



IJAYUSH
International Journal of AYUSH
AYURVEDA, YOGA, UNANI, SIDDHA AND HOMEOPATHY
<http://internationaljournal.org.in/journal/index.php/ijayush/>

International Journal
Panacea
Research library
ISSN: 2349 7025

Review Article

Volume 12 Issue 3

May-June 2023

CLUSTERING OF METABOLIC DISORDERS (SYNDROME X) WITH AYURVEDA: A MIRACLE

*Dr. Vaibhav Mishra¹, Dr. Lalita Dushad²

^{a1}PG Scholar Dept. of Shalya Tantra, PIA

²PG Scholar Dept. of Shalya Tantra, PIA

Corresponding Author's Email ID: vaibhav.monster93@gmail.com

ABSTRACT

21st century is the country of Psychosomatic Disorders and SADD syndrome (Stress, Anxiety, Depression and Disease). The real meaning of healthy life is seven-dimensional equilibrium, Bhautik (physical), Bouddhik (Intellectual), Bhavanatmak (Emotional), Samajik (Social), Adhyatmik (spiritual), Vyavsayik (occupational), Paryavaran (environmental).

Conventional system of medicine is not very satisfactory in this problem has lack of holistic and comprehensive approach towards psycho somatic metabolic diseases. *Ayurveda* has potential and interventions to resist disease occurring in degenerative face and improves physiological processes that influence metabolic and immunological status and compensates age-related biological losses in mind, body altogether affords rejuvenating effect to a remarkable extent. *Ayurveda* is the ultimate mind- body healing experience for detoxifying the body strengthening the immune system, restoring balance well-being. It is one of the most effective healing modalities in *Ayurveda* system. It promotes detoxification and rejuvenation through eliminating toxins and stagnant excreta waste metabolites from body. Acharya Charak has mentioned the extensive use of *Panchakarma* therapy for almost all major metabolic diseases as aggravated doshas are removed from the body, disease does not reoccur. Benefits of *Ayurvedic* therapy as told by Acharya *Charak* are as follows -elimination of vitiated Dosha, preventive and promotive health, management of various systematic diseases, restoring normal health, sense organ, mind, intelligence and complexion becomes clear, person is not affected by old age and lives disease-free life. *Panchakarma* is the demand of hour to develop an effective, holistic protocol for geriatric metabolic disorders.

The proposed essay is aimed to explore the mechanism of action, to make this therapy more evidence based.

INTRODUCTION

According to Ayurveda human body consist of three doshas, Sapta dhatu and Three Malas.

In Ayurveda the human body has been described as a living subject where the wear and tear are a continuous and perpetual phenomenon regeneration and decaying rates has go simultaneously right from the neonatal live to young age where growth and development occurs after words this process is altered and degeneration takes upper hand. As the age advances body becomes fragile and metabolic functions weakened and the body succumbs to various disease.

Ayurveda and Panchakarma is a unique bio-cleaning therapy of Ayurveda, which brings about homeostasis of the body and eliminates disease causing toxic substances from the body.

This may be brought about by subtle changes at cellular level by modulating physiological, biochemical, and immunological activities at molecular level. A metabolic disorder can happen when abnormal chemical reactions in the body alter the normal metabolic process. Metabolic disorder occurs when the metabolism fails and causes the body to have either too much or too little of the essential substances needed to stay healthy. There is a large list of metabolic disorders which include diabetes, obesity, galactosemia, Hypo and hyperthyroidism, acid-base balance related problems, etc. Panchakarma has shown its effect in obesity hypertension, diabetes, elevated cholesterol etc.

MAIN BODY

Over 220 million people globally have diabetes, and there are 400 million clinically obese adults. These illnesses have a hugely negative influence on the world's economy and human suffering. The management of various disease processes, including the use of natural remedies that are both economical and effective, urgently needs to be better understood.

Currently, obesity, hyperglycaemia, and dyslipidaemia are the primary components of the Metabolic Syndrome (MS), which is becoming an epidemic on a global scale. Major risk factors for death from this MS include CAD, CKD, NAFLD, and others.

The metabolic syndrome, a multifactorial disorder, is frequently connected to a collection of conditions formerly known as syndrome X and insulin resistance syndrome. There has been an increase in therapeutic emphasis centred on prevention and a corresponding increase in knowledge of the illness as a result of the metabolic syndrome's high link with early morbidity and death. Understanding the intricate etio-pathogenesis of MS is crucial in order to implement effective management.

Obesity is primarily brought on by an unhealthy, high-calorie diet and a sedentary lifestyle. By releasing a lot of FFA into the bloodstream, which blocks insulin receptors and results in pre-diabetes or hyperglycemia, central obesity raises the likelihood of insulin resistance, which eventually results in metabolic syndrome. If this stage of pre-diabetes or full-blown diabetes is ignored, metabolic syndrome develops. According to recent data, global industrialisation is increasing, which is linked to rising obesity rates, which is expected to drastically increase the prevalence of MS, especially as the population ages. Furthermore, MS in younger populations is beginning to manifest itself due to the increased prevalence and severity of childhood obesity.

Ayurved Concept of Metabolic syndrome

The two basic theories of sickness according to Ayurveda are those associated to overeating and undereating, respectively. the condition metabolic syndrome is thought to result from excessive dietary intake because of faulty tissue metabolism.

Inefficient metabolism leads to metabolic syndrome. *Agni's* role in metabolism is regarded as such in *Ayurveda*. The main factors that vitiate *Agni*, notably *Medadhatvagni*, are several causes of metabolic syndromes, such as sedentary lifestyles, fatty, heavy meals, excessive calorie consumption, and lack of exercise or physical activity. Create *Aam*, *kapha*, and *Meda* above *Nidana*, which will vitiate *Agni*. Therefore, metabolic syndrome is *Santarpana Janya Vyadhi*. *Santarpanottha Vyadhi* also covers the illnesses related to the metabolic syndrome, such as obesity, type 2 diabetes, and dyslipidaemia. Obesity, dyslipidaemia, and diabetes are the three primary components of the metabolic syndrome. The ayurvedic theory of *medavaha Sroto dusti* is responsible for the aforementioned characteristics. Therefore, the early stages of metabolic syndrome can be related to *medavaha Sroto dusti*.

Type 2 diabetes and coronary artery disorders develop from metabolic syndrome in its middle stage. As a result, it can be described as the sankara Vyadhi situation.

Acute pancreatitis, CAD due to hypertriglyceridemia, diabetic retinopathy, neuropathy, nephropathy, cerebral haemorrhage, hypertensive cardiomyopathy, hypertensive retinopathy, and hypertensive retinopathy and nephropathy due to hypertension are complications of specific diseases that develop in later stages of the metabolic syndrome.

As a result, as the disease advances gradually, the symptoms worsen and the need for treatment increases. Therefore, it is advisable to treat this illness before it progresses to a state that involves Vyadhi Shankara and Upadrva in its middle or later stages.

Shadvidha kriyakala has been referred to by Acharya Sushruta for early disease detection, allowing for the earliest feasible planning of treatment and halting disease progression.

Metabolic syndrome's earliest stage is known as Medavaha Sroto dusti. The nidan and samprapti of the Medavaha Srotasa Dusti can therefore be useful in understanding the Ayurvedic aspect of metabolic syndrome. Apathyanimittaja Prameha and Updrava of Avaran can be used as analogues for the fully established metabolic syndrome and complications-free stages of the syndrome, respectively. Depending on its various stages, ayurvedic treatment for metabolic syndrome.

Causes of metabolic disorders

Following are the most common causes of metabolic syndrome,

- Genetic
- Stress
- Overweight
- Sedentary lifestyle
- Aging
- Diabetes mellitus type 2
- Alcohol intake
- High calories food intake
- Smoking

- Post menopausal
- Carbohydrate rich diet
- Shift of work pattern
- Poor quality and decreased sleep

Diagnosis of Metabolic Disorder

The NCEP ATP III definition states that metabolic syndrome is present if three or more of the following five conditions are true: fasting triglyceride (TG) levels over 150 mg/dl, blood pressure over 130/85 mmHg, and fasting high-density lipoprotein (HDL) levels.

Obesity-related primary and secondary metabolic syndrome problems

Impaired kidney functions, Fatty liver disease, Hypertension, Heart failure with preserved ejection fraction, Obstructive sleep apnoea, Pre-diabetic turns to diabetic, Polycystic ovarian disease, Atherogenic dyslipidaemia, Sympathetic activation and tachycardia, Hyperuricemia, chronic inflammation.

Lifestyle as the leading cause of Metabolic Disorder & Management

The effects of a "unhealthy" lifestyle can be apparent in all aspects of the metabolic syndrome. The prevention and treatment of metabolic syndrome and related disorders depend heavily on effective lifestyle changes. In the setting of metabolic syndrome, interventions targeted at preventing substance abuse and supporting good nutrition, exercise, and sleep hygiene are especially important.

1-Diet

One of the main treatments for improving all metabolic syndrome symptoms is weight loss. Overweight and obesity, both of which are a component of the metabolic syndrome, are primarily caused by an imbalance between energy intake and expenditure. The following dietary changes should be part of metabolic syndrome treatment.

- Cutting back on trans-unsaturated fatty acids, which are found in highly processed foods like commercial bakery products and some hydrogenated fats, as well as saturated fatty acids, which are found in meat, dairy, coconut, and palm oil (the benefits include lowering triglyceride levels and raising HDL-C levels).

- Consuming more dietary fibre, such as that found in pulses, fruits, vegetables, and whole grains (benefits include lowering triglyceride levels, raising HDL-C levels, and improving regulation of blood pressure, body weight, and glycemia). Additionally, vegetables are a good source of potassium, which helps to regulate blood pressure;
 - Increasing the intake of the omega-3 fatty acids, by eating e.g. fish (the benefits include reducing triglyceride levels)
 - Lowering the percentage of dietary carbs (particularly simple ones) to under 50% of total calorie intake, notably by cutting back on sugar-sweetened beverages (effects include lowering triglyceride levels)
 - Reducing salt intake (the benefits include decreasing blood pressure)

2-Lack of physical exercise

Even though physical activity has numerous known and clinically verified health benefits. From the standpoint of the metabolic syndrome, increasing HDL-C levels, lowering triglyceride levels, improving glycaemic management due to improved tissue sensitivity to insulin, and lowering blood pressure are the most important impacts of physical activity.

The most recent recommendations from the European Society of Cardiology state that an adult should engage in at least 150–300 minutes of moderate–intensity aerobic physical activity per week (defined as having trouble speaking in full sentences during the exercise); 75–150 minutes of vigorous–intensity aerobic physical activity (defined as being unable to speak during the exercise); or an equivalent combination of both. The recommendations encourage weight training in addition to aerobic activity on two or more days each week, indicating extra benefits of this type of exercise.

There is not a single recommended exercise type – the activities should be tailored to match a patient’s health status, skills and interests. Apart from organised activities, the patients should be encouraged to increase their daily physical activity outside workouts, such as walks, using stairs rather than lifts, doing daily chores, etc.

3-Alcohol consumption

In addition to cancer, depression, and suicide, drinking alcohol increases the chance of being overweight, obese, and developing cardiovascular disease. Due to its high calorie content and lack of nutrients, alcohol has a negative impact on body weight. Alcohol also raises blood pressure and the levels of triglycerides and uric acid in the metabolic syndrome environment.

4-Sleep and circadian Rhythm

For you to stay at your ideal weight, you need to get enough good sleep. Reduced sleep duration and/or quality is linked to a higher risk of weight gain and many metabolic syndrome problems.

Below, are the main principles of sleep hygiene:

- One should have approximately 6 to 8 h of sleep per night (1/3 to 1/4 of a day);
- With regular bedtime and wake-up times;
- The bedroom should be as dark as possible, with the bed used only for sex and sleep;
- Exposure to blue light from light-emitting electronic devices (e.g. smartphones, tablets) should be minimised at least 1 h before the planned bedtime;
- Vigorous physical exercise should be avoided within at least 3 h and meals within at least 4 h before the planned bedtime;
- Alcohol should be avoided in the evening, to ensure optimum quality of sleep.

Obesity as a basic element of metabolic syndrome

In the greatest CV risk group, 85% of adults or nearly 60% of all adults are overweight. Among adults, one in five are obese. As a result of an excessive build up of adipose tissue, obesity is a problem of energy homeostasis. By measuring the waist circumference at or below 80 cm for women and 94 cm for men, respectively, the International Diabetes Federation (IDF) defines central obesity in European adults. Women with a waist circumference of less than 88 cm and men with a waist circumference of less than 102 cm are shown to have a markedly elevated risk of metabolic problems.

When obesity or even overweight is diagnosed, treatment must begin right once because delaying treatment raises the risk of early death, social marginalisation, and frequently, disability. Over 200 problems, including type 2 diabetes mellitus, hypertension, and dyslipidaemia, which are the most prevalent, are caused by an excessive build-up of adipose tissue, especially abdominal obesity.

Non-Medical Management of Obesity

The non-medical treatment of obesity includes dietary therapy, dietary modification, and increased voluntary physical activity. food advice should be tailored to each person's unique energy needs. A licenced psychologist or psychological therapist should offer cognitive-behavioural therapy, which includes changing eating habits and/or treating an eating disorder.

Tips to Modify Your Life style to Combat Metabolic Disorders

- Reduce the calories by 500-600 kcal/day
- Eat less simple carbohydrates (Sweets, soft drinks, cereals)
- Eat less animal fats and choose plant-based fats (olive oil) instead.
- Be active i.e., minimum 150-300 minutes of moderate intensity aerobic physical activity per week e.g., cycling, brisk walking, stretching.
- Eat less salt and do not add it to meals and avoid highly processes foods.
- Cut down on drinking
- Stop smoking
- Make sure you sleep 7-8 hours every night

Ayurvedic Managament of Metabolic Disorders

The lifestyle can be changed in accordance with the dos and don'ts (Pathya) listed in the ayurvedic conditions previously described.

The following are some very common physical metabolic disorders of in Ayurveda:

- Cardiovascular – Hypertension (Vyanbala vaishamya), MI, CCF
- Endocrine -Diabetes Mellitus (Madhumeha)
- Gastrointestinal disease-Indigestion (Ajirna), Constipation (vibandha)

- Musculoskeletal -osteoporosis (Asthi sauseerya/Asthi dhatu kshaya), osteoarthritis (sandhigata vata), spasm
- Menopausal syndrome
- Trichopathies- Baldness& Hairloss
- Carcinoma
- Dyslipidemia
- Obesity & Diabetes
- Hepato-Renal Pathies

Metabolic disorders and its brief management by *Ayurveda* and *Panchakarma*

Role of *Panchakarma* in 'Constipation'

The affected channel includes large intestine or Purishvaha srotas. Although all doshas can take part in pathogenesis, Involvement of Apana vata is predominant. The muscles of large intestine lose their tone and manifests disease. The main Cause of constipation at metabolic level is dietary. Faulty food habits Causes vitiation of vata which leads to constipation.

1-Acute Type- The best treatment is to give oil enema followed by decoction enema or introduction of glycerin suppository in the rectum. This is effective immediately.

2-Chronic Type- Whole Body oil massage (Sarvadaihika Abhyanga). As Constipation is vata dominant, Oil massage to entire body in clockwise direction is ultimately beneficial.

Medicated Enema I.e., Karma, yoga and Kaal Basti with sesame oil are advocated.

Udara Basti - Verma medicated oil is retained 20-30 minutes over the umbilicus and surrounding abdominal area with the help of application of circular dough prepared with wheat flour and water.

Role of panchakarma in 'obesity'

Obesity must be described first as it is the root cause of other metabolic disorders. Central obesity is considered the main sign of metabolic syndrome. Obesity is described as '*Medoroga*' or '*Sthaulya roga*' in ayurveda. Continuous indulgence in large amounts of

processed or fast food, overeating, sedentary life, lack of exercise, etc leads to increase in body fat which gets deposited.

Some of the important panchakarma procedures which can help in obesity are.

- Deep dry udhwarthana with herbal powders and pastes.
- Synchronised abhyanga with specific oils, steam bath, mobilises the accumulated fat whereas specially designed panchakarma procedures for detoxification clears and prevents its further accumulation.
- Vamana & Virechana methods are also beneficial. Lekhana Basti which is a type of enema contains ayurvedic drugs which causes reduction of excessive fat from the body. Drugs which are used are triphala kwatha, kasis, honey, gomutra, saindhav lavana, yavakshar, shilajatu etc. These all are fat reducing by virtue of their properties.

Role of Panchkarma in 'Diabetes'

Panchakarma, here can be advised according to the dosha and dushya involvement and specific treatment according to any complications.

- Abhyantara snehapana, abhyanga, mridu swedana, vamana, virechana, basti, nasya all are beneficial Mridu swedana is indicated. Excessive swedana is contraindicated in prameha as swedana cause utkleshana (Aggravation) and vilayana of doshas which are deeply adhered to the dushyas. But in prameha, doshas are already in aggravated state so doesn't require swedana.
- Abhyanga relaxes muscles, improves circulation which further causes increased glucose absorption and the amount of insulin required for impaired glucose level also decreases. It also opens the pores, cleanses system through skin and toxins are excreted through sweat.
- As ayurveda describes prameha patients as of two types – sthula and krisha. So, in sthoola pramehi rukshana can be done which provides better relief in the signs and symptoms, fasting blood sugar, postprandial blood sugar, urine sugar, weight and BMI.
- Sarvanga udhwartana is also beneficial. Teekshna rooksha udhwartana is useful in obese patients.

- Dhanyamala parisheka; all these methods give compatness and medas pravilayana.
- Vamana and virechana are mainly indicated in sthula pramehi. Most of the texts prohibit the use of vamana and virechana karma due to inability of the patient to bear the potency of medicine and therapy. But shodhana procedures have their effect as it clears avarana, srotorodha and thus brings back homeostasis It has been proved by several research work that vamana and virechana provides significant improvement in general condition of patients.

Basti also plays an important role. Lekhana basti is indicated in obese patients. Several basti are indicated like

- Panchprasrutika basti
- Madhutailaka basti
- Nagrodadi gana basti
- Salasaradigana basti

Anuvasana basti is mainly done with vidangodi taila, triphaladi taila.

Several panchkarma procedures are also helpful in diabetes complications. Some of them are given below.

- Neem lepa & Parisheka is beneicial in underlying skin diseases, itching, diabetic carbuncles and diabetic foot.
- Jaluka method is helpful in prameha pidika (diabetic carbuncles), skin diseases.
- Nasya/Murdha taila helps in diabetic neuropathy likewise, siroabhyanga, siropichu, sirodhara with either tailadhara, takradhara, kashayadhara are helpful. Several oils are used in sirodhara like mahanarayana taila, ksheerbala taila, balaashwangandha lakshadi taila, etc.
- Pizichilli & Navarakizhi also helps in diabetic neuropathy by strengthening nerves and increases immunity.
- Netra tarpana & aschyottan is useful in diabetic retinopathy. This can be done using triphala ghrita, maha triphala ghrita, patoladhi ghrita, jeevanthiyadhi ghrita etc. Putapaka method is also equally beneficial. Anjanas can also be applied like chandrothaya varti anjana, nalekeera anjana, Vimala anjana, vinayaka anjana.

- Basti karma with gokshur (Gokshuradi niruha basti) and dashmoola (Dashmooladi niruha basti) are beneficial in diabetic nephropathy patients.

Role of Panchkarma in 'Hypertension'

Neurological disorders (Vata vyadhi) are considered as major critical diseases in Aayurveda and cured by rigorous panchakarma and palliative medicine. Over a period of time, panchakarma can bring back the lost sensation in nerves.

As per Ayurveda, aggravation of prana vayu affects the normal functioning of the nervous system thereby triggering mental imbalance.

- Shirodhara and nasya have been proved to be the most effective line of treatment to counter anxiety. They stimulate vital centres and helps improve the pre-existing condition. Also helps in stress reduction.
- Padabhyanga too has above advantage.
- Urobasti helps in providing relief to chest, strengthens heart muscles. Basti is an unparalleled treatment to control vayu which is the chief causative factor for hypertension and other nervous disorders. (Shirobasti).
- Rakta Mokshana (blood-letting) is also helpful. As per ayurveda, toxin accumulation is one of the causes for arterial blockage. Rakta Mokshana lets out the contaminated blood and relieves blocks in circulation.
- Pizhichil which is squeezing of warm medicated oil onto the patient's body from a piece of cloth that is periodically soaked in a vessel containing medicated oil. Thus, it helps in both physical and mental relaxation.
- Shidehara–continuous pouring of oil on the forehead stimulates and soothes the hypothalamus to induce sleep by reducing stress. (As in insomnia). Proper management of hypertension by above methods may reduce the complications of cerebrovascular accidents (Stroke), renal failure, cholesterol deposition in arterial block etc.

Thus, we see that Panchakarma therapies are beneficial for those who are suffering from various metabolic diseases as well as preventive measures for healthy people. Above said

panchakarma procedures increase the self-healing power of the body and purifies body from within.

We can also see from above that panchakarma is particularly useful in chronic metabolic or stress-related diseases. It balances the doshas, bringing them back to equilibrium and thus the individual back to good health.

Role of panchakarma in 'Insomnia'

Between 26 and 45 percent of elderly adults report having trouble falling asleep or staying asleep. Their sleep patterns also tend to become shorter, lighter, and more fragmented. Unsettling elements include pain, constipation, nocturia, dyspnoea, depression, and anxiety.

Shiro Dhara with Takra Dhara and Amalaki

Usage of Medhya Rasayanas on a regular basis, such as Brahmi, Jata Manasi, Sankhpuspi, etc. Satwavajaya-like prayer and dhyana in the evening help people develop their inner fortitude and provide peace.

DISCUSSION

The term "metabolic syndrome" refers to a collection of interrelated physiological, biochemical, clinical, and metabolic characteristics that directly raise the risk of Type 2 Diabetes Mellitus and cardiovascular disease. The incidence of metabolic diseases is rising day by day as a result of the disrupted pattern of lifestyle, which makes metabolic disorders one of the biggest health concerns of the present. Due to urbanisation, rising obesity rates, and sedentary lifestyles, it is a significant and growing public health issue and clinical challenge on a global scale. IDF (2006) defined metabolic syndrome as the presence of central obesity with any one of the three factors (raised triglycerides, reduced HDL, raised blood pressure, or raised FBS). It increases the risk of Type II DM by five times and the risk of cardiovascular disease by two times. The prevalence of metabolic syndrome varies by region (urban vs. rural) and population composition (sex, age, race, and ethnicity) and ranges from 10% to 84% globally. According to IDF estimates, the adult population worldwide has metabolic syndrome. Worldwide, the prevalence of metabolic syndrome ranges from 8 to 43% in males and 7 to 56% in women, according to NCEP-ATP III CRITERIA

2001. Since the majority of people have sedentary lifestyles, have high socioeconomic level, high BMIs, and are overweight, lifestyle modification continues to be the preferred primary strategy. Thus, the management of metabolic syndrome may benefit from lifestyle changes along with particular Ayurvedic therapies such as palliative (Shaman), panchkarma (Shodhan), sadhvrit (good conduct/ethical regimen for balanced condition), exercise and diet, yogic practises, etc.

CONCLUSION

The stage of metabolic syndrome determines the course of therapy and preventive actions. In the contemporary environment, metabolic disorders are increasingly serious health concerns, and the frequency of these cases is rising everyday as a result of the disruption of daily routine. According to Ayurveda, metabolic diseases can result from faulty Agni activity, Ama generation, vitiation of Dosha and Dhatu, channel obstruction, and other factors. Diseases that fall under the category of metabolic disorders include dyslipidaemia, madhumeha, ati sthoulya, srotsam lepa, and others. Ayurveda recommends using internal medicine to treat a variety of metabolic diseases in addition to practising yoga, meditation, and other forms of healthy daily routine.

REFERENCES

1. Sushruta Samhita with Nibandha sangrha commentary of Dulhan Acharya, edited by vaidya Yadavji Trikamji Acharya, Chaukhamba Surbharathi Prakashan, Varanasi, edition 7th, 2008 Sutrasthan 15 verse 3, p.67.
2. Sri Kaviraj Ambikadutta Shastri, Sushruta Samhita, chaukhambha Sanskrit Sansthan Varanasi,2012 Ed, Sutra Sthan 1/33
3. Sarangdhar (1300AD), Sarangdhar Samhita part -2 chapter 6, vs.20.
4. Singh, R.H. (2005), swasthavrtta Vijynana chapter 3,4,7,22-23, Chowkhambha Subharati,Varanasi.
5. Vagbhata(300AD), Ashtanga Hridaya Uttara tantra, Rasayana chapter, ChowkKhamba publications, Varanasi.
6. Charaka Samhita Sanskrit Text with English Translation Vol 1 Sutra Sthana, Chaukhambha Publications; 2017th edition (1 April 2017) sutra sthana 16/20.

7. Prof.R.H.Singh, Panchakarma therapy, chapter 7, reprint edition, Varanasi Chowkhamba, Sanskrit series office, 2007 , page 218 - 219.
8. Ayurvedic Panchakarma By Prof. Dr.Subhash Ranade and Prof. Dr.Avinash Lele chap.03
9. Dr Brahmananda Tripathi, Charak Samhita of Agnivesh, chikitsasthan, volume 2, chapter 1 /4, verse no. 36 -38, edition 6, Varanasi, Chowkhambha Surabharti Prakashan, 1999, page 70
10. Dr. S.Suresh Babu, The principals and practice of Kayachikitsa, volume 3, chapter 7, Reprint edition, Varanasi, Chowkhambha Orientalia, 2015, page 235 -36.
11. Dr.Brahmananda Tripathi, Charaka Samhita of Agnivesh, Chikitsasthan, volume 2,chapter 30,verse no. 152, edition 6, Varanasi, Chowk Khamba, Surbharathi Prakashan,1999, page 1038.
12. Sanjay Pund, Vd.Shivaji Vavhal, ashtang Shangraha, sutrasthan, chapter 6, verse no.52, edition 1, Ahmednagar, Shantanu Prakashan, 2003 , page 71.
13. Dr. Brahmananda Tripathi, Charaka Samhita of Agnivesh, SiddhiSthan volume 2, chapter 12, verse no. 15, edition 6, Varanasi Choukhamnha SurBharathi Prakashan, 1999, page 1324.
14. Panda Nutan. A clinical study on the concept of Jara W.S.R to Ageing Process and its management by Rasayan Yoga. PG Department of Kayachikitsa Government Ayurveda College Raipur, Chhattisgarh., 2011.
15. Ujjwala Vaman Rao Pawar. Lifestyle modification plan as per Ayurveda in geriatric. International research journal of Pharmacy., 2013;04(10):7-11.
16. Srikanth Narayanam. Ayurveda and Siddha for geriatric care. researchgate, 2008.
17. Ayurvedic Panchakarma by Prof. Dr Subhas Ranade and Prof. Dr.Avinash Lele.
18. Swathi C, Role of Panchakarma in management of metabolic disorder, The pharma innovation journal 2019 ;8(6) :653 -65.