia ribes</i>	Embelin

Cardiovascular system

Drug	Component
<i>Thevetia nerifolia</i>	Thevitin A,B, Peruvoside
<i>Rauwolfia serpentine</i>	Reserpine
<i>Terminalia arjuna</i>	Arjunolic acid
<i>Coleus spp.</i>	Colenol

Antidiabetic

Drug	Component
<i>Momordica charantia</i>	Charantin
<i>Gymnema sylvertere</i>	Gymnemic acid
<i>Andrographis paniculata</i>	Andrographolide

Anti obesity

Drug	Component
Tea polyphenolics	Epigallacatechin-3,5-diogallate, oolonghombisflavan, oolongtheanin, 3-o-gallate, theaflavin
<i>Alpinia officinarum</i>	3-methyle therganglin
<i>Commiphora mukul</i>	Gugulipid

Antimalarial

Drug	Component
<i>Azadiarchta indica</i>	Nimbolide, gedunin
<i>Selaginella bryopteris</i>	Biflavonoids
<i>Ancistrocladus heyneanus</i>	Naphthylisoquinoline, ancistrocladidine, ancistrolanzanine C, ancistroheynine

Antileishmanial

Drug	Component
Diospyrin spp.	Diospyrin
Plumbago spp.	Plumbagin
Berberis aristata	Berberin
Piper species	Piperine
Swertia chiraita	Amarogentin
Picororrhiza kurroa	Picroliv

Antineoplastic

Drug	Component
<i>Arnebia nobilis</i>	Arnebin
<i>Roylea calycina</i>	Diterpenoid precalyon
<i>Tithonia tagitiflora</i>	TagitininF
<i>Dysoxylum binectariferum</i>	Flavopiridol
<i>Podophyllum emodii</i>	Podophyllotoxin
<i>Tephrosia candida</i>	Tephodidoside
<i>Alstonia scholaris</i>	Echitamine chloride
<i>Tylophora indica</i>	Tylophorine
<i>Parthenium hysterophorus</i>	Perthenin

Conclusion

Ayurvedic drugs have a tremendous potential clinically in their parent form and not as individual component. Hence, efforts towards better pharmaceuticals should be helpful for a number of conditions. Apart from this, the standardization of herbal medicinal products also needs improvement and more stringent control as for the allopathic system of medicine. There is also a need to develop and screen a large number of pure compound and plant extract libraries to make the most out of what is available. Besides this, semi-synthetic modifications can also be attempted for existing hits to get better lead compounds from *Ayurveda*. These approaches can surely be a driving force for the drug discovery from *Ayurveda* and lead to fruitful outcome for mankind.

References

1. Patwardhan B, Vaidya Ashok D.B. & Chorghade Mukund ; Ayurveda & natural products drug discovery, Current Sciences, vol.86no.6,2004,p-789-799
2. A.A.Salim, Y-W.Chin & A.D. Kinghorn; Drug discovery from plants, p-1-25
3. Abhilash Mullasseril; Drug designing :An ayurvedic perspective, IQSR Journal of pharmacy, vol.3 issue4,p29-33
4. Sukhdev, Ethnotherapeutics and modern drug development; The potential of Ayurveda p1-20
5. M.Lahlou, The success of natural Product Chemistry in drug discovery, Expert opinion on drug discovery, vol.2, no.5, 2007, p697-705
6. M.S.Butler; The role of natural product chemistry in drug discovery: journal of natural products, vol.67, no.12, 2004, p 2141-2153
7. Dr. Brahmanand Tripathi, Edited Charak Samhita Viman Sthana 8 p-723-788

A REVIEW ARTICLE ON CONCEPTUAL STUDY OF *KRIKATIKA MARMA*

*Sakshi **Pramod Anand Tiwari

Abstract

Ayurveda is basically subdivision of *Atharva-veda*. The science of *Ayurveda* deals with curing on human sufferings and providing them a better way of living. *Marma Sharir* is one of the fundamental aspect in *Ayurveda*. The eminent scholars like *Acharya Sushruta*, *Charaka* and *Vagbhata* elucidated 107 *Marmas* with their traumatology and treatment. According to *Acharya Sushruta* some vulnerable points are recognized and are termed as '*Marmasthanas*' which are seats of *Prana*. This work has been put forward to review *Krikatika Marma* among those 37 *Marmas* of *Urdva- Jatrugata* (head neck region) *Marmas*. The *Marma* is classified under *Vaikalyakara*, *Sandhigata* category. Relations between its structural, functional and traumatological (prognostic) features have been established.

Keywords: *Marma*, *Krikatika*, *Sandhi*, *Vaikalyakara*, ligaments and atlanto-occipital joint.

Introduction

Marma are one of the speciality in *Rachna Sharir*. These are specific points which must be kept in knowledge by a physician or surgeon during treatment procedures (especially surgeries). *Marma* is conglomeration of five elements as *Mamsa*, *Sira*, *Snayu*, *Asthi*, *Sandhi*. As a natural phenomenon, *Prana* are seated at these places. Any injury to these places leads to consequences depending on structures involved.¹ The categorization depends upon *Rachna* (morphological), *Shadanga* (regional), *Pramana* (dimensional), *Parinama* (prognostic) and *Sankhya* (numerical) with *Panchbhutika* (elements).

Acharya Charaka referred in chapter '*Trimarmiya siddhi*' & '*Chikitsa adhyaya*' the references and importance of *Trimarmas*.² In the chapter entitled '*Marmavibhaga*' mentioned in *Ashtang Hridayam* have quoted the classical description of *Marma*.³ The *Krikatika Marma*, according to *Sushruta* is one of the *Sandhi Marma* (structural) and *Vaikalyakara* (Traumatological). The *Marma* is determined to be half *Anguli Pramana*. For the exact location mentioned in text is (*Shirogriva Sandhanye*) i.e. joint between occipital and first cervical vertebra (atlas vertebra). The injury is mentioned as (*chala murdhata*) which means shaking of the head.⁴

The table illustrates the detail of *Krikatika Marma Panchviddha* classification:

Table 1.1 : Illustrates The Classification of *Krikatika Marma*

S. No.	<i>Panchviddha</i> classification	Particular <i>Marma</i> association	Possible anatomical structure
1.	<i>Shadanga</i> (Regional)	<i>Urdva- Jatrugata</i>	Head neck region
2.	<i>Rachna</i> (Structure)	<i>Sandhi Marma</i>	Atlanto-occipital joint
3.	<i>Parimana</i> (Measurment)	Half <i>Anguli</i>	-----
4.	<i>Parinama</i> (Prognostic)	<i>Vaikalyakara</i>	Deformity
5.	<i>Panchbhutika</i> (Five elements)	<i>Marma</i> <i>Soumaya guna</i>	(Nodding of head) -----

Krikatika Marma is located at site of junction of head and neck; on injury they produce instability of head. The relationship of *Krikatika Marma* is done with the atlanto-occipital joint. The Atlanto-occipital joint is a synovial joint of ellipsoid and condylar type of variety. It consists of reciprocal surfaces (convex-concave). Articular surfaces are elongated, directed forward and medially.¹⁵ The ligaments involved are fibrous capsule, anterior and

posterior atlanto-occipital membranes. The movements due to ellipsoid variety of joint permit the free movement in two axes.¹⁶

Flexion and Extension (nodding) : transverse axis

Lateral Flexion: Antero-posterior axis

Joint is also said to be "YES JOINT"

*PG Scholar, **Professor and HOD, Department of *Rachna Sharir*,
Babe Ke Ayurvedic Medical College & Hospital, VPO. Daudhar, Distt. Moga (Pb.)

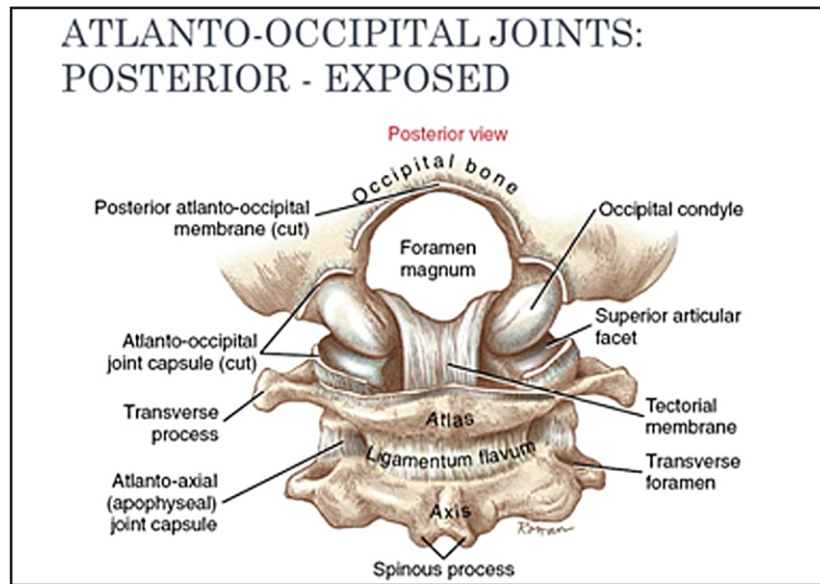


Figure:1.1 Showing The Atlanto -Occipital Joint

Discussion

Krikatika Marma is considered under *Vaikalyakar Marma*. The *Marma* is located in the back of neck region, at joint between occipital bone and atlas vertebra. It affects the movements of joint due to fracture or severe injury. The instability of head is said as injury results due to trauma at *Marma*. This statement is also acceptable. A joint complex lying in close relationship at *Marma* (median & lateral atlanto- occipital joint) is of surgical value. Occasionally, dislocation of atlas on axis may be result of softening of cruciform ligament.⁷ Here injuries to the particular region lead to shaking or rhythmical movements of head. The structures associated here are atlas and occipital bone, ligamentum nuchae, captis muscle, vertebral arteries and related nerves in the region. The functional side of joint is flexion, extension in two axes and disturbed in stiffness of muscles, ligaments etc.⁸

Due to any injury of the *Marma* and joint are similar to the shaking or rhythmical movement of head. This creates a relation between its structural, function and traumatological aspect.

Conclusion

The conclusion section relates to the relationship between structure, function and its injuries in both sciences. The *Krikatika Marma* and atlanto- occipital joint are similar to each other at various levels. A common head shaking signs is observed in both cases. As it is clearly described that these *Marma* points are seats of *Prana* so they must be protected from the injuries.

References

1. Dr. B. G. Ghanekar Edited *Sushruta Samhita Shaarir sthana 6/15, Ayurveda Rahsahya* Commentary, Reprint 2006 Varanasi: Meharchand Lakshmandas Publication; New Delhi. P-173
2. Dr. P. V. Sharma; Edited *Charaka Samhita Siddhi Sthana 9, Part 2*; Reprint 2014 Varanasi: Chaukhambha Orientalia.
3. Pandit Kashinath Pandey and Dr. Gorakhnath Chaturvedi; Edited *Ashtang Hridayam Sharir Sthana 4, Part 2*; Reprint 2009 Varanasi: Chaukhambha Bharati Academy.
4. Dr. B. G. Ghanekar Edited *Sushruta Samhita Shaarir sthana 6/36, Ayurveda Rahsahya* Commentary, Reprint 2006 Varanasi: Meharchand Lakshmandas Publication; New Delhi. P-198
5. BD Chaurasia; Edited *Human Anatomy 5th Edition*; Reprint 2012; volume-III New Delhi; CBS Publishers & Distributors: P-201-202
6. BD Chaurasia; Edited *Human Anatomy 5th Edition*; Reprint 2012; volume-III New Delhi; CBS Publishers & Distributors: P-203-204
7. Prof. J.N Mishra, Edited *Marma and its Management*; 1st Edition, Varanasi; Chaukhambha Orientalia. P-196-198
8. Keith L Moore; Edited *Clinically Oriented Anatomy*; 6th Edition 2010; Lippincott Williams & Wilkins: P- 467-469

CONCEPT OF AGNI AND ITS MODERN PERSPECTIVE

*Rainy Sachdeva **Kavita Vyas ***Veenu Malhotra

Abstract

According to Ayurveda, *Agni* is essential for the body as the roots for the plants because life, complexion health, vigour, vitality, strength and physique - all these depend on *Agni*. Though *Agni* is a single entity, according to place and function, it is described of 3 types which are *Jatharagni* or *Kayagni* (1), *Bhootagni* (5) and *Dhatvagni* (7). The word *agni* denotes both the physical and biological fire but in context of a living organism, the later term is more preferable, which has been termed as *Jathargani*, too. The main gross functions of *Agni* in the body are digestion and metabolism. *Agni*, because of being very subtle, carries out these functions through the gross media of *Pitta*.

Vagbhata says that the roots of all diseases are *Mandagni* while *Samagni* is for health. If the status of *Agni* is deteriorated, it may cause several somatic as well as psychosomatic diseases like *Manasa Dosha*, *Ajirna*, *Aamvisha*, *Alasaka* and *Visuchika*. Therefore, sincere efforts should be made to preserve *Jatharagni* with the fuel of wholesome food taken in right manner. To determine the status of *Agni*, during prescribing drugs and drug doses along with prescription of *Aahara* and *Vihara*, it is the prime need for an Ayurvedic physician to understand the concept of *Agni*. Hence, understanding the concept of *Agni* is need of an Ayurvedic physician.

Key Word: *Ayurveda*, *Agni*, *Pitta*, *Manasa Dosha*, *Ajirana*, *Jatharagni*, *Mandagni*, Digestion, Metabolism.

Introduction

Ayurveda is an ancient Indian system of life-science and medicine. Its classical knowledge and practice is based on its own metaphysics and biology which are entirely different from modern basic sciences. The mode of pathogenesis and diagnostics are based on its own theories of *Triguna* (three basic qualities), *Pancha Mahabhuta* (5 Primordial substances), *Tridosha* (3 Biological Humours) and *Agni* (Digestion power).

Functions of Agni

The ingested food is favourable for the body when it is digested well by *Agni*. Hence, a person can attain healthy and long life, *Bala* (strength), *Varna* (color), *Swasthya*, (health), *Utsaha* (enthusiasm), *Upacaya* (development of the body), *Prabha* (complexion), *Ojas* (strength), *Tejas* (valour), *Vaya* (age), and even *Ayu* (life), only if the *Agni* is in its normal state and functioning properly.¹

According to functions and site of action, 13 types of *Agnis* have been mentioned in *Ayurveda*, viz. *Jatharagni* (1), *Bhutagni* (5) and *Dhatvagni* (7). Among all these types, *Jatharagni* is considered to be the prime one, as it is responsible for nourishment of other *Agnis*², too.

Aims and Objectives

- 1.To emphasize and discuss the concept of *Agni* in *Ayurvedic* classical literature.
- 2.To evaluate the role of *Agni* in the process of digestion and metabolism in the present perspective.

Materials and Methods

Material related to *Agni* in *Ayurveda* and other related topics have been collected from various Ayurvedic classical texts like *Charaka Samhita*, *Sushruta Samhita* and *Ashtang Hridaya* with commentaries on them. The modern medical literature as well as other related information were collected from internet.

Review on Concept of Agni

Jatharagni

According to *Ashtang Hridaya*, the seat of *Jatharagni* is *Grahani* (Duodenum) as it withholds the food for certain time. *Grahani* is also the site of *PittadharaKala*³. Hence it is the main site for *Pitta* to perform its functions. *Agni* actually carries out its functions of digestion & metabolism through the media of *Pitta*. Thus, *Grahani* becomes headquarter of *Agni* as well as *Pitta*. That is why, when *Agni* undergoes deterioration, *Grahani* also gets vitiated and produces various types of diseases. The food taken in adequate quantity acts as a fuel for the body. As per *Ayurvedic* concept, the ingested food undergoes metabolic transformation by *Jatharagni* (Digestion fire). It is responsible for separation of food material into *Prasada* (the pure and useful part) and *Kitta*⁴ (the waste part). *Jatharagni* also gives stimulation to the *Bhutagni* and then only it becomes easy for tissues to metabolite the absorbed food with the help of *Dhatvagnis*. After the food has been digested in the alimentary tract, it is necessary to circulate it throughout the body for the nourishment of bodily tissues. For this purpose, *Vata Dosha* helps to circulate the processed

*M.D. Scholar, ** Assistant Professor, ***Associate Professor,

PG Department of Samhita and Siddhanta, Babe Ke Ayu. Med. College and Hospital, VPO. Daudhar, Distt. Moga (Pb.)

metabolic products inside the *srotas*⁵. *Dhatus* get nourished by receiving nutrients from metabolized food substances. In this way, *Agni* is used to convert the food in the form of energy responsible for all the vital functions of the body.

Relation of *Jatharagni* with *Doshas*

Jatharagni is classified into 4 categories namely *Samagni*, *Vishamagni*, *Tikshnagni* and *Mandagni* in accordance of the influencing *Dosha*.⁶

Samagni

When all the three *Doshas* are in equilibrium, *Agni* remains in *Sama* state. It is the physiological state of *Agni*. The *Samagni* digests and assimilates food properly, within proper time. This, thus increases the quality of the *Dhatus*.

Vishamagni

Improper digestion and metabolism takes place in this state of *Agni*. Sometimes *Agni* performs normal functions while sometimes it cannot digest food taken even in usual quantity. Different types of *Vatavyadhis* occur due to this type of *Agni*, which is affected by *Vata Dosha*.

Tikshnagni

When *Pitta* gets increased, it increases the intensity of *Agni*. In this state, quick digestion of food takes place regardless of the type of the food. *Acharya Sushruta* states that when the power of digestion is increased from normal to above normal, food digests very quickly and produces hunger or desire for the food. When food gets digested, the throat, the mouth cavity and the lips become dry with burning sensation. This condition is known as *Atyaagni* or *Bhasmak* in *Ayurveda*.⁷

Mandagni

Manda means to slow. The slow digestive power or digestive capacity is attributed to *Kapha* dominancy. Those, who suffer from *Mandagni*, eat very less. Lord *Dhanwantari* says that *Agni* digests the least amount of food in the greatest amount of time⁷, produces heaviness of the abdomen, difficulty in breathing and gives rise to disease of *Kapha* origin.

Clinical Assessment of *Jatharagni* status⁸

Signs and symptoms of proper functioning of *Agni*

- Adequate food intake capacity
- Timely evacuation of bowel and bladder
- Good strength
- Good resistance to infection (good immunity)
- Good Skin luster and texture
- Proper functioning of all sensory organs

Mild/ moderate malfunctioning of *Agni*

- Loss of appetite
- Lethargy
- Constipation/Diarrhoea
- Incomplete evacuation of bladder or difficulty in micturation
- Improper functioning of sense organs
- Depression/loss of feeling of happiness

Severe malfunctioning of *Agni*

- Collection of fluid in body (*Ascites*, oedema, pleural effusion, pericardial effusion etc.)
- Marked loss of energy and general debility
- Loss of enthusiasm
- Improper sleep, etc.

Malfunctioning of *Agni* leads to production of *Ama* (undigested food that remains in tract and acts as an antigen and is responsible for production of autoimmune diseases). Production of *Ama* may occur at the level of *Jatharagni* (improper digestion in G.I.T), *Bhutagni* (liver dysfunction) or *Dhatwagni* (disturbed tissue metabolism).

Jatharagni and *Pitta*

Pitta and *Agni* are both the same or are different? For this different *Acharyas* have given different views. Some *Acharyas* consider *Pitta* to be *Agni* while others speak differently. According to *Acharya Sushruta*, there is no existence of any other *Agni* in the body without *Pitta* because when there is increased digestion and combustion in the body due to *Ushna Guna* of *Pitta*, the treatment is like that of *Agni* only. According to *Acharya Marichi*, the *Agni* present in the *Pitta* gives good or bad results when it is normal or vitiated⁹.

There are many examples in our classics which indicate that *Pitta* is the same as *Agni*. But some doubts also come in front of us from classics in which there is indication that *Pitta* and *Agni* are not same as in the quotation of *Acharya Sushruta Samadosha Samagnishcha*¹⁰, which indicates that *Pitta* and *Agni* are two different entities. Concept that ghee alleviates *Pitta* but enhances *Agni* also put us in doubt¹¹.

Exploring the historical background of *Agni*, it is found that the Vedas bear a handful of literature about *Agni*. *Samaveda* bears elaborated description about *Agni* which is clear by enumeration of a separate chapter as '*Agnaneyakanda*'. In this *Veda* *Agni* is given special names as *Parameshwara* (God), *Atma* (Soul), *Vaishwanara* (Digestive fire) etc. It is considered as the life existing in the creatures of the universe and which spreads/propagates all over the area is called *Agni*. In *Brahmasutra*, *Agni* has been meant to be a sign of life in the body¹². *Agni* is a pivot around which the remaining factors responsible for the maintenance of health and

causation of disease as well as decay revolve¹²
 Going through all above references, it can be assumed that as an entity, as an element, *Agni* is only one in number, which remains present in all worldly substances. Some substances contain this element in excessive amount, which are called as “*Aagneya*” in nature. Among the three *Doshas*, only *Pitta* is *Aagneya*, means dominant in *Agni* element. Hence, most of the properties as well as functions of it are actually attributed to its *Agni* element. In short, it can be summarized that *Pitta* is

dependent on *Agni* but *Agni* may have its separate entity other than *Pitta* too. That's why, the treatment modalities of *Pitta* are same as those of *Agni*, but the remedies for deteriorated *Agni* may be of different type.

Modern perspective of Jatharagni

According to *Ayurveda*, there are 13 types of *Agni* in body namely- 7 *Dhatwagni*, 5 *Bhutagni* and 1 *Jatharagni*. They can be merely compared with some modern substances/secretions/processes, as follows:

Jatharagni = refers to the whole process of digestion in G.I.T
Bhutagni = refers to the final digestion in liver
Dhatwagni = refers to tissue metabolism } *Agni*

The four types of *Jatharagni* can be understood from modern perspective as follows:

Mandagni = Hypo secretion of digestive enzymes
Tiksangni = Hyper secretion of digestive enzymes
Vishmagni = Irregular secretion of digestive enzymes } Pathological states of *Agni*

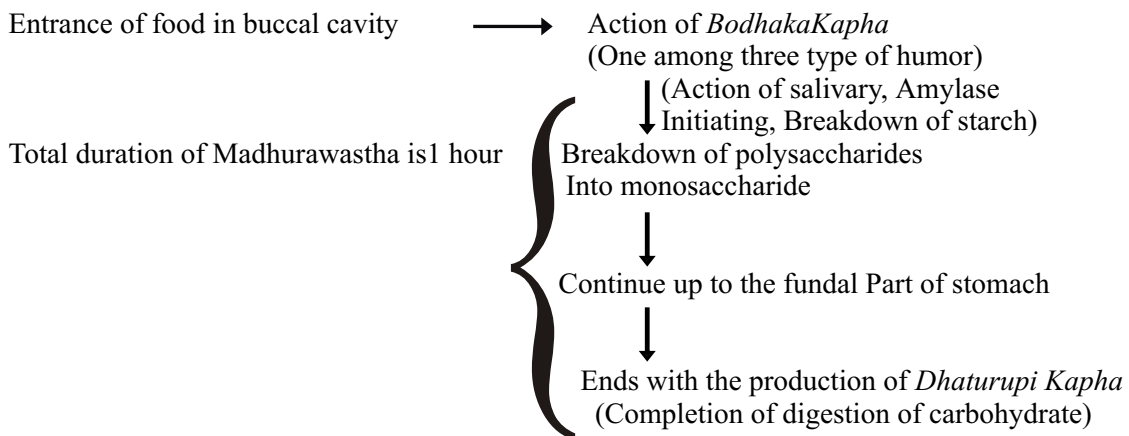
Samagni = Normal secretion of digestive enzymes —————> Healthy state of *Agni*

Functioning of Jatharagni (Process of Digestion)

Process of digestion occurs in three stages which are known as three *Avasthapakas*. All of these three stages occur in different parts of GIT and they are attributed for different types of nutrients. Modern science explains the process of digestion as per distinct nutrients while *Ayurvedic* nomenclature is in accordance of the *Rasas* produced at the end of each stage. At first sight, there seems to be conflict in both view points but actually it

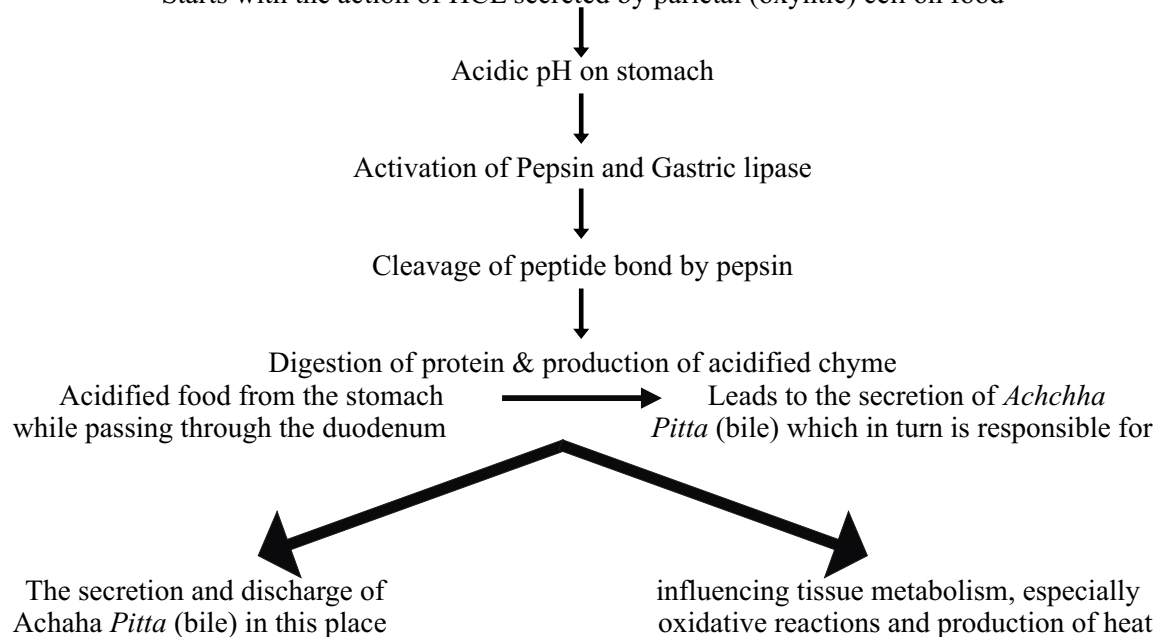
is not For e.g. Modern science describes digestion of carbohydrates in initial phase of digestion. These carbohydrates may be in variety of chemical compositions but ultimately all of them possess sweet taste. Modern science has emphasized on the substances or chemical compositions while *Ayurveda* has focused on tastes which are responsible for production of *Doshas* as an end result. Comparison of both opinions can be done, upto some extent, as follows¹³

Madhurawasthapa (production of Kapha/digestion of Carbohydrate)



Amla Awasthapaka (production of Pitta/digestion of proteins & fats)

Starts with the action of HCL secreted by parietal (oxyntic) cell on food



This, aids in digestion of food in the Intestines and the separation of the *Sara* (food nutrients) from the *Kitta* (stool)

Katu Awasthapaka (Production of Vata/Last stage of digestion added by action of colon bacteria, production of stool and residual gases)

The last stage of digestion in the colon occurs through the activity of bacteria. Numerous bacteria, esp. colon bacilli, are present normally in the absorbing colon i.e. cecum, ascending and transverse colon. These bacilli are capable of digesting small amount of cellulose, in this way providing a few calories of extra nutrition to the body. Bacteria are also involved in the digestion of protein into amino acid and amino acids into simpler substances like indole, skatole, hydrogen sulfide and fatty acid. Other essential substances like vitamin K, Vitamin B12, thiamine, riboflavin are formed as a result of bacterial activity. The vitamin K is especially important because the amount of this vitamin in the daily ingested food is normally insufficient to maintain adequate blood coagulation. About 1500 ml of chyme normally passes through the ilio-cecal valve into large intestine. The chyme remains in the large intestine for 3-10 hrs, it become solid or semisolid and contains nearly 100 ml water. The sodium ions are absorbed by the mucosa of colon by active transport, creating an electrical potential gradient, which results in absorption of chloride ions. The absorption of sodium and chloride ions creates an osmotic gradient across the large intestinal mucosa, which in turn causes absorption of water. These three phases are collectively known as *Awastha-*

paka i.e. digestion at the level of G.I.T. *Bhutagni* work at the level of liver and known as *Nisthapaka*, whereas *Dhatwagni* works at the level of tissues¹³

Bhutagni

Agni, present in five basic elements is *Bhutagni*. Each and every cell in our body is composed of five *Mahabhutas* or five basic elements and the ingested food is also composed of these five basic elements with their respective *Agni*¹⁴ or bio-energies. *Acharya Charaka* has mentioned that five *Bhutagni* digest their own part of the elements present in food materials and likewise qualities similar to each *Bhuta* nourish their own specific *Bhautika* elements of the body¹⁴. Importance of *Bhutagnis* cannot be ignored because all the three authorities are in favor of the existence of *Bhutagnis* right from the beginning of digestion to the assimilation of the respective fractions. It is evident that body and *Ahara* both are *Panchbhautik*. Things which are *Panchbhautik* have *Panchbhutagnis* in them. Every minute fraction of the body is *Panchbhautik* and has *Bhutagni* in it and the *Ahara* that one takes also has *Bhutagni* in it which moves along with it. Along with the food these *Bhutagnis* also enter the body and in the GIT act along with the *Jatharagni*. They start their action after *Jatharagnipaka* when there is separation of the *Sara* and *Kitta* and then for assimilation of this *Sara* into the body. *Bhutagnis* digest their respective fraction. Thus

assimilated *Ahara rasa* reach the *Dhatus* and each *Dhatu* takes its respective portion. It is then assimilated with the action of *Bhutagni* at cellular level. As per modern science, the functioning of *Bhutagni* can be equated with conversion of digested materials in the liver. *Bhutagni's* function starts immediately after absorption of digested food in blood stream, i.e. portal circulation to the liver and it ends before assimilation. Therefore, these functions are carried out in the portal system i.e. liver and vascular systems. Hence, liver is considered as center of *Bhutagnivyapara*¹⁵. According to Physiology in *Ayurveda*, *Bhutagnipaka* follows *Jatharagnipaka* and it completes with the process of intestinal digestion. After completion of *Bhutagnipaka* only, the formation of *Ahararasa* is completed and *rasa* assimilation is possible.

Dhatvagni

Tissue metabolism promotes the growth of *Sharira* (body). *Dhatus* are seven in number - *Rasa, Rakta, Mamsa, Meda, Asthi, Majja* and *Shukra*. All of them, directly or indirectly, get nourishment from *AharaRasa* or the chyle which is the end product of digestion. After *Jatharagni* and *Bhutagni Paka, AharaRasa*, circulates in body to reach all tissues. Each *Dhatvagni* has got the specialty to synthesize and transform the suitable constituents, present in *Ahara rasa*, into its particular *Dhatu*. This action is a sort of selective action. *Acharya Charaka* has mentioned the fact that the seven *Dhatus* are a support of the body and contain their own *Agni* with the help of which they digest and transform the materials supplied to them to make the substances compatible for assimilation and nourishment¹⁶.

Conclusion

In modern era, principles of *Ayurveda*, which are interwoven with basic concept of life, have significant value. Hence, one can't deny the importance of such principles. These principles are the outcome of strict experimental studies by *Acharyas* done in several years. Here in this context explaining briefly about *Agni*, it can be determined that *Agni* is an element which is present everywhere, inside as well as outside the body. Among the three *Doshas*, *Pitta* is dominant in *Agni Mahabhuta* proportion and hence is of *Aagneya* nature. Thus, *Pitta* (especially *Pachaka Pitta*) represents the *Agni* element in human body, and is mainly termed as *Jatharagni*. According to *Acharya Vagbhata*, this *Pitta* with its *Pakadi Karam* and by leaving behind its *Dravtava* can be called *Anala (Agni)*. The functions of *Bhutagni* and *Dhatvagni* are dependent on *Jatharagni* in context of their nourishment, normal and abnormal status. Though

the concept of *Agni* cannot be limited upto digestive enzymes, the mere comparison between them is reasonable. If any of the 13 *Agnis* is not functioning properly, it can produce *Aama* which is the root cause of several diseases. Hence, balancing of *Agni* is the only solution. Again, for the disorders related to increase or decrease in the amount of *Dhatus*, management of *Dhatvagni* becomes inevitable. Since *Dhatvagni* is highly influenced by *Jatharagni*, in this case also, the main attention shall be given to *Jatharagni*. In nut shell, *Agni* is one of the most important factors responsible for health as well as diseases.

References

1. Agnivesha. Charaka Samhita with Charak chandrika Hindi Commentary by ,Dr Brahmanand Tripathi, reprint 2008 Chaukhambha Surbharati Prakashan Varanasi, page no551(Cha chi15/3)
2. Vagbhata, Ashtanga Hridaya with Vidyotini Hindi Commentary by Kaviraja Atrideva Gupta. 3rd Edition, 2007. Chaukhambha Prakashan, Varanasi. Page no, 291(A.H Sha 3/71)
3. Vagbhata, Ashtanga Hridaya Samhita with Vidyotini Hindi Commentary by Kaviraja Atrideva Gupta 3rd Edition 2007 Chaukhambha Prakashan Varanasi page no ,188(A.H Sha 3/50)
4. Agnivesha, Charak Samhita with Charak Chandrika Hindi Commentary by Dr Brahmanand Tripathi, reprint 2008 Chaukhambha Surbharati Prakashan Varanasi, page no553(Cha chi15/15)
5. Agnivesha Charaka Samhita with Charak Chandrika Hindi Commentary by Dr Brahmanand Tripathi, reprint 2008 Chaukhambha Surbharati Prakashan Varanasi, page no558(Cha chi15/36)
6. Agnivesha Charaka Samhita with Charak Chandrika Hindi Commentary by Dr Brahmanand Tripathi, reprint 2008 Chaukhambha Surbharati Prakashan Varanasi, page no705(Cha.vi6/12)
7. Sushrut Samhita, Shastri Ambicadutt Dr Varanasi Chaukhamba Sanskrit Sansthan, 2007 page no134(Su.su35/29)
8. Agnivesha. Charak Samhita with Charak Chandrika Hindi Commentary by Dr Brahmanand Tripathi, reprint 2008 Chaukhambha Surbharati Prakashan Varanasi, page no551(Cha.chi15/8-9)
9. Agnivesha Charak Samhita with Charak Chandrika Hindi Commentary by Dr Brahmanand Tripathi, reprint 2008 Chaukhambha Surbharati Prakashan Varanasi, page no259(Cha.su12/11)
10. Sushrut Samhita, Shastri Ambicadutt Dr Varanasi Chaukhamba Sanskrit Sansthan, 2007 page no88(Su.sha15/48)
11. Sushrut Samhita, Shastri Ambicadutt Dr Varanasi Chaukhamba Sanskrit Sansthan, 2007 page no136(Su.chi31/25)
12. Shadakalpadruma, Radhakantdev R, editors. Amar Publication Varanasi: Chaukhamba Sanskrit 1 Series 1967:
13. Divya K Tripathi JS and Tiwari Sk(2013) Exploring Novel Concept of Agni and its clinical Relevance., Altern Integ Med 2:140 [Cited 1-8-2016] Available from <http://www.esciencecentral.org>
14. Agnivesha Charak Samhita with Charak Chandrika Hindi Commentary by Dr Brahmanand Tripathi, reprint 2008 Chaukhambha Surbharati Prakashan Varanasi, page no552(Cha.chi15/14)
15. Dr. Sreenivasulu, Concept of Ama in Ayurveda by Chowkhamba Sanskrit series, 1st edition, 2005
16. Agnivesha Charak Samhita with Vaidyamanorama Hindi Commentary by Acharya Vidyadhar Shukla and Prof . Ravi Dutt Tripathi , Chaukhambha Surbharati Prakashan Varanasi, page no 427(Cha.su28/4)

BEAUTY AND AUTHENTICITY OF TRIDOSHA
(1st Prize Winning, Ganga Sahey Panday Memorial All India Ayurved essay
competition in 2016 organized by Vishav Hindu Parishad)

*Supriya Arora

Introduction

Ayurveda, the ancient science of healing is based on the *Tridosha* theory and it believes in the equality of microcosm v/s macrocosm and has got faith in the theory that whatever is present in the external universe is also available in the human body and an individual is an epitome of the universe, as all the material and meta-physical phenomena of the universe are present in the individual and all those present in the individual are also contained in the universe.

The *Ayurvedic* concepts of physiology, pathology, diagnosis, prognosis, medicine and therapeutics are all based on the doctrine of *Tridoshas* viz. *Vata*, *Pitta*, *Kapha*. *Tridoshas* are the fundamental constituents of the body and play a vital role in the maintenance of overall health through a life in conformity with laws of nature. When these factors become increased or decreased, either partially or totally, the body becomes either sick or dead. The normalcy of *Tridoshas* corresponds to physiological states and the imbalance of the *dosic* equilibrium on the other hand, represent pathological states.

Methodology

Relationship between Doshas and Panchmahabhutas- (1)

The three *doshas* viz. *Vata*, *Pitta*, and *Kapha* originates from the five basic elements. The combination of *Vayu* and *Akash* give rise to *Vata dosha*, likewise the combination of *Jala* and *Prithvi* give rise to *Kapha dosha* whereas the *Pitta dosha* is due to *Tejas mahabhuta* only. (As. Su. 20/1)

Relationship between Doshas and Rasas- (2)

Rasas are six in number viz. *Madhura*, *Amla*, *Lavana*, *Katu*, *Tikta*, *Kashaya*. *Doshas* are three viz. *Vata*, *Pitta* and *Kapha*. *Katu*, *Tikta* and *Kashaya rasas* aggravate the *Vata dosha* whereas the *Madhura*, *Amla* and *Lavana rasas* alleviate the *Pitta dosha*. *Madhura*, *Amla* and *Lavana rasas* aggravate the *Kapha dosha* and *Katu*, *Tikta* and *Kashaya rasas* have got an alleviating effect on *Kapha dosha*. (Ch. Vi. 1/ 4-6)

Relationship between Doshas and Agni- (3)

Depending upon their intensity, *Agnis*, located in the body of human beings can be divided in 4 groups viz. *Tikshna*, *Manda*, *Sama*, *Vishama*. Individual having

doshic harmony will have *Sama Agni*, domination of *Pitta dosha* is responsible for *Tikshna Agni* whereas dominance of *Kapha dosha* leads to *Manda Agni*. *Vata dosha* leads to *Vishama Agni* by its dominance. (Ch. Vi. 6/12)

Relationship between Doshas and Kostha- (4)

The *kostha* are of three kinds viz. *Mridu*, *Madhyam* and *Krura*. These are based on the combination of *doshas*. The persons dominated by *Pitta dosha* bear *Mridu kostha* and milk can purgate them. On the contrary, *Krura kostha* are dominated by *Vata* and *Kapha dosha* and they are hardly purgated even by the medicines like *Triphala*, etc. The *Madhyam kostha* have balanced *dosha*. (Su. Chi. 33/21)

Relationship between Doshas and Vipaka-

The food having six tastes undergoes certain digestive changes in the gut and the six tastes turn into three *vipakas*. *Madhura vipaka* nourishes *Kapha*, *Amla vipaka* nourishes *Pitta* and *Katu vipaka* nourishes *Vata*.

Effect of age on Doshas-

Kapha is predominant in first third of life (anabolic phase or juvenile phase of growth). *Pitta* is predominant in the middle third of life (period of physiologic equilibrium) & the *Vata* is predominant in the later of life (catabolic period). So if we take *aahar* that causes *Kapha dosha* it will definitely cause disease in children and likewise in others.

Clinical Significance-

Samanya-Vishesh Siddhanta- (Ch. Su. 1/44)

The objective of curative treatment in *Ayurveda* is to restore the balance of *doshas* because according to *ayurveda* disease is nothing but a state of imbalance of *doshas* or in other words loss of equilibrium or homeostasis. The therapeutic attempt to restore balance is by:-

- Augmenting the weakened *doshas*
- Decreasing the increased *doshas*
- Preserving the normal one's

This is done by utilising appropriate diets, drugs and activities drawn from the nature on the principle of *Samanya* and *Vishesh*. Acc to the classical doctrine of *Samanya* and *Vishesh* a similar or homologous material received from outside enriches the similar in the body

and a dissimilar heterologous material depletes its counterpart in the body.

Tridoshas in present research-

Genomics have ushered in an era of predictive, preventive and personalized medicine wherein it is hoped that not too far in the future there would be a paradigm shift in the practice of medicine from a generalized symptomatic approach to an individualized approach on his/her genetic makeup.⁽⁵⁾ Several approaches are being attempted to identify genetic variations that are responsible for susceptibility to disease differential response to drugs, however, have met with only a limited success.

Ayurveda an ancient system of medicine documented and practiced in India since 1500 B.C. has personalized approach towards management of health and disease. According to this system, every individual is born with his/her own basic constitution, termed *Prakriti* which to a great extent determines inter individual variability in susceptibility to disease and response to external environment, diet and drugs. Now we can judge how *Prakriti pareekshan* is so much scientific in relation to genomic study which is far time consuming and expensive.

How genomic and *Prakriti Pareekshan* is so much similar?

On 29 Oct. 2015, science magazine Nature published a peer-reviewed paper online, titled 'Genome- Wide analysis correlates *Ayurveda Prakriti*'. The paper, published by *Periyasamy Govindaraj* et al has opened a significant front in the history of personalized medicine and also in bringing indigenous knowledge systems into the exploratory framework of science.

***Ayurveda* and Genomes: where did it begin?**

In 2000, Dr. Bhushan Patwardhan, a scientist with interdisciplinary school of Health Sciences, University of Pune proposed the original hypothesis that the concept of *Prakriti* in *Ayurveda* has strong genetic connotations and suggested a relation between *Prakriti* variations and genomic variations in individuals. In 2002, he coined the term Ayurgenomics and in 2003, a first paper on the concept was published. Since then there have been studies which associate specific genomics variations with the manifest state (phenotype) of a particular *Prakriti*.⁽⁷⁾

But what about the general genetic variation in the population and the *Prakriti* type? According to *Ayurveda*, each individual has a specific dominant *Prakriti* and this manifests itself in 'physical, psychological, physiological and behavioural traits', and is 'independent of social, ethnic and geographical variables'.

SNP or Single Nucleotide Polymorphism is the commonest genetic variation that one finds in human beings. Mostly considered as having no effect on the health or life, quite a few SNPs are important in that they create a predisposition towards certain diseases and also have a role in the differential effects drugs have on individuals. This is in a way very similar to *Prakriti* variations of individuals.

Critical Analysis-

Each individual has a specific dominant *Prakriti* and this manifests itself in 'physical, psychological, physiological and behavioural traits', and is 'independent of social, ethnic and geographical variables'.

Survey and Study-

For the study, 3,416 normal healthy male subjects between 20-30 years of age were recruited. As menstrual and premenstrual phases would have confounding effects during the determination of *Prakriti* assessment, the females were excluded. 'The subjects belonged to diverse ethnic and linguistic groups, and inhabited different geographical regions. The health status of every individual was ascertained by modern as well as *Ayurvedic* methods'.

Then, of the total 3,416 individuals evaluated, 971 having dominance of one *Prakriti* were taken and through quality control, 262 individuals (94 *Vata* dominant, 75 *Pitta* dominant and 93 *Kapha* dominant) with the highest proportion of one predominant *Prakriti* were randomly selected. Subjected to further quality control (QC) a final 245 were selected.

Starting with 7, 91, 186 SNP markers, they zoomed in on 4,05,782 SNPs. ANI-ASI deep ancestry structure of Indian population was also taken into account. The analysis now reveals 52 SNPs as 'genuine characteristics of *Prakriti* and not derived from ancestry'.

Then the scientists employed these 52 SNPs in *Prakriti* genetic differentiation and 'found striking separation of subjects according to their *Prakriti*'. The study has thrown certain interesting observations like the possibility of 2 alleles of same locus influencing different *Prakritis*. Of these 52 SNPs, 28 were genetic SNPs. An SNP is considered genetic if it falls within a distance of 10 kb of a gene (1 kb is the length equal to 1000 base pairs in a DNA strand). One such is PGM1 gene. And it is associated with *Vata* type SNP markers.

The paper says:

In *Ayurveda*, characteristics of *Pitta* include digestion, metabolism and energy production. Interestingly, we found PGM1 gene in the centre of many metabolic pathways i.e. glycolysis or gluconeogenesis, pentose phosphate pathway, galactose metabolism, purine metabolism and; starch and sucrose metabolism. Our finding

suggests that the function of the gene directly correlates with the role of *Pitta* in metabolism as described in *Ayurvedic* literature.

Discussion-

Why do we need the *Tridosha Siddhanta*?

We are having an era of infectious diseases and due to increasing infections day by day new antibiotics are being discovered but due to massive antibiotic resistance we need something which will help us curing disease from its root cause and as stated earlier Genomic study has been done. So, some thread is missing by Science also that is linked to “The *Tridosha Siddhanta*”.

This shows how with the evaluation of *Prakriti*, in respect to genome studies are made. By this evaluation and assessment of *Prakriti* we can prevent and cure many lifestyle disorders. As the genomic study is a much expensive and time consuming procedure, on the other hand *Prakriti* evaluation is cheap and less time consuming. So putting under the limelight, how the *Tridosha* Assessment in *Prakriti* is so much valid in the present Era.

If we follow *Dincharya* and *Ritucharya* described in our texts; the aggravation of *dosha* can be minimised.

Moving toward the diet

In *Ayurveda* diet has been given extreme importance dietary consideration is an important component of prescription in *Ayurvedic* therapy. Sometimes diet management in itself is a complete treatment. The Elemental constitution of *Panchabhautika Prakriti* corresponding *tridoshika* attributes of dietary articles can be accessed by their external appearance, digestibility and possible effects in body after their intake. Diet modifications can also help in balancing the *Tridoshas*, as in *Samanya-Vishesha Siddhanta*. (Ch. Su. 1/44)

As, we know, in a diabetic patient, the disease is *Kaphaj* and if we avoid taking the *Kaphaj aahar* and *vihaar*, we can prevent the disease.

In today's era, in the metro cities people want better progenies and for this, planned pregnancies, couples are moving towards complete *shodana* of body. In this, *Prakriti* assessment is done to achieve a healthy baby. If we take an example of pain, in cervical spondylitis,

Ayurvedic practitioners are practicing through *Tridoshas* as in *Vata*, enema is given. So everything revolves around *Tridoshas*.

As described in our texts, the disease can be of any name but these are due to imbalance in *Tridoshas*. Name can be Ebola, Swine flu, etc. but the cure is by balancing the three *doshas*.

Conclusion-

So we can evaluate and judge how *Prakriti*, hence the *Tridoshas* assessment is so much important for keeping a healthy person healthy and curing the diseased. And this is the *prayojna* of *Ayurveda*.

As antibiotic resistance is taking place and one time will come when all the antibiotics will be finished then balancing the *Tridoshas* and *Prakriti pareekshan* will be the only remedy. This shows the importance of *Tridoshas* in the present perspective.

“The time is changing and not only the policy makers of India, but the whole world is realizing the importance of *Ayurveda*. Who could have thought some years back that people with upbringing in cosmopolitan culture would prefer bottle gourd and gooseberry juice over carbonated soft drinks in the near future”.

So the definition of health given by *Acharya Sushruta* is so much relevant in this era also. So, we are there firstly, science is proving this now. The missing element that will lead to the suppression of disease is the study of *tridosha siddhanta*.

Bibliography-

Samhitas- *Charak Samhita, Sushruta Samhita, Astang Hridaya* and *Sangraha*

Salient features of *Ayurveda* by S.C. Dhyani
The Roots of *Ayurveda*- Dominik Wujastyk

References

1. Relationship between *doshas* and *panchmahabhutas*- (As. Su. 20/1)
2. Relationship between *doshas* and *rasas*- (Ch. Vi. 1/ 4-6)
3. Relationship between *doshas* and *agni*- (Ch. Vi. 6/12)
4. Relationship between *doshas* and *kostha*- (Su. Chi. 33/21)
5. <https://www.researchgate.net/publication/228439943-AYURGENOMICS>
6. Magazine Nature titled 'Genome Wide Analysis'
7. <http://www.sciencedirect.com/science/article/pii/S037887411-6304883>