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EDITORIAL

Ayushman Bharat

Indeed it is a great pleasure for different medical systems under AYUSH cluster that present NDA government at centre strongly patronizing and promoting AYUSH systems. Incorporation of AYUSH systems in Ayushman Bharat is one of the remarkable recommendations by NITI Aayog and it is praise worthy decision of successive two NDA governments for practical oriented and affordable health management under social health schemes as well as promotion of non-conventional methods advocated by traditional systems of health care to combat life style disorders and Non Communicable Diseases. It is need of time to restrict cost of health care management. Society cannot be allowed to become victim of pharmaceutical industry and private hospital industries, as well as some unholy practices of medical fraternity. Changing of lifestyle in terms of approach of dietetics requirement and change of nature of diets, lack of physical exercises and lack of interest in total understanding of living beings and ecosystem further complicated the scenarios of health management system. Suggestive analysis between living being and environment and their understanding as well as keen interest and approaches for returning into nature always advocated by traditional health care systems. Always traditional health care practitioners considered human being as a part of entire nature. Nature is not subject to be exploited by human being, rather human being is considered as a part of our own ecosystem and universe and they should be ready to obey the rules of nature as a simple common entity of the eco-system. So, incorporation of AYUSH system as a component in health and wellness centres is definitely a revolutionary approach undertaken by Ministry of AYUSH, GOI. For the common people in society, assimilation of traditional concept of daily and seasonal regimens, ethics and values as well as expose to the inherited laws of homogenous co-existence should be followed and encouraged to practice both in rural and urban areas. It cannot be excused in terms of changing social scenarios. After proper consideration in his/her micro and macro environments, practice of different principles of Yoga system and *naisargik upachar* will deliver additional advantages. Proper blending considering one individual's psycho-somatic conditions to transform into a disease free productive way of living should be the motto of society. Ayushman Bharat itself having literally in-depth and foresight meaning aiming at healthy and prosper nation. Technically AYUSH is not merely combination of some system of medicine but AYUSH means combination of body, mind soul and sensory faculties as preached by *Charak Samhita* which essentially show four dimensions to assess proper health, for healthy individuals. All system of medicine all over the globe cannot ignore these facts. When an individual have the four dimensional composition, the approach of health care management should also be in the four dimensional way. In that point, it highly signifies necessity of Ayurveda and Yoga for health care of modern society. Veda word itself has four meanings: to know, to think, to obtain, to exist. So Ayushman Bharat will promote this noble idea and encourage the Sanatan Parampara (tradition) of the sub-continent. It should not be restricted to a narrow thought. We should be proud that we have highly rich traditions supported by noble thoughts of philosophical and scientific analysis.

So the concept of Ayushman Bharat covering, health and wellness centres aiming at preventive, curative & promotive approach for one individual in relation to his or her health issues and potentially help them to enlighten his/her optimum capabilities or energies for stage of enlightenment. On the other hand, social health security schemes may also be considered as a ray of hope for the poor people who reside in the remotest and backward areas. Hopefully, it may be an example of ray of hope for the poor countries of the third world to handle their health related problems and their management. But the Government and society needs to be more vigilant and careful to unholy practices and propaganda of people who have vested interest in pharmaceuticals and hospital industries. Good policies implemented in true sense be appreciated and unethical things be streamlined and needs to be under control. Hope healthy nation leading to a prosperous nation.

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Prof. (Dr.) P.K. Goswami
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Review Article

Scope of local therapies (*sthanik-chikitsa*) in gynecological disorder

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Abstract
In Ayurvedic classics all gynecological conditions are described under the umbrella of *yonivyapada* (gynaecological disorders). In the era of fast development and competition every individual wants to be perfectly healthy. Ayurvedic concept of *sthanik-chikitsa* (local therapies) in regards to women are *yoni-prakshalana* (vaginal douching), *yoni-pichu* (medicated tamponing), *yoni-dhoopana* (vaginal steaming), *agnikarma* and *uttarbasti* (intravaginal instillation) are widely being used while mentioning the management of various *yonivyapadas*. *Vata* considered being the main responsible factor. All the above described *sthanik-chikitsa* mostly normalizes the *vata dosha*. Thus *sthanik-chikitsa* possesses very promising outcomes in the management of various gynecological disorders when augmented with oral management and can be very well managed at OPD setup.
Keywords: *Agnikarma,* gynecological disorders, local therapies, *Sthanik-chikitsa, Yonivyapada, Yoni-prakshalana, Yoni-pichu, Yoni-dhoopana, Uttarbasti*.

Introduction
Gender difference plays an important role in manifestation of disease and health outcomes. In this competitive era women are equal with her counterpart. So to withstand and to achieve the goal she, be in the perfect health both physically and psychologically particularly in terms of reproductive health. Ayurveda for its holistic approach is capturing the attention and demand of the human population in the Global scenario and is gaining its popularity as preventive, restorative and curative health aspect. In Ayurveda all gynecological conditions are described under the umbrella of *yonivyapada*, which has been counted as twenty in number.[1,2,3] *Sthanik-chikitsa* (local therapies) plays a vital role in the management of all gynecological disorders, showing a synergetic effect with the oral therapy when taken into consideration. Among the *sthanik-chikitsa yoni-prakshalana* (vaginal douching), *yoni-pichu* (medicated tamponing), *yoni-dhoopana* (vaginal steaming), *agnikarma* and *uttarbasti* (intravaginal instillation) are widely being used and also enormously being mentioned in the management of various *yonivyapadas* (gynaecological disorders) in Ayurvedic classics.

MANAGEMENT OF THE CONDITION
In this paper the different descriptions of effective *sthanik-chikitsa* available in Ayurvedic classics, views of commentators, various drugs used in the procedures and probable mechanism of actions are being collected, critically interpreted and discussed. In addition, some self experienced medicinal plants effectively used in different procedures are also highlighted with specific mention.

Yoni-prakshalana (vaginal douching): is a method of cleansing vaginal area with medicated oil or *kwath* (decoction). Yoni means female genitalia and *prakshalana* defines washing or bathing. The procedure is very simple and is patient friendly. It is mentioned in various conditions as *yoni-daurgandhya* (foul smelling vagina),[4-6] *yoni-puyasrava* (purulent vaginal discharges),[7] *yoni-kleda* (excessive moistness of vagina),[8] *yoni-kandu* (vaginal itching),[9] *yoni-paicchilya* (vaginal unctuousness),[10,11] *yoni-srava* (excessive vaginal discharges),[12] *sweta pradara* or *pandura-asrigdara* (leucorrhoea),[13] *ashta-artavadushti* (menstrual disorders),[14] *upadamsha* (a type of venereal disease),[15-17] The drugs used are *tuvaraka* (Hydnocarpus laurifolia)[18], *palasha* (Butea monosperma), *dhataki* (Woodfordia fruticosa), *jambu* (Syzygium cumini)[19], *nimba* (Azadirachta indica), *triphala* (combination of Emblica officinals, Terminalia chebula and Terminalia bellirica)[20] etc.

Yoni-pichu (medicated tamponing): is a local procedure where a sterile cotton swab dipped in medicated oil or ghee is placed at posterior fornix of the vagina. The medicine soaked swab is retained for a specified period of time so that it exhibits action locally. It has been specifically mentioned in the general management protocol for *yonivyapada chikitsa*.[21,22] It has been quoted that pichu of *mushakataila* cures undoubtedly all

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the *yonivyapadas*.[23,24] *Yoni-pichu* is also mentioned in the conditions of various *yonivyapadas* like *vataja*,[25-27] *pittaja*,[28,29] *sannipataja*,[30] *acharana* (constitutional nymphomania),[31] *vipluta* (presacral neuralgia),[32,33] *vamini* (effluvium seminis),[34] *upapluta* (monilial vulvo-vaginitis),[35] *vivrita* (laxity),[36] *yoni-stabdhata* (stiffness) and *karkashata* (roughness of vagina)[37,38] *yoni-shoola* (vaginal pain),[39,40] *yoni-paka* (suppuration of vagina),[41] *yoni-daha* (burning sensation of vagina),[42] *yoni-sitalata* (coldness of vagina),[43] *yoni-kandu* (vaginal itching),[44] *yoni-picchilya* (vaginal unctuousness),[45] *ashta-artavadushti* (menstrual disorders). Drugs commonly used used for *pichu* as *guduchyadi taila* [46], *dhatakyadi taila* [47], *udumbara taila* [48] etc.

Yoni-dhoopana (vaginal steaming): It is a procedure where aromatic plants and their products are used for vaginal steaming or fumigation. This is a simple and accessible practice for any woman to use at home. In classics it is mentioned in the management of *shweta pradara*.[49] Drugs used for *dhoopana* purpose are *sarala* (Pinus roxburghii), *guggulu* (Commiphora mukul)[50] etc.

Agnikarma (thermal cauterization): It is a minimally invasive para-surgical procedure for all those kinds of condition where the medicine and surgery has limited scope. The procedure involves the creation of controlled, pointed therapeutic burns over the diseased tissue. In classics it is mentioned in the management of *yoni-arsha*.[51, 52] *Agnikarma shalaka* (cauterization stick) for this purpose was self prepared from bark of *karanja (Pongamia pinnata), neemba, haridra (Acacia catechu)* and *guggulu* as binding agent. This has been used in routine practice very effectively.

Uttarbasti (intravaginal instillation): *Uttarbasti* is a procedure in which the medicated oil is instilled per vagina, through the cervix into the uterine cavity. There are many scope of *uttarbasti* in today' perspective in regards to various *yonivyapadas*.[53-55] In the diseases of yoni (reproductive organs) women should be given two or three *asthapana basti* (cleansing enema) followed by *uttarbasti*. This *uttarbasti* should be given during *ritukala* (late proliferative or ovulatory period) because at this time the reproductive organs are free from coverings or their orifices are open, thus take up unction properly.[56, 57] *Vata* being the main factor for *yonivyapada*[58, 59] should be treated effectively with *uttarbasti*. Indication for *uttarbasti* administration are *vataja yonivyapada*,[60,61] *pittaja yonivyapada*,[62,63] *kaphaja yonivyapad*,[64,65] *udavarta* (dysmenorrhoea)[66] *shuska* (estrogen deficiency)[67] *rakta-yoni* (dysfunctional uterine bleeding),[68] *acharana* or *vipluta*,[69] *prakcarana* (pain in sacral region),[70] *aticarana, karnini* (cervical erosion),[71] *yoni-shoola*,[72,73] *ashta-artavadushti*,[74,75] *stree vandhyatwa* (female infertility). *Uttarbasti* is also given in disease of *basti-vikara* (problems of urinary bladder), *yoni-bhramsa* (uterovaginal prolapse), *tibra-yoni-shoola* (severe vaginal or reproductive organ pain), *asrigdara* (abnormal uterine bleeding), *aprasravita* and *bindu-bindu sravamutra* (retention of urine and discharge of urine drop by drop).[76, 77] *Dashamoola* [78] *guduchyadi taila* [79] and oil processed with *jeevaniya-varga* [80] are commonly used in this purpose.

DISCUSSION

In Ayurvedic clinical practice *sthanik-chikitsa* are specialized treatment procedures for all *yonivyapadas*. Oral therapy when merged with *sthanik-chikitsa* has the potential to fulfill the desired effect. In today's clinical practice *yoni-prakshalana* is used in various gynecological conditions like cervical erosion, infertility, vaginal or cervical inflammation, fungal infection and provides strength to the vaginal muscles etc. The drugs used as *tuvaraka*, *palash, dhataki, jambu, nimba, triphala* mostly having *kashaya* and *tikta rasa, krimighna* (anti-microbial), *sothahara* (anti-inflammatory) and *tridoshasamaka (vata, pitta* and *kapha* alleviator) properties. *Yoni-pichu* benefits in nullifies vitiated *doshas*, strengthened the *dhatus* (muscular and ligamental components), subsides the pain, improves hygiene, prevents fungal infection, manage recurrent abortion, heals cervical erosions, cure genital prolapse, post –menopausal vaginal dryness. During pregnancy and labor helps to soften the vaginal canal, enabling eventless delivery, promotes laxity of the pelvic floor muscle to enable normal labor, prevents the chances of vaginal and perineal tear during labor. Drugs used for pichu are mostly having *vatashamaka* properties, have qualities of *snehana* (oleation), *vedanashamana* (analgesic) as *guduchyadi taila*, *dhatakyadi taila, udumbara taila*. In *yoni-dhoopana* (vaginal steaming) it is used in conditions as chronic vaginal infection, menopausal vaginal dryness, significantly reduces pain, relives the bloating and exhaustion associated with menstruation, and relieves heavy menstrual flow. It prepares the uterus for fertility, helps in better healing and involution of the reproductive system after birth. The warmth of herbal steam permeates the vaginal mucosa. The gentle heat as well as the moisture that carries medicinal plant oil increase the local circulation and thus target organ absorption. The drugs used for *dhoopana* purpose are *sarala, guggulu, neemba* etc having the properties of *rakshoghna* (antimicrobial) and also *vedanashamaka* (analgesic). *Agnikarma* (thermal cauterization) is a superior *anushastra karma* (para surgical procedure). This procedure aims at management of various afflictions by inflicting burns on the tissue surface directly by using different materials known as *dahanopakaranas* (tools of cauterization). Even in the modern surgery, the principles of *agnikarma* have been adopted with advanced technology like, radiation therapy, cauterization for hemostasis, excision of unwanted growth etc. *Agnikarma* or

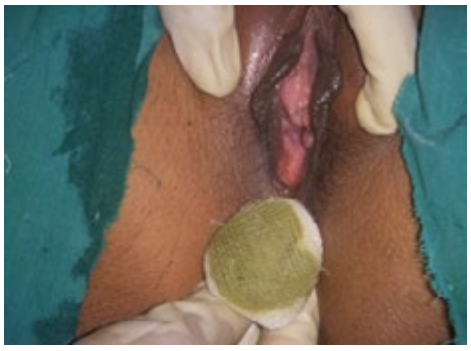
a medical cauterization has been used widely in the clinical practice since time immemorial and is said to have immediate and long lasting results. Precisely used in the unhealthy eroded part of cervical erosion. It burns the unhealthy tissue, improves local circulation thus increases the local tissue metabolism and healing. It reduces local infection and inflammation. *Agnikarma shalaka* was made for this purpose from *karanja, neemba, haridra*, and *guggulu* possess *vrana-shodhana* (wound purifying), *vrana-ropana* (wound healing) properties. *Uttarbasti* showed encouraging results in dysmenorrhoea, habitual abortion, hypoplasia or hyperplasia of endometrium, secondary amenorrhea due to inflammation, infertility or sub-fertility due to tubal or ovulatory factors. Thus *Uttarbasti* can very well be utilized in enhancing the endometrial thickness and priming up the endometrium before Assisted Reproductive Technique (ART). The basic pharmacology behind *uttarbasti* procedure is absorption through utero-vaginal mucosa and transportation of *uttarbasti* medicine through blood circulation. The purpose of *uttarbasti* may be categorized under *snehana* (unction), *shodhana* (purification), *brimhana* (nourishment) depending on the ailment or condition for which the procedure is done. Mostly *guduchyai taila* for *snehana, dashamoola taila* for *shodhana* and oil prepared with *jeevaniya-varga* for *brimhana* is used.

A research point always exists in all the procedure in terms of drugs combination, mode of administration, dosage formulation and uses with duration. Thus it is the need of the time to explore scientifically with sufficient evidence on the different aspects of clinical application of *sthanik-chikitsa*. Because it possesses very promising outcomes in the management of various gynecological disorders when augmented with oral medication. It can be very well managed at a simple setup. Ayurvedic clinical practitioners may merge their management with those local therapies for a better result.

Conclusion

Sthanik-chikitsa has its own principles and effects. It can be successfully combined with oral therapies on the basis of diagnosis of pathological status and proper examination of the drug to be used. It is the need of the time to extend research on standardizing the procedures, mechanism of drug action, doses on the basis of *prakriti* and *dosha* predominance in a *vyadhi* or dimension of reproductive structures or purpose of the procedure. It could be a great contribution of *sthanik-chikitsa* of Ayurveda to the women health care system.

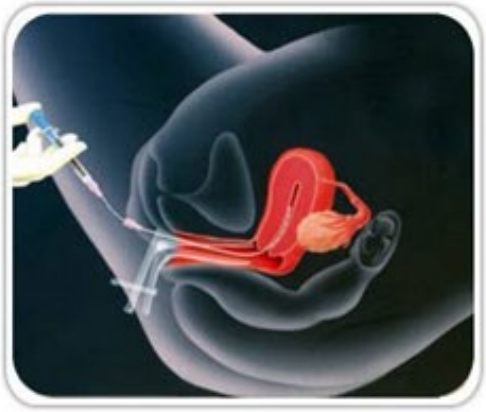
Sthanik -chikitsa **(local therapies)**



***Yoni pichu*: (medicated tamponing)**

Yoni dhoopan: **(vaginal steaming)**

Agnikarma: **(thermal cauterization)**



Uttarbasti: **(intravaginal instillation)**

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Review Article

Critical Review of Hypothyroidism as per Ayurveda

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Abstract
Thyroid problems are the most common endocrine disorders presently seen worldwide and hypothyroidism is one of the most common functional disorder of thyroid gland.There is no direct reference of thyroid disorder in *Ayurvedic* classics. Endocrine disorders are difficult to understand in *Ayurveda*. Though certain disorders like *Prameha* (Diabetes) are well described in various *Ayurvedic* texts but as far as diseases of thyroid gland are concerned they are not well understood. In Ayurveda, we correlates the disorders caused by thyroid gland as *Galganda, Bhasmak Roga* etc but the concept of hormone over-production or under-secretion is not clear. It has been reported that in India alone, about 42 million people suffering from thyroid disorders. The incidence of hypothyroidism is increasing day by day, and there is increasing demand to treat the disease through the *Ayurvedic* system of medicine. Hence, here is an attempt to get the understanding of disease Hypothyroidism as per *Ayurveda* through various *Ayurvedic* principles so as to set its management strategies.
Keywords: Endocrine Disorders, *Galganda*, Hypothyroidism, Thyroid gland.

Introduction
Thyroid problems are the most common endocrine disorders presently seen worldwide. It is second only to diabetes mellitus as the most common endocrine disorder. Hypothyroidism is one of the most common functional disorder of thyroid gland.Hypothyroidism results when the thyroid gland fails to produce enough of the thyroid hormone, due to structural or functional impairment that significantly impairs its output of hormones, this leads to the hypo metabolic state[1].

Clinically, Hypothyroidism is a clinical syndrome resulting from deficiency of thyroid hormones due to their insufficient synthesis which in turn results in a generalized slowing down of metabolic processes.[1] It is characterized by a broad clinical spectrum ranging from an asymptomatic or subclinical condition with normal levels of thyroxine (T4) and tri-iodothyronine (T3) and mildly elevated levels of serum TSH to an overt state of myxedema, end-organ effects and multi-system failure [2,3,4,5]. They are influenced by the age of the patient, the rate at which the hypothyroidism develops and the presence of other disorders. In very young infants, hypothyroidism can result in irreversible mental and physical retardation, unless treatment is initiated within weeks after birth, whereas, in children and adults, the effects of hypo-function of thyroid though profound are reversible.[6]

The prevalence of hypothyroidism in the developed world is about 4-5%. The prevalence of subclinical hypothyroidism in the developed world is about 4-15%. The female-male ratio is approximately 6:1. Urban India has a high prevalence of hypothyroidism, which is about 10%. It has been reported that in India alone, about 42 million people suffer from thyroid disorders.[7]

It is sometimes referred as 'Silent disease' as the symptoms of hypothyroidism are notorious for their non-specific nature and for the way in which they mimic many symptoms of other diseases. So it often remains undiagnosed or misdiagnosed.[8]

Aims & Objectives:
- To find out the factors involved in hypothyroidism as per Ayurvedic principles.
- To develop the concept of hypothyroidism along with management strategies in terms of Ayurveda.

Material and Methods
This study based on the literature review of the relavent Ayurvedic original texts with commentaries, necessary and valid interpretation, analysis made by different schollars. The pathogenesis of hypothyroidism is obtained

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by searching various medical research databases like PubMed, Google scholar and other national research databases. The study of various Ayurvedic texts were made critically and an effort is made to understand the concept of hypothyroidism along with management strategies.

The clinical manifestations of Hypothyroidism, depending upon the age at onset of disorder are divided into two types – Cretinism (in infants and children) and Myxedema (in adulthood). Two principal types of Hypothyroidism are Primary Hypothyroidism and Secondary Hypothyroidism. Primary Hypothyroidism is a condition of decreased hormone production by the thyroid gland due to its loss or destruction through processes such as autoimmune destruction or in radiation injury. Secondary hypothyroidism is the result of hypothalamic or pituitary disease or defects in the thyroid-stimulating hormone (TSH) molecule. Primary one is in approximately 99% of cases of hypothyroidism.[9] Iodine deficiency remains the most common cause of hypothyroidism worldwide. In areas of iodine sufficiency, autoimmune mechanisms (Hashimoto's thyroiditis) appear to play an etiological role in a significant proportion of patients along with iatrogenic causes (like treatment of hyperthyroidism).[10]

Weight gain, tiredness & easy fatigability, anemia, swelling over face, hands & feet, menstrual irregularities, cold intolerance & dry rough skin, thin brittle hair & hair fall, muscle stiffness & pain, weakness in the extremities, constipation, decreased appetite, mood disturbances, forgetfulness, inability to concentrate, goiter are major presentations of Hypothyroidism. In due course of time, untreated hypothyroidism may lead to number of health problems such as obesity, arthritis, heart disease, infertility etc. [11]

Third-generation thyroid-stimulating hormone (TSH) assays are generally the most sensitive screening tool for primary hypothyroidism. If TSH levels are above the reference range, the next step is to measure free thyroxine (fT4). Because the most frequent presenting symptoms of hypothyroidism are non-specific, it can be commonly differentiated from the diseases like Anemia, Chronic Fatigue Syndrome, Depression, Menopause, Obesity, Ovarian Insufficiency, Fibromyalgia, Hypoalbuminemia, Hypopituitarism, Hypothermia, Hypercholesterolemia, etc.[11]

The conventional treatment of Hypothyroidism is Thyroid hormone replacement therapy i.e. *Levothyroxine*. But *Levothyroxine* has certain side-effects on long term use like it precipitates angina, causes cardiac arrhythmia, palpitation, tachycardia, muscle cramps, weakness, restlessness, osteoporosis etc. On the other hand, under-treatment with levothyroxine can lead to dyslipidemia and progression of cardiovascular disease.[11]

So, there is a great need to find out a safe and effective remedy which not only relieve symptoms but also increase in sense of well-being leading to more acceptability and better compliance. Extensive research has been carried out all over the world in exploring new modes of treatment for hypothyroidism. It can be traced from rich, time-tested unsheathed treasure of knowledge of *Ayurveda*. *Ayurveda* is a science of life with sole aim of providing health to the mankind. It can offer new dimensions towards understanding the etiopathogenesis and successful management of hypothyroidism. As far as the name of disease is concerned, no specific term is found for Hypothyroidism in *Ayurvedic* classics. Though certain disorders like *Prameha* (Diabetes mellitus) are well described in various *Ayurvedic* texts but as far as diseases of thyroid gland are concerned they are not well understood. In *Ayurveda*, we correlates the disorders caused by thyroid gland as *Galganda, Gandmaala, Bhasmaka* etc but the concept of hormone over-production or under-secretion is not clear.[22] Though many diseases of current era do not find mention in *Ayurvedic* texts, yet they can be successfully treated due to deep insight provided by the Ayurvedic principles. According to *Acharya Charak*, it is not necessary that every disease manifestation must have certain name, but it is more important to understand the possible pathogenesis of the disease in terms of involved factors like *dosha, dushya* etc. After knowing that, it can be successfully treated [12].

DISCUSSION

Ayurveda and the Thyroid Gland

There is no direct mention of the thyroid gland in Ayurveda, but a disease by the name *Galaganda*, characterized by neck swelling, is well known. The first description of neck swelling was mentioned in *Atharva Veda* by the name *apachi*. *Charaka* mentioned the disease under 20 *sleshmavikaras*.[13] *Sushruta* in *Sareera Sthana* has mentioned that of the seven layers of the skin, the sixth layer *Rohini* is the seat of *Galaganda*.[14] In *Nidana Sthana* he described *Galaganda* as two encapsulated small or big swellings in the anterior angle of the neck, which hang like scrotum[15], whereas *Charaka* mentioned *Galaganda* as a solitary swelling.[16]

Climatic conditions, water supply, dietary conditions, etc., are mentioned as the main aetiological factors. *Bhela* described that *Sleepda* and *Galaganda* are more common in prachya desa (eastern part) of the country, and that persons consuming predominantly fish are liable to develop *Galgaganda*.[18] *Harita Samhitakara* described the role of *dustambu* (contaminated water) and *krimidosha* (infection) in the precipitation of *Galaganda*.[19] *Kashyapa Samhitakara* added that any part of the country that is cold, damp, with densely grown long trees,

water stagnation and heavy rains may be prone for the development of *Galaganda*.[20]

In *Ayurveda Galganda* is due to vitiation of the *Kapha dosha* mainly but also of *vata* and *meda dhatu*. [21, 22, 23] *Rasa dhatu* plays a major role in pathogenesis as *Rasaja Vikaras* mentioned in *Charak samhita* are similar to the clinical features of hypothyroidism. Hormonal disturbances are the dysfunction of *Agni. Rasadhatvagni-mandhyata* leads to *Rasa Vridhi* and over production of *Mala* of *Rasadhatu* i.e. *Mala Kapha Vridhi. Dhatvagnimandhya* is also the major features of the disease and all these features contribute with the modern concept of metabolism i.e., decreased Basal Metabolic Rate. [22, 24]

Thyroxine and Agni

The principal function of Thyroxine is to stimulate basal rate of metabolism. Thyroxine acts as a catalyst for the maintenance of cellular oxidative processes throughout the body. Hence, it has profound influence on tissue metabolism all over the body. These functions have striking similarity with the description of *Agni* in *Ayurveda*. Like Thyroxine, all the metabolic processes of the body are under the control of *Jatharagni*, and *Dhatvagnias* per *Ayurveda*.[25] *Jatharagni* contributes parts of itself to dhatu. *Jatharagni* present in *dhatu* (*Dhatvagni*) when hyperactive leads to wasting and when hypoactive leads to hypertrophy of *dhatu*.[26] These points, perhaps, can be illustrated with hyper and hypo-metabolism associated with hyper and hypo functioning of thyroid gland.

Pathogenesis (Samprapti) of Hypothyroidism as per Ayurveda

The analysis of the symptomatology of hypothyroidism in the light of *Ayurvedic* principles showed that the pathogenesis and manifestations of hypothyroidism occurs due to dysfunction of *Agni*. It all starts with improper diet (heavy, cold, sweet and saturated fat containing food items) and sedentary lifestyle (lack of physical activity, sleeping after meals, sleeping during day time) which is now-a-days very common. It leads to aggravation of *kapha*. The increased amount of kapha impairs the *Jatharagni* with the formation of *aamdosha*. As *Dhatvagni* depends on *Jatharagnibala*, so impairment of *dhatvagni* takes place in due course of time. The effect of hypothyroidism is alteration in metabolic activity which, according to *Ayurveda*, is vitiation of *Dhatvagni*. This *dhatvagni* vitiation causes improper formation of *saptadhatu* starting from rasa to *shukra*.[27] It leads to improper nourishment to the body leading to symptoms of hypothyroidism along with swelling in neck described as '*Galganda*' in *Ayurvedic* texts.[28] Thus, a chain of pathological events is started followed with complications like obesity and infertility.

A critical conceptual analysis of hypothyroidism with reference to *Ayurvedic* principles of metabolism shows *Agnimandya (Dhatvagnimandya), Aamdosa, Kaphaprakopa* and *Rasa dhatudusti* as prominent pathological features in this condition. *Dhatvagnimandya* (especially *Rasa dhatvagnimandya*) leads to *Sama Rasa Vridhi* and over production of *mala* of *Rasadhatu* i.e. *Mala rupa Kapha Vridhi*. Majority of the *Nanatmaja Roga* of *Kapha Dosha*[29] can be included as signs and symptoms of Hypothyroidism i.e. *Tandra* (Drowsiness), *Atinidra* (Excessive sleep), *Staimitya* (Timidness), *Gurgatrata* (feeling of Heaviness), *Aalasya* (Laziness), *Balasaka* (Loss of strength), *Apachana* (Indigestion), *Hridayolepa* (feeling of heaviness over chest), *Galganda* (Goitre), *Atisthoulya* (Obesity), *Svetavbhasta* (Pallor). Many of *Rasaja Vikara*, which have been mentioned by *Acharya Charak*[30] are similar to the clinical features of Hypothyroidism i.e. *Asradhdha* (Loss of desire for food), *Aruchi* (Anorexia), *Gaurava* (feeling of Heaviness), *Tandra* (Drowsiness), *Angamarda* (Malaise), *Panduroga* (Anemia), *Klaibya* (Impotency), *Srotorodha* (Obstruction of microcirculatory channels), *Agnimandya* (hypo metabolic state) etc. According to *Ayurveda*, Hypothyroidism can be considered as *krichrasadhya* (chronic ailment) as vitiation of *Dhatvagni* once created can't be corrected easily, so it takes time to reverse the pathological changes takes place due to Hypothyroidism. This vitiation of *Dhatvagni*, if not treated properly can reach up to genetic levels (*shukra* and *artava*) which may give an idea about congenital Hypothyroidism (as per modern science).

Ayurvedic Management

In light of above discussion, the drugs that have their effect at *Agni* level and possess *Kaphavatashamaka* properties are supposed to be ideal agents for treating hypothyroidism. The dietary rules and proper lifestyle (*Dinacharya* and *Ritucharya*) as described in *Ayurvedic* texts should also be followed for proper control of Hypothyroidism. *Ayurveda* has advised three fundamental modalities to manage every disease i.e. *Nidana Parivarjana, Sanshodhana Chikitsa* and *Sanshamana Chikitsa*.

1. ***Nidana Parivarjana***[31] - It means avoidance of the various causative factors of the disease. It is first line of treatment of any disease. Hypothyroidism manifests as a result of *Kapha-vatavriddhi, Agnimandya, Rasa Dhatudushti* and formation of *Amadosha*. Therefore, all the *Kapha-vatadosha* aggravating and *Agnimandyakarakaahaara-vihaara* should be avoided in Hypothyroidism.

2. ***Samshodhana Chikitsa:*** Because of its slow onset, Hypothyroidism is categorized as chronic disease where

involved *dosha* are at its maximum level. For *Pravriddha, Bahu Dosha* and *Jirna Vyadhi* (chronic ailment), *Ayurveda* always suggests *Shodhana* (bio-purification) therapy. [32] Due to the dominance of *Kapha Dosha* in the pathogenesis of Hypothyroidism and *Vamana Karma* (medicated emesis) being specially prescribed for *Kapha Dosha*[33], so amongst *Shodhana Chikitsa*, it may be effective for the patients of Hypothyroidism. *Virechana* (medicated purgation) can also be used if shotha is dominant feature. For proper evacuation of bowel and to regularize *Agni, Niruha Basti* (medicated enema) should be administered. In *medovridhi* (dyslipidemia and obesity) conditions, *Lekhana Basti* (medicated enema) may also be given. [34]

3. Samshamana Chikitsa

Selection of drugs may done in following way -

- At hypothalamo pituitary level: anti stress drugs, *medhya rasayana* drugs, *nasya karma* may be beneficial.
- At thyroid gland level: thyroid stimulatory drugs are recommended.
- At metabolism level (*Agni*): *deepana, pacahana, ushna, teekshna, sukshma, lekhana* drugs which pep-up body metabolism is recommended.
- Immuno-modulatory drugs for autoimmune related hypothyroidism.
- Drugs acting on *Agni*[35], having *Deepana* (stomachics and appetizers), *Pachana* (Digestives), *Lekhana* (Depleting and reducing weight), *Anulomana, Srotoshodhaka* (Microcirculatory channels cleansing), *Shothahara* (anti-oedema) and *Kaphashamaka* properties are likely to check the basic pathogenesis of Hypothyroidism and encourage body's sluggish metabolism.
- Thyroid stimulatory drugs like *Kanchnara Guggulu* are also found to be effective in various clinical studies.[36, 37]
- Immunomodulatory drugs like *Guduchi*[39] may be prescribed in autoimmune related conditions.

Specific Herbs

1. ***Kanchnara*** – It is probably the most important drug in *Ayurvedic* pharmacopoeia for treating any type of thyroid problems. *Kachanar* (Bauhinia tormentosa) is another herb used in both enlargements of the thyroid as well as hypothyroidism.[51]
2. ***Guggulu*** – It is the best vata and medohara as per *Astanga Samgraha*. It possesses l*aghu, ruksha, sukshma guna, usna virya, katu vipaka* and *lekhana* property, so it is effective in the management of *Kapha-meda* predominant disorders like hypothyroidism. It is found to be having thyroid stimulating property and supports healthy thyroid function, mostly by increasing the conversion of less active Thyroxine (T4) to more active Triiodotyronine (T3) through increasing thyroid proteolytic activity. It also increase iodine uptake along with hypo-cholesterogenic property. *Guggulu* (Commiphora mukul), in the form of *Kachanar guggulu*.[51] *Guggulu* is also a fat burning herb due to it's light, dry, and sharp nature.[51] As a *dipana, pachana*, and *lekhana*, it alleviates both *vata* and *kapha* and regulates the *agni*.[51] It also appears to alleviate several indicators of heart disease, common amongst hypothyroid patients, including high cholesterol and high blood pressure. [53] Other research data suggests that *Guggulu* corrects function and structure of the thyroid significantly after melatonin induced hypothyroidism and "directly stimulates thyroid function probably through some enzymatic mechanisms." [54]
3. ***Pippali*** – It increases the absorption of selenium, whose deficiency can impair thyroidfunction because conversion of T4 into T3 is catalysed by specific selenoproteins.[41] *Vardhman Pippali Rasayana* shows good results in hypothyroidism during many research works. [42,43]
4. ***Trikatu*** - *Trikatu* is predominantly having *usna, tiksna, laghu, ruksaguna, Katu rasa, katu vipaka* & *usnavirya*. Hence it exhibits *kapha-vatashamaka, deepana, pachana, srotovishodhana* & *shothahara* properties. [41] It is commonly used to treat the condition of *mandagni*, *aamdosa*, and *kapha-vata* disorders and hence effective in correcting the dysfunction of *Agni* seen in hypothyroidism.[45]
5. ***Triphala*** – It is one of the most popular herbal remedies which 'cleanse' by promoting bowel movement. It is having *deepana, pachana, vatanulomaka* and *srotoshodhaka* properties. Hence *Triphala* may correct the state of *Agnimandya* which is one of the main factors involved in pathogenesis of hypothyroidism as per *Ayurveda*. Various scientific researchers have demonstrated that *triphala* stimulates bile secretion, helps digestion and assimilation, and significantly reduces serum cholesterol and lipid levels (as hypercholesterolemia occurs due to hypothyroidism). [44]
6. ***Panchkola*** - It comprises of five drugs i.e. *Pippali, Pippalimula, Chavya, Chitraka* and *Shunthi*. *Panchkola* is predominantly having *ushna, tikshna, laghu, rukshaguna, katu rasa, katuvipaka* & *ushnavirya*. Hence it exhibits *kapha-vatashamaka, deepana, pachana, srotovishodhana* & *shothahara* properties. *Panchkola* is considered as one of the common drugs to treat the condition of *mandagni, aamdosa*, and *kapha-vata* disorders.[46] All these properties of *Panchkola* will take care of the *mandagni* and sluggish metabolism seen in hypothyroidism. As per *Chakradutta*, the diet & drinks prepared with *Panchkola* are indicated in *Amavata*. The pathogenesis of hypothyroidism as per *Ayurveda* is more or less similar to *Amavata* with the predominance of *Agnimandya* & *Amadosha*.[47, 48]

7. Modern research shows us that extracts of Ayurvedic *rasayana Ashwagandha* (Withania sonifera) along with *Bauhinia purpurea* "are capable of stimulating thyroid function in female mice."[56]*Bauhinia Purpurea* enhanced both T3 and T4 hormones, but *Ashwagandha* only increased T4[54]. *Ashwagandha* alone was found to stimulate thyroid function increasing serum T3 and T4[55]. Another study done on patients with bipolar found that *Ashwagandha* root unexpectedly healed subclinical hypothyroidism.[55]
8. ***Shigru*** (Morringa oleifera Lam.) a well-known plant in India, rich in iodine, an essential component of thyroid hormones, T3 and T4. It has *Deepana* (stomachic), *Pacahna, Kaphavatahara* properties. It is recommended in *Galaganda, Kandu, Sotha, Apachi, Vrana, Medoroga, Vidradhi, Gulma*, etc.[58]

Specific Formulations

- *Vati/Guggulu – Kanchnara Guggulu* [47, 49, 59], *Vyoshadi Guggulu, Medahara Guggulu* [60], *Triphala Guggulu* [59], *Arogyavardhini* [59], *Guduchi Ghana Vati*.[39]
- *Churna – Panchakola Churna* [45],*Trikatu Churna*. [46-48]
- *Lauha/Mandoora – Punarnava Mandura* [61],*Tryushnadi Lauha* [61],*Guduchyadi Lauha* [61],
- *Kwatha - Kanchanaradi Kwatha*[36], *Dasamula Kwath*[49, 60]
- Other Single Herbs – *Jalkumbhi* [8, 49], *Coleus forskohlii*[62], Coriander seeds[63].

Dietary and Life-Style Modifications

- Iodine rich foods such as fish, sea foods, beetroot, kelp, parsley, oatmeal etc. should be taken.
- Avoid Goitrogenic foods such as cabbage, cauliflower, broccoli, turnips, soybean products, peaches, pears, sweet potatoes, mustard, maize, cassava etc.[50] Also minimize intake of Caffeine drinks like coffee, cola and smoking.[51]
- Diet should be high in fibre and low in calorie. Salt intake should be kept at a minimum. Heavy, fried food and high sugar diet should be avoided.
- Sedentary life style should be avoided. Patient should increase his physical activities. Aerobic exercises should be done regularly (increases tissue sensitivity to thyroid hormone and stimulates thyroid gland secretion).[52]
- Physical and emotional stress should be reduced by doing Yoga & *Pranayam*.

Yoga[64]

Sarvangasana (shoulder stand) is the most suitable and effective *asana* for the thyroid gland. Enormous pressure is placed on the gland by this powerful posture. As the thyroid gland has a large blood supply, pressure has a dramatic effect on its function, improving circulation and squeezing out stagnant secretions. Also beneficial after *Sarvangasana* is the practice of *Matsyasana* (fish pose) and *Halasna* (plough pose). Other effective asanas include *Surya Namaskara* (Sun salutation), *Pavanamuktasana* (wind relieving pose) with emphasis on head and neck exercises, *Supta Vajrasana* (sleeping thunderbolt pose), *jalandharabandha, viparitakara¸ trikona asana*.

Pranayam[64]

The most effective *pranayama* is *ujjayi*. It acts on the throat, and its relaxing and stimulating effects are most probably due to stimulation of the throat area, which are controlled by the brain stem and hypothalamus. *Bhramari pranayam*, also found helpful. *Surya, Chandra, Nadi Sodhana pranayama* (right, left and alternate nostril breathing) is useful in balancing metabolism.

CONCLUSION

From the above description, *Galgaganda* may seem reasonable to assume the condition refers to Goiter which is abnormal swelling in the thyroid gland or some type of neck tumor, where thyroid functions may or may not be compromised. But hypothyroidism is not just a localized disease; it has many symptoms related to many systems of the body. So it is better not to restrict hypothyroidism only with Galaganda as mentioned in the classics.

As per Ayurvedic principles, Hypothyroidism occurs due to *Jatharagnimandya* and *Dhatvagnimandya* along with *Kaphaprakopa*. Increasing the quantum and quality of *Agni* is the mainstay of treatment so drugs having *Deepana, Pachana, Lekhana, Kaphashamaka,Vatanulomaka* and *Srotoshodhaka* properties seems to be effective in this condition along with dietary rules and proper lifestyle as described in *Ayurvedic* texts. Thus a multi-factorial and holistic approach is required for management of hypothyroidism i.e., diet, drugs and yogic exercises & *pranayam* all in combination helps in normalizing the thyroid functions.

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Review Article

Homoeopathic approach in Metabolic Syndrome - A Review

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Abstract

Metabolic syndrome is lifestyle disorder with major cardiovascular and other systemic risk factors and the prevalence of the same is increasing globally at an alarming rate. Though there are many risk factors and aetiological components involved in this syndrome, obesity and insulin resistance remains the main initiator of all the pathophysiological changes associated. Preventive measures with lifestyle modification (weight loss and physical activity) constitutes the first-line therapy. This article reviews about the current knowledge of metabolic syndrome regarding prevalence, aetiology and risk factors, pathophysiology, clinical features, diagnosis, investigations, Homoeopathic approach in the management with a review on major studies done in Homoeopathy related to metabolic syndrome.

Keywords: Diabetes mellitus dyslipidaemia, hyperlipidaemia metabolic syndrome, obesity.

Introduction

The metabolic syndrome or syndrome x is a constellation of three or more of the following: abdominal obesity, triglycerides 150 mg/ dl or higher, HDL cholesterol less than 40 mg/dl for men and less than 50 mg/ dl for women, fasting glucose 110 mg/dl or higher, and hypertension[1].This syndrome could be defined as the presence of visceral obesity, insulin resistance, dyslipidaemia and hypertension[2],and is increasing in prevalence at an alarming rate[1]. Metabolic syndrome is also termed as the 'insulin resistance syndrome, and is much common in obese individuals.[3]

There is no uniform definition of metabolic syndrome and various organizations use different definitions.[4-10] Each definition possesses many common features, but there are several different parameters.[4] The American Association of Clinical Endocrinologists (AACE), World Health Organization (WHO), and European Group for the study of Insulin Resistance (EGIR), definitions are all largely focused on insulin resistance, and primarily used for research.[11] The National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) definition is more clinician-friendly which use measurements and laboratory results that are readily available.[4,11]

Prevalence- Global scenario: Worldwide prevalence of metabolic syndrome ranges from <10% to 84%, depending on the region, urban-rural environment, composition (sex, age, race, and ethnicity) of the patient, and the definition used.[12 - 18]

The prevalence of the metabolic syndrome increases with age with the highest recorded prevalence globally among Native Americans, encompassing around 60 percentage of women aged 45-49 years and 45 percentage of men aged 45-49 years meetingthe NCEP: ATPIII criteria. In the United States, this syndrome is more common among Mexican-American women. In France, 30-60 year olds have shown less than 10 percentage prevalence for each sex, although 17.5 percentage of people between 60-64 years of age are affected.[19]

Prevalence- Indian scenario: The prevalence of metabolic syndrome in India had been documented to be from 11% to 41%.[11] According to astudy done in Northern India in 2018, the overall prevalence of metabolic syndrome was found to be 40.9% (26.2% of total males and 59% of total females).Maximum numbers of metabolic syndrome cases in this study were in the age range of 50–59 years, followed by 40–49 years, and suggested that prevalence of metabolic syndrome in <40 years age group is rapidly increasing.11In a study conducted in urban locale of Eastern India, Age-standardized prevalence rates of metabolic syndrome were 33.5% overall, 24.9 % in males and 42.3% in females. [20]

In another hospital based study conducted in India in 2019, 50.5% of the newly detected hypertensive patient had metabolic syndrome according to the IDF criteria.[21] The prevalence was 60.5%, 64.5% and 68% with modified IDF criteria for Asian Indians, NCEP ATP III guidelines and Parikh and Mohan criteria respectively.[21, 22] Recent

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studies show more than half of hypertensive patient had metabolic syndrome. [23, 24]

All the above mentioned studies point out to the fact that metabolic syndrome is undoubtedly increasing in its prevalence both globally and nationally. Greater global industrialization (associated with rising obesity) is expected to increase the prevalence of metabolic syndrome as the population ages. The rising prevalence and severity of obesity among children causes features of the metabolic syndrome in a younger population. 19Early detection and recognition of the metabolic syndrome with preventive measures globally, employment of corrective measures with proper planning and execution of treatment strategies for the same is the need of the hour.

Risk factors and Aetiology[19]
Overweight/ obesity: There is a strong relationship between waist circumference and increasing adiposity with central adiposity being a key feature of the metabolic syndrome.

Sedentary lifestyle/ physical inactivity: Many components of the metabolic syndrome are associated with a sedentary lifestyle including increased adipose tissue (mainly central), decreased HDL cholesterol, increased triglycerides, hypertension and increased blood glucose in genetically susceptible individuals.

Ageing: increasing prevalence of the metabolic syndrome is noted globally as per the population ages.

Diabetes mellitus: More than 75 % of patients with type 2 diabetes mellitus or impaired glucose tolerance have the metabolic syndrome.

Cardiovascular disease: The prevalence of the metabolic syndrome among patients with coronary heart disease (CHD) is 50%. [Prevalence of 35% among patients with premature CAD (before or at the age of 45)]. The risk of an acute myocardial infarction or stroke is 3 folds higher and they are twice likely to die of CVS disease compared to others without metabolic syndrome.

Lipodystrophy and hypercholesterolemia: Genetic/familial and acquired lipodystrophies, hypercholesterolemias are associated with increased risk. Female gender, inadequate fruit intake, and middle-to-high socioeconomic status had also been noted to significantly contribute to increased risk of metabolic syndrome.[25]

Pathophysiology[3,19]
Insulin resistance remains the initiator of all pathophysiological changes. Though the primary cause of insulin resistance is unclear, there might be multiple defects in insulin signalling which affects several tissues in the body. The theory centred on the adipocyte is more acceptable as obesity is a major cause of insulin resistance. Free fatty acids (FFAs) are released in excess from an expanded adipose tissue mass (predominantly from intra-abdominal, central adipose tissue).

In the liver, FFAs result in increased production of glucose and triglycerides and secretion of very low density lipoproteins (VLDLs) with decrease in high density lipoprotein (HDL) cholesterol and an increase in low density lipoprotein (LDL) particle number. FFAs also reduce insulin sensitivity in muscle by inhibiting insulin mediated glucose uptake and a reduction in glucose converting to glycogen and increased lipid accumulation in triglyceride (TG). The increase in circulating glucose, FFAs and increased pancreatic insulin secretion, results in hyperinsulinaemia which causes enhanced sodium resorption and increased sympathetic nervous system activity and contribute to hypertension, as might higher levels of FFAs. The proinflammatory state is superimposed and contributory to the insulin resistance produced by excess FFAs.

The enhanced secretion of interleukin 6 (IL-6) and tumour necrosis factor alpha (TNF-∞) produced by adipocytes and monocyte derived macrophages result in more insulin resistance and lipolysis of adipose tissue triglyceride stores to circulating FFAs. IL-6 and other cytokines also enhance hepatic glucose production, VLDL production by the liver, hypertension and insulin resistance in muscle.

Cytokines and FFAs also increase hepatic production of fibrinogen and adipocyte production of plasminogen activator inhibitor 1 (PAI-1), resulting in a prothrombotic stage. Higher levels of circulating cytokines stimulate hepatic production of C- reactive protein (CRP). Reduced production of the anti-inflammatory and insulin sensitizing cytokine adiponectin is also associated with the metabolic syndrome. Leptin is an adipose- derived hormone (termed as adipokines as they are cytokines secreted by adipose tissue) 26involved in fat metabolism which reduces lipogenesis2 and closely corresponds with insulin resistance, which is a risk factor coronary heart disease (CHD) and metabolic syndrome.[27]

Clinical features[19]

Signs and symptoms: Typical symptoms are not present in metabolic syndrome, though physical examination might reveal increased waist circumference and high blood pressure. The presence of either or both of these signs should prompt the clinician to investigate for other biochemical abnormalities associated. Less frequent examination findingsare lipoatrophy or acanthosis nigricans and other associated findings of insulin resistance.

Associated diseases and other associated conditions:[19]Cardiovascular disease, type 2 diabetes, increases in ApoB and ApoCIII, uric acid, prothrombin factors (fibrinogen, plasminogen activator inhibitor 1), serum viscosity, asymmetric dimethylarginine, homocysteine, white blood cell count, proinflammatory cytokines, C- reactive protein, micro albuminuria, non-alcoholic fatty liver disease and/or non-alcoholic steatohepatitis, polycystic ovary syndrome and obstructive sleep apnoea.

Investigations[3,19]

- Fasting lipids and fasting blood glucose- elevated levels.
- Measurement of additional biomarkers associated with insulin resistance- ApoB, high sensitivity C- reactive protein, fibrinogen, uric acid, urine micro albumin, liver function tests.
- Sleep study- if symptoms of obstructive sleep apnoea present.
- Ultrasonography abdomen, serum testosterone, leutinizing hormone, follicle stimulating hormone- if polycystic syndrome is suspected.

Diagnosis[28]

The National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) definition devised in 2001 (updated by the American Heart Association and the National Heart Lung and Blood Institute in 2005) is one of the most widely used criteria of metabolic syndrome. It incorporates the key features of hyperglycaemia/insulin resistance, visceral obesity, atherogenic dyslipidaemia and hypertension. It uses measurements and laboratory results that are readily available to physicians, facilitating its clinical and epidemiological application which is simple, easy to remember and does not require any specific criterion to be met except at least three of the five criteriastated.

According to the NCEP ATP III definition, metabolic syndrome is present if three or more of the following five criteria are met:[19, 28] Central obesity: waist circumference over 40 inches (>102cm) (men) or 35 inches (> 88cm) (women), Hypertension: blood pressure over 130/85 mmHg, or specific medication, Hypertriglyceridemia: fasting triglyceride (TG) level over 150 mg/dl, or specific medication, Low High Density Lipoprotein (HDL) cholesterol: fasting High Density Lipoprotein (HDL) cholesterol level less than 40 mg/dl (men) or 50 mg/dl (women), or specific medication, Fasting blood sugar over 100 mg/dl. (Or specific medication or previously diagnosed type 2 diabetes).

MANAGEMENT

General management: The underlying risk factors that promote development of the metabolic syndrome are overweight and obesity, physical inactivity, and an atherogenic diet. Lifestyle modification (weight loss and physical activity) is the first-line therapy.[29] Preventive measures should be advocated and awareness should be done before the onset of disease, especially in high risk group patients. The general management principles should be based on the following components.

Obesity: As obesity is the driving force behind the metabolic syndrome, weight reduction is the primary approach to the disorder which includes a combination of calorie restriction, increased physical activity and behaviour modification.[19]

- Calorie restriction and Dietary Modification: The major guidelines are low intake of saturated fats, trans fats, and cholesterol; reduced consumption of simple sugars; and increased intakes of fruits, vegetables, whole grains, lean poultry and fish with proper adherence to the diet plan.[19, 29, 30, 31, 32] "Crash diets" and "extreme diets" are rarely effective in producing long-term weight reduction. The effective and healthy way for long-term weight loss is consuming reduced-energy diets, consisting of a modest 500-1000 calorie reduction per day. [29,33]
- Physical activity: A minimum of 30 minutes moderate intensity daily activity requiring moderate caloric expenditure like gardening, walking, house cleaningetc. (not always formal exercises such as jogging, swimming or tennis), multiple short (10 to 15-minute) bouts of activity (brisk walking), avoiding common sedentary activities in leisure time (television watching and computer games) are ideal.[19, 29, 33] A more realistic

goal for weight reduction is to reduce body weight by ≈7% to 10% over a period of 6 to 12 months with the maintenance of weight loss which is best achieved by including regular exercise in the weight-reduction regimen.[29, 33]

- Behaviour modification: The emphasis is on improvements in eating habits such as setting goals, planning meals, reading labels, eating regular meals, reducing portion sizes, self-monitoring and avoiding eating binges[33] by highlighting the benefit of social support, stress management, and the value of a regular exercise regimen.[29]

Surgical Management: Metabolic or bariatric surgery for patients with a body mass index >40 kg/m2 or >35 kg/m^2 with comorbidities.[19, 34]

Role of preventive measures in individuals with any of the risk factors is vital before the onset of metabolic syndrome.

Homoeopathic approach of metabolic syndrome

Homoeopathy (In Greek, Homoios = similar, pathos = suffering) is one of the complementary and alternative medicine (CAM) systems founded by Dr Christian Friedrich Samuel Hahnemann in 1796, which is based on the principle of 'like cures like' ("Simila Similibus Curentur").[35, 36] It is a method of medical practice that aims to improve the level of health of an organism through the administration of medicinal products selected individually according to the principle of similarity. [35]

Homoeopathy is a holistic medicine where a person is treated as a unique individual and their body, mind, spirit and emotions are all considered in the management and prevention of disease. Taking all these factors into account a homeopath will select the most appropriate medicine (Similimum) based on the individual's specific symptoms and personal level of health to stimulate their own healing ability.36 Since homeopathy is strictly individualized and takes into account the physical, emotional, mental, constitutional, biographical and environmental state, it is a medicine for the person as a whole. [35]

Metabolic syndrome falls under the category of Lifestyle diseases or Non communicable diseases (NCDs) with major metabolic risk factors such as raised blood pressure, overweight/obesity, hyperglycaemia and hyperlipidaemia (all major components of metabolic syndrome) contributing to the key metabolic changes that increase the risk of NCDs.[37, 38] If we correlate the major aetiological and pathological factors of metabolic syndrome and classify it according to the Homoeopathic classification of diseases, metabolic syndrome falls under the category of chronic diseases with a fundamental cause, which is generally due to a chronic miasm. 39 Though psora is the most general and universal mother of all chronic miasms,[40] a proper evaluation and study of the miasmatic expressions of the patient should be done while evaluating metabolic syndrome. Ascertaining the physical constitution of the patient by taking into consideration of his moral and intellectual character, occupation, mode of living and habits, social and domestic relations, age, sexual function etc.[39] are important in the Homoeopathic treatment of metabolic syndrome too, as is the case in other chronic diseases. Maintaining cause (causa occasionalis) has to be removed which can be an obstacle to cure.[41]

After case taking, recording, interpreting, classifying and evaluation of the symptoms (analysis) with eliciting the characteristic symptoms, problem definition, synthesis (erecting a totality), selection of a suitable repertory according to the case and repertorization is essential for a logical elimination of apparently similar medicines by gradually narrowing down the field and arriving at the similimum with the help of further reference to material medica if needed is very important.[42] If the true similimum is prescribed, the symptoms will be cured in accordance with Hering's law of cure in three directions: from within outward, from above downward, and in the reverse order of their appearance.[43] All these basic principles and steps should be followed by the physician while formulating the treatment plan of metabolic syndrome in Homoeopathy with special emphasis to general management and preventive measures of the same.

Some symptoms and components corresponding to various elements of metabolic syndrome with major high ranking remedies are represented in Murphy's repertory[44] as follows.

Chapter	Rubrics	Sub rubrics	Major high ranking remedies
Clinical	Obesity, general	• Elderly, people • Young, people, in; • stout, and robust; • uterine, complaints, with; • menopause, during	Calcarea carbonicum, Capsicum, aurum metallicum, graphitis, kali carbonicum, phytolacca etc.
Clinical	1. Hyperglycemia, high blood sugar. 2. Diabetes, Mellitus	• Blood, sugar levels, high. • Debility, with. • Exhaustion, with. • Hereditary. • Weakness, with.	Carcinosinum, phosphoric acid, phosphorous, insulinum, lactic acid, Syzygium Jambolanum.
Clinical	Cholesterol	• Increased	Cholesterinum, calacarea carb, insulinum, lycopodium, sulphur, chloroform.
Clinical	Hypertension	• Heart, disease, with. • Sudden, rise of	Amyl Nitrosum, Aurum metallicum, crategus, glonine, lachesis, natrummuriaticum, nux vomica

Phatak's repertory points out similar rubrics with similar group of medicines for metabolic syndrome where the individual rubrics of the pathology like obesity, increased blood pressure, hypercholesterolemia and diabetes mellitus are mentioned alphabetically.[45] Dr Boericke mentions that Phytolacca (is a fat reducer) and can be used clinically for the treatment of obesity[46]. He also adds that Fucus vesiculosus is remedy for obesity.[46] Such prescriptions will be beneficial only if the totality of symptoms of the patient corresponds to that of phytolacca, (or any such remedy in that case), than blindly using these remedies for fat/ weight reduction without emphasising to the totality of symptoms. Fucus vesiculosus is indicated for obesity with thyroid enlargement, non-toxic goiter and exophthalmos in obese subjects. Digestion is furthered and flatulence diminished with obstinate constipation and forehead feels as if compressed by an iron ring.[46] Phytolaccais predominantly a glandular remedy and indicated in the treatment of obesity which is associated with rheumatism, gout and sterility of obese people.[46]

Major studies done in Homoeopathy related to metabolic syndrome

An animal study done in India to explore the remedial effects of homoeopathic mother tincture Syzygium jambolanum on metabolic disorders of Streptozotocin induced diabetic male albino rat indicated that the treatment restored the body weight and significantly controlled the elevated blood glucose levels in male albino rats with a recovery of levels of glycogen in liver and skeletal muscle tissues. Levels of serum urea, uric acid and creatinine were increased in diabetic rats significantly as compared with the control group, which were resettled in the control group after treatment in diabetic animals. This study concluded that the homoeopathic mother tincture of Syzygium jambolanum has therapeutic effect on metabolic disorders and oxidative injuries in Streptozotocin induced diabetic male albino rats.[47]

A cross sectional study compared the use of complementary and alternative medicine (CAM), including dietary supplements, by individuals with and without features of metabolic syndrome (FeMS).[48] Though the study didn't investigate about the effect of Homoeopathic medicines on metabolic syndrome, it concluded that Individuals with FeMS were more likely to use CAM, particularly supplements and doctors need to properly inquire about and understand their patients' supplement use, especially if CAM therapies are used in conjunction with conventional medications.[48]

An exploratory interventional study conducted in India with the primary objective to evaluate the role of homeopathic drugs in the management of essential hypertension and the secondary objective to detect cases of metabolic syndrome according to the clinical criteria formulated by the National Cholesterol Education Program (Adult Treatment Panel (ATP) III) concluded that constitutional treatment based on homeopathic principles might represent a satisfactory option for the management of essential hypertension and the presence of metabolic syndrome was identified in 46.67% of the cases studied.[49]

DISCUSSION

From all the above studies, it is evident that there had not been much scientific studies in Homoeopathy regarding the usefulness of Homoeopathic medicines in the treatment of metabolic syndrome, though some components and aspects of the disease were studied and positive results and responses were obtained. Most of the previous studies assessed only the individual components or pathological entities of metabolic syndrome like hypertension, diabetes mellitus etc or prevalence of the same. There was only one major animal study conducted and similar human studies were negligible in this context.[47] A meta-analysis was not possible due to the limited number of studies.

CONCLUSION

Metabolic syndrome is a pathological state encompassing visceral obesity, insulin resistance, dyslipidaemia and hypertension, and is increasing drastically globally in an alarming rate. Homoeopathy as holistic system of medicine treats the patient with disease by considering their individual characteristics along with pathophysiological correlation. A few components and aspects of the metabolic syndrome and Homoeopathic management were studied and positive results and responses were obtained previously. But more extensive and vigorous scientific studies are required to assess the usefulness of Homoeopathy in the treatment of metabolic syndrome, which might open up new avenues to enhance the scientificity and scope of the system while providing betterment to the patients.

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Clinical Research Article

Antioxidant activity of *Yograj Churna*: An in-vitro study

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Abstract

Background

Cellular damage induced by free-radicals like Reactive Oxygen and Nitrogen Species (ROS and RNS) has been implicated in several disorders and diseases, including Anaemia. The naturally occurring anti-oxidant rich-herbs play a vital role in combating these conditions[11].Recent researches have shown that the antioxidants of plant origin with free-radical scavenging properties could have great importance as therapeutic agents in several diseases caused due to oxidative stress. The present study was carried out to investigate the *In-vitro* free-radical quenching capacity of a known *Ayurvedic* herbo-mineral formulation called *Yograj Churna* which has been considered as a *Rasayana in Pandu Roga* (Anaemia)

Methods

Methanol extracts of *Yograj Churna* formulation were studied for *In-vitro* total antioxidant activity. In-vitro assays like DPPH, ABTS scavenging to evaluate radical quenching potential were performed.

Results

The formulation has shown 35.31% at 0.1 mg/ml DPPH free-radical scavenging activity as against 80% at 0.1 mg/ml for standard ascorbic acid (IC50 value is 15.15µg/ml for Yograj Churna and 5.6µg/ml for standard). ABTS radical scavenging activity of *Yograj Churna* was 11.6 at 100 µg/ml concentration as against 20.77 at 100µg/ml for ascorbic acid with an IC50 value of 237.15 ascorbic acid and 439.4 for *Yograj Churna.*

Conclusion

The traditional formulation mentioned in the chapter *Pandu Roga Chikitsa* as *Rasayana* has been found to have anti-oxidant property by free radical scavenging activity based on the In-vitro assays (DPPH and ABTS). *Rasayana* itself is said to be a branch whose actions are related to combat diseases which are caused by free radicals. The present study was an attempt to prove the anti-oxidant properties present in the formulation *Yograj Churna* which thus validates the potential use of *Yograj Churna* as an anti-oxidant to fight diseases.

Keywords - Antioxidant, *Yograj Churna, Pandu Roga*

Introduction

Ayurvedic medicine has originated in India several thousand years ago. It is extensively used now-a-days in this country and is becoming increasingly popular in western nations. Indian system of medicine has rich history of using plants in medicinal purpose. Generally, Ayurvedic practice involves the use of medications that typically contains herbs, metals minerals and other material[1,2]. *Yograj Churna* is the combination of some herbs and minerals used extensively in Ayurvedic formulations, from ancient time. These Ayurvedic ingredients are as follows: *Triphala (Amalaki– Phyllanthus emblica*, *Bibhitaki –Terminalia bellirica(Gaertn.) Roxb,Haritaki – Terminalia chebula* Retz.),*Trikatu (Sunthi – Zingiber officinale Rosc, Maricha – Piper nigrum Linn, Pippali – Piper longum Linn), Vidanga (Embellica ribes Burm.f), Chitrakmula (Plumbago zeylanica linn), Suddha shilajit (Ashphaltum punjabianum), Swarnamakshika* (Copper pyrite $CuFeS_2$), *Raupyamakshika* (Iron pyrite, Fe_2S_3) , *Lohabhasma* (Iron powder) and Misri (Sugar candy).[3] As per classical reference being a *Rasayana* for *Pandu* it also cures diseases like poisoning, bronchitis, tuberculosis, obstinate skin disease including diabetes, asthma, anorexia, epilepsy, jaundice and haemorrhoids[3].

'Oxidative stress', which is due to the imbalance of formation and dissolution of free radicals, considered to be one of the main cause of most of the diseases of present scenario. Recently, much attention has been directed towards the development of "ethno medicine[9]" which is indigenous to a culture of people that posses strong antioxidant properties and beneficially less toxicity[4]. A free radical may be defined as any species capable of independent existence that one or more unpaired electrons. In recent years the term reactive oxygen species (ROS) has adopted to include molecules such as hydrogen peroxide (H_2O_2), hypochlorous acid (HOCl) and

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singlet oxygen (O_2). ROS cause tissue damage by variety of different mechanism such as DNA damage, lipid peroxidation, protein damage, oxidation of important enzymes eg – anti protease enzyme. The different types of toxic effects of the free radicals can be blocked by the antioxidants which either scavenge the free radicals or block their synthesis[4].

Materials And Methods

Plant materials:-

The drug was chosen purely based on the classical reference of it being a Rasayana[3]. The Method of preparation for *Yograj Churna* is was followed as per *Charak Samhita: Chikitsasthana Pandu Roga Adhyaya*, 16th Chapter. For the present study all the ingredients were collected from Ayurvedic Pharmacy, Banaras Hindu University (BHU). Parts of the ingredients were crushed and powdered using grinder and passed through sieve #85. The ingredients were taken in the ratio as mentioned in Table no 1.

Table 1: Ingredients of Yograj Churnaas per Charak Samhita[3,5]

S.No	Name	Botanical name/Chemical name	Quantity of drug
1	*Triphala*	*Amalaki – Embelica officinalis Bibhitaki – Terminalia bellerica(Gaertn.) Roxb*	50gm each
2	*Trikatu*	*Sunthi – Zingiber officinale Rosc, Maricha – Piper nigrum Linn,*	50gm each
3	*Chitrakmula*	*Plumbago zeylanica Linn*	150 gm
4	*Vidanga*	*Embelia ribes Burm. f*	150 gm
5	*Sudhashilajit*	*Asphaltum punjabianum*	250 gm
6	*Rupyamakshik*	Iron pyrite (Fe_2S_3)	250 gm
7	*Swarnamakshik*	Copper pyrite ($CuFeS_2$)	250 gm
8	*Lohabhasma*	Iron Powder	250 gm
9	*Misri*	Sugar Candy	400 gm

Chemicals And Instrumentation:

1,1diphenyl-2-picryl-hydrazil (DPPH), 2,2'- azinobis (3- ethylbenzothiazoline -6-sulphonic acid, ABTS). Ascorbic acid was purchased from sigma –aldrich pvt.ltd. methanol, concentrated hydrogen peroxide and potassium persulphate were purchased from sigma Aldrich pvt.ltd. Weighing balance (Metler Toledo AB 265-S), UV –Visible spectrophotometer (Shimadzer/UV- 1700) were used for weighing and spectrophotometric analysis.

In Vitro Antioxidant Activity:-

Following methods have been used for the examination of free radical scavenging potential. [6,7,8]

Preparation of extracts:

For 72 hours, maceration was done of the powdered sample in methanol followed by occasional shaking. Decantation of the macerate was done and filtration was done through Whitman filter paper 1. The methanol extract was concentrated by Lyophilisation, for complete removal of solvent. DPPH and ABTS scavenging activity was measured by Spectro-photometric method.

Preparation of reference standard solution:-

1ml of different stock solution of ascorbic acid (50µg/ml dissolved in methanol) i.e 10 20 30 40 50 60 70 80 90 and 100 µg/ml ; 2ml of DPPH (100µM) and ABTS (100µM) solution were taken and finally make up the volume up to 5.0ml with methanol separately.

Preparation of sample solution and dilution:-

10mg of extract was dissolved in 10ml of methanol to make stock solution and the series of dilutions 10, 20, 30, 40, 50, 60, 70, 80, 90, 100µg/ml for *Yograj Churna.*

DPPH Assay:-

The antioxidant activity of methanolic extract of all samples were determined by using a method based on the reduction of methanolic solution of colored free radical 1,1 diphenyl-1-2 picryl hydrazyl (DPPH). The radical scavenging activity of tested sample was expressed as an inhibition percentage. Ascorbic acid was used as

reference standard. In 5.0 ml volumetric flasks added 2.0ml of DPPH solution, 1.0 ml of final dilutions of different concentrations range prepared from methanolic extract of sample stock solution and made upto the volume of 5.0ml with methanol8. In same way prepared the control dilutions of DPPH, replacing 1.0ml of prepared dilutions (The drug solution under investigation) with methanol8.The absorbance of all the dilutions was taken after 30 minutes at wavelength (max) 517nm using methanol as blank. The standard protocol which was followed is of Re et al, 1999; Ayoola et al, 2008.

ABTS assay:-

Abts (2,2'azinobis (3-ethylbenzothiazoline -6- sulphonic acid) free radical scavenging activity was analyzed by following standard protocol Re and colleague (1999). The ABTS cation radical was produced by the reaction between 5ml of 14mM ABTS solution and 5ml of 4.9mM potassium persulfate solution, which was incubated for 16 hrs in the dark at room temperature . Prior to use this solution was standardized by diluting on spectrophotometer at 734nm to get an absorbance of 0.700±0.020. The test sample at various concentration (10 20 30 40 50 60 70 80 90 100 µg/ml) with 1 ml of Abts solution was homogenized and absorbance was recorded at 734 nm. Ethanol was used as a blank and all absorbance was taken within 6 min.

Statistical analysis:-

The percentage inhibition was calculated using the formula:

% inhibition = (Ac – As / Ac) * 100

Where Ac = absorbance of control

As = absorbance of sample.

IC50 value (a concentration at 50% inhibition) was determined from the curve between percentage inhibition and concentration. All the determinators were done in triplicate and the IC50 value was calculated by using the equation of line (papuc et al , 2008) . The results of antioxidant data of ascorbic acid and methanolic extract of *Yograj Churna* for both DPPH and ABTS are given in the table (2, 3, 4, 5). IC50 values were also calculated for all the samples and presented in figures (1,2,3,4)

Table 2: Readings at 517 nm for DPPH Ascorbic acid

conc	10	20	30	40	50	60	70	80	90
t1	0.602	0.56	0.48	0.42	0.363	0.28	0.23	0.15	0.13
t2	0.619	0.55	0.48	0.40	0.369	0.27	0.25	0.17	0.12
t3	0.623	0.54	0.47	0.40	0.357	0.28	0.23	0.15	0.13
Contr-ol	c1	c2	c3						
	0.67	0.65	0.66						
Percentage inhibition	7.13	16.23	27.31	38.11	45.12	57.68	63.21	75.02	80.65

Table 3: Readings at 517 nm for DPPH *Yograj Churna*

conc	10	20	30	40	50	60	70	80	90	100
t1	0.56	0.56	0.53	0.51	0.47	0.47	0.45	0.42	0.42	0.41
t2	0.59	0.56	0.52	0.51	0.48	0.47	0.45	0.41	0.41	0.41
t3	0.60	0.56	0.53	0.52	0.45	0.48	0.44	0.42	0.42	0.39
Contr-ol	C1 0.644	C2 0.641	C3 0.613							
Percentage inhibition	7.41	11.29	15.90	18.47	25.46	24.34	28.79	32.41	33.77	35.31

Table 4: Reading for ABTS at 734nm Ascorbic acid

conc	10	20	30	40	50	60	70	80	90	100
t1	0.41	0.44	0.44	0.44	0.41	0.42	0.42	0.40	0.38	0.37
t2	0.44	0.45	0.45	0.41	0.41	0.41	0.40	0.40	0.37	0.38
t3	0.45	0.45	0.46	0.43	0.43	0.41	0.41	0.38	0.39	0.35
Contr-ol	C1 0.47	C2 0.46	C3 0.45							
Percentage inhibition	6.7	3.8	4.8	8.1	10.2	10.6	11.6	15.1		

Table 5: Reading for ABTS at 734nm Yograj Churna

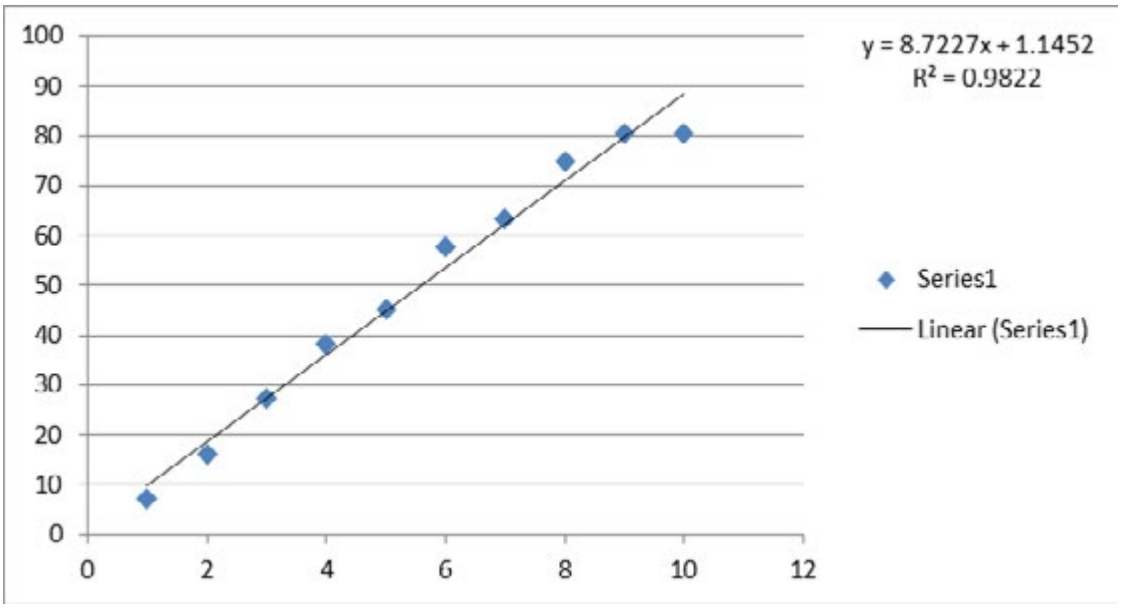
conc	10	20	30	40	50	60	70	80	90	100
t1	0.47	0.45	0.45	0.45	0.43	0.42	0.44	0.41	0.41	0.40
t2	0.47	0.46	0.46	0.44	0.43	0.42	0.42	0.41	0.41	0.40
t3	0.46	0.45	0.45	0.44	0.43	0.42	0.42	0.41	0.41	0.40
Control	C1 0.47	C2 0.46	C3 0.45							
Percentage inhibition	-0.3	2.2	2.26	4.19	8.04	8.98	7.78	6.78	10.68	11.60

Results

Antioxidant activity:

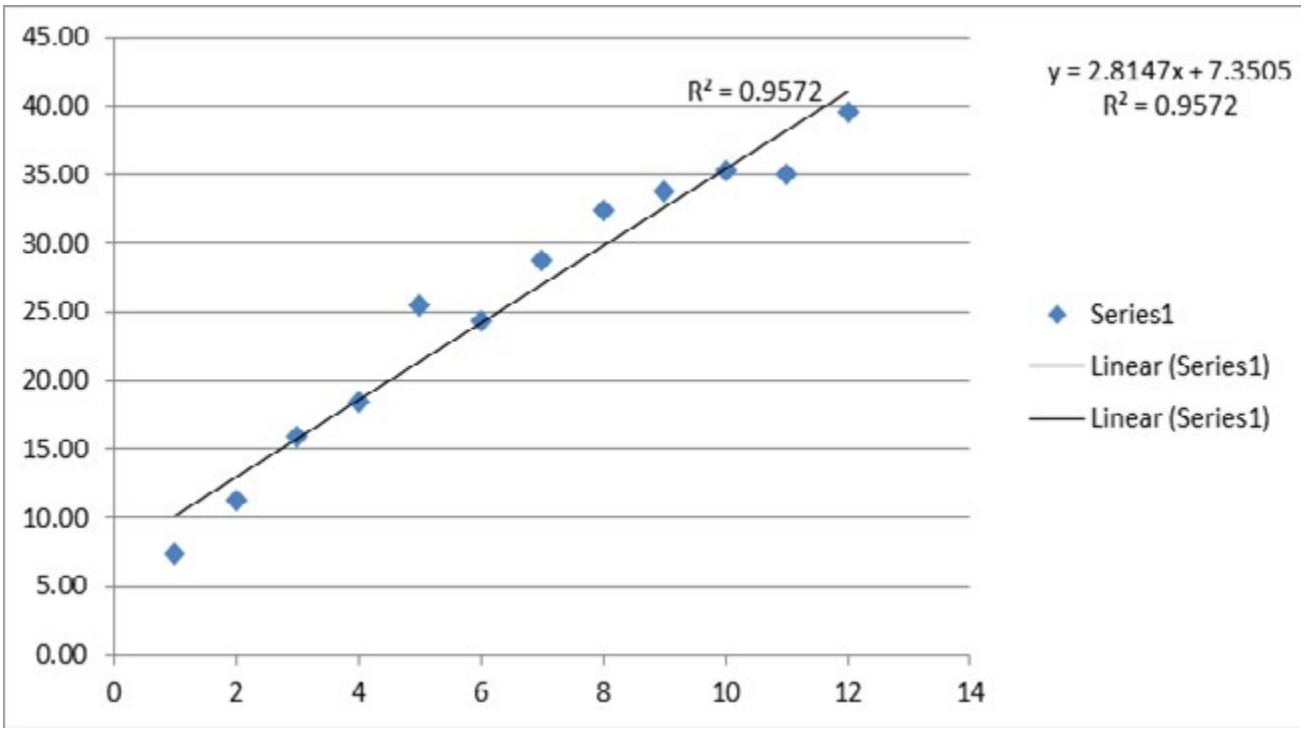
Methanolic extract of all the *Yograj Churna* and Ascorbic acid were evaluated for antioxidant properties by using DPPH and ABTS method. Results of antioxidant activity were compared with ascorbic acid, a standard antioxidant. As observed in figures (1-4), DPPH screening has shown the IC 50 values of *Yograj Churna* (15.15) and that of IC 50 value of ascorbic acid (5.60) and in ABTS has shown the IC50 values of 237.15µg/ml and 439.41µg/ml for ascorbic acid and *Yograj Churna* respectively. The *Yograj Churna* formulation shows the moderate antioxidant property both in DPPH and ABTS as compared to that with ascorbic acid. Fig 1,2,3,4 shows that as a whole, show good amount of antioxidant activity and this activity increases with the increasing concentration.

Fig 1:-ascorbic acid: X – concentration with changing scale y – inhibition.



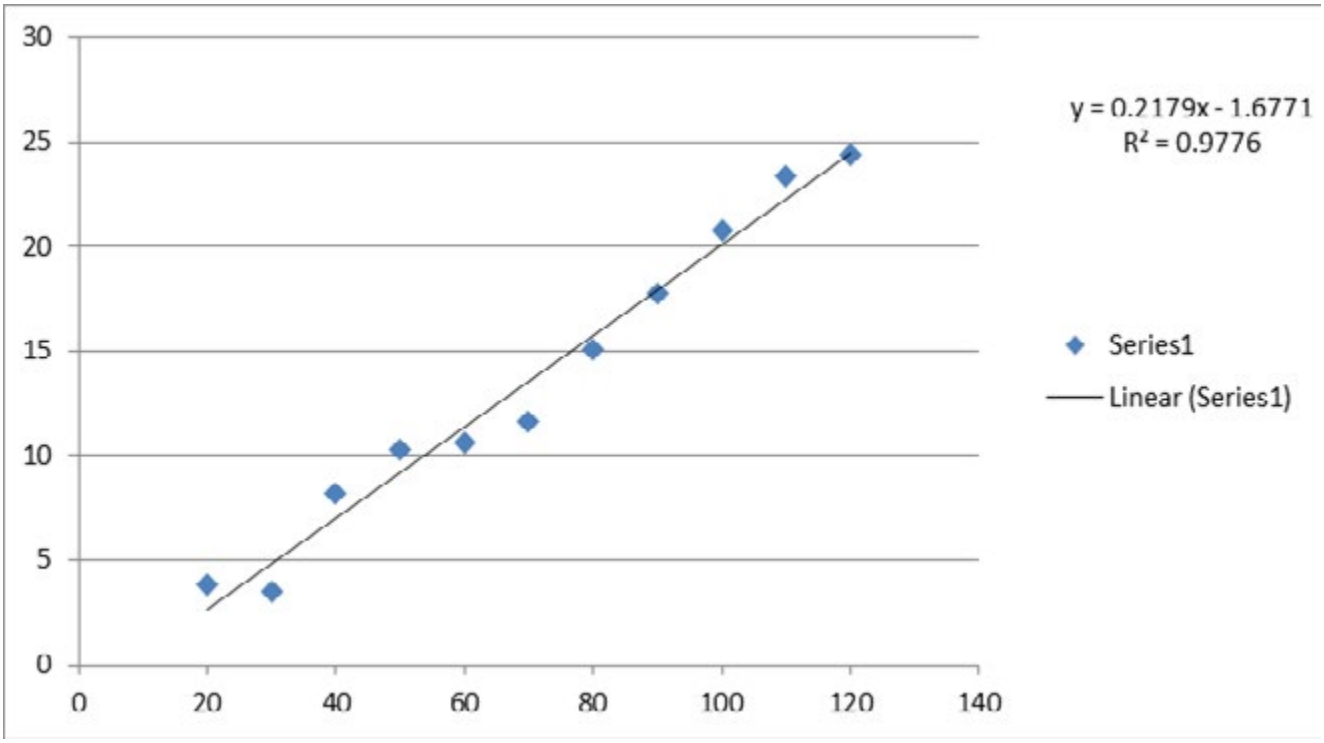
Observation: The Fig.1 shows percentage of inhibition which is directly dependent (proportional) on the concentration of the sample i.e. co-relation exists.

Fig 2:- *(Yograj Churna)* x- concentration with changing scale y – inhibition



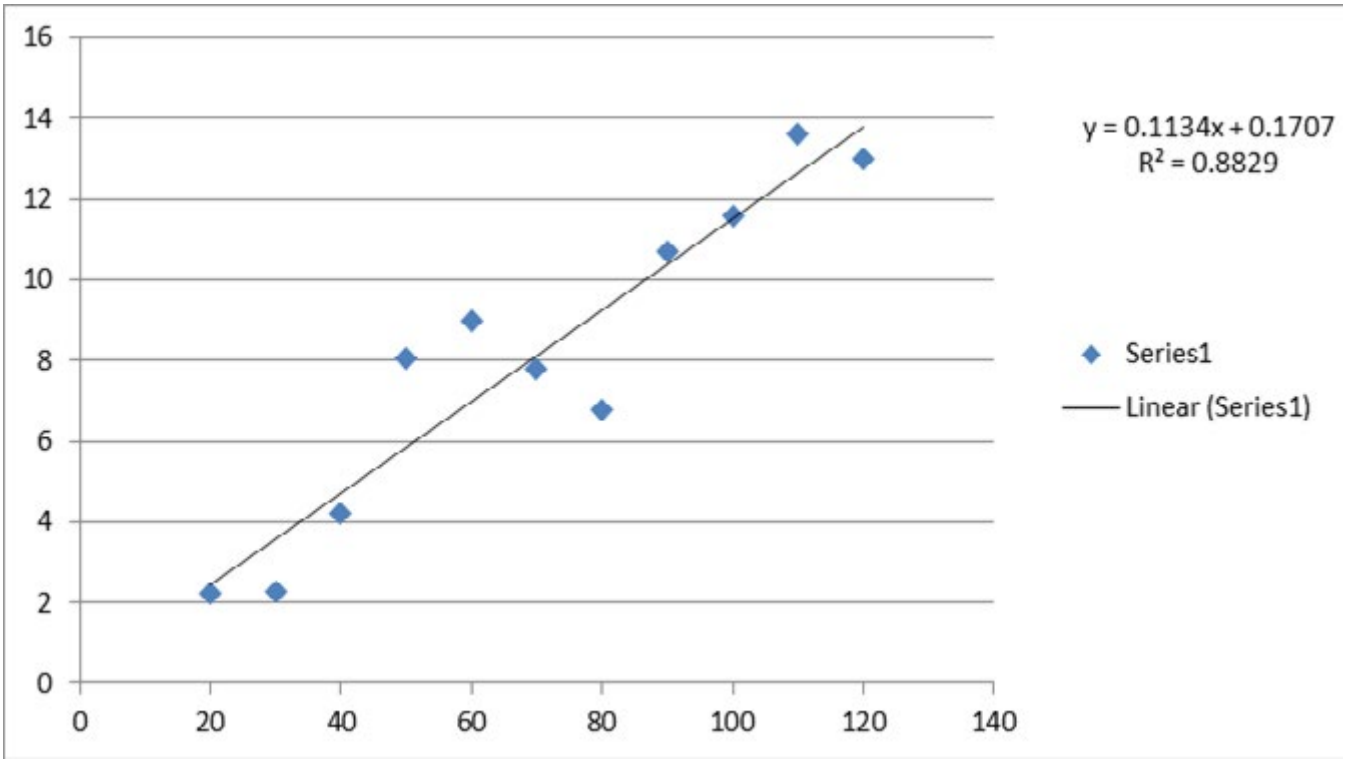
Observation: The Fig.2 shows percentage of inhibition which is directly dependent (proportional) on the concentration of the sample i.e. co-relation exists.

Fig 3:- (ascorbic acid) ABTS x =concentration with changing scale y = percentage inhibition



Observation: The Fig.3 shows percentage of inhibition which is directly dependent (proportional) on the concentration of the sample i.e. co-relation exists.

Fig 4:- *(Yograj Churna)* ABTS x =concentration with changing scale y = percentage inhibition



Observation: The Fig. 4 shows percentage of inhibition which is directly dependent (proportional) on the concentration of the sample i.e. co-relation exists.

Discussion

The present study was done to know the antioxidant potential of *Yograj Churna*. The formulation was a classical drug used for Anaemia and considered as a *Rasayana* for it. Based on this concept the study was done[10]. As antioxidant potential of many Ayurvedic drugs individually has been supported by evidence using Antioxidant assays[11]. Antioxidants slow down the process of excess oxidation and protect cells from the damage caused by free radicals. When cells are attacked by free radicals, excess oxidation causes damage and destroys cells. Antioxidant stops this process. The cellular damage caused by free radicals can be responsible for causing and accelerating many diseases. *Triphala*, which is one of the ingredient of *Yograj Churna* is rich in antioxidant[12] and is recommended to guard against free radicals and protect from damaging excess oxidation. So the methodology was adopted to find whether *Yograj Churna* has got *Rasayana* benefits.

The antioxidant potential of methanolic extract of the formulation of *Yograj Churna* showed that higher the concentration lower was the values, which showed that with higher concentration the scavenging activity increased. The results shows that the antioxidant potential is present moderately in the research sample as compared to the standard

Dpph (2- Diphenyl-1-picrylhydrazyl)- In the present study the percentage of scavenging effect on the DPPH radical was increased with the increase in the concentration of methanolic extract of yograj from 10 to 100µg/ml. The percentage of inhibition existed from 7.41 at 10µg/ml to 35.31at 100µg/ml for YC extract. The methanolic extract of Yograj Churna showed DPPH scavenging activity and compared with ascorbic acid as standard. The result of IC50 values are 15.15µg/ml and 5.60µg/ml DPPH is one of the free radicals widely used for testing preliminary radical scavenging activity of the plant extract. Scavenging of DPPH radical is related to the inhibition of lipid per oxidation. DPPH is usually used as a substance to evaluate the antioxidant activity. Antioxidants either transfer an electron or a hydrogen atom to DPPH, thus neutralizing its free radical character. DPPH test, which is based on the ability of DPPH, a stable free radical, to decolorize in the presence of antioxidants, is a direct and reliable method for determining radical scavenging action. The DPPH assay has been largely used as a quick, reliable and reproducible parameter to search the in vitro general antioxidant activity of pure compounds as well as plant extracts.

ABTS (2,2'-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid)- This study reports that the methanolic extract of Yograj Churna has radical scavenging activity. The percentage of inhibition was existing from 2.2 at 10µg/ml to 11.6 at 100µg/ml From the results, the methanolic extract YC has showed ABTS radical scavenging activity and compared with ascorbic acid as standard and the IC50 values are 439.41 µg/ml and 237.15 µg/ml. Based on the above results indicated, the methanolic extract of YC was found to most effective in exhibiting in vitro antioxidant activity in various methods.

Conclusion

The antioxidant property of the formulation *Yograj Churna* has been validated by the modern evidence of *In-vitro* assays. So, in diseases caused due to free radicals originating by oxidative stress, *Yograj Churna* may be used. Further studies will be required to identify the active ingredients of the formulation targeting the disease and methods like Network Pharmacology may be used by researchers for indentifying the targets of the diseases.

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Clinical Research Article

Oligozoospermia (Ksheena Shukra) - Infertility – current burning issue among habitat of Jamnagar, Gujarat: A cross sectional observational study

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Abstract

Historically, the concepts of infertility have changed over time, and also the problems. Today, increased mental stress, tobacco – alcohol addiction, pollution, faulty eating & clothing habit, change in culture etc. have endangered reproductive capacity of men, leading to oligozoospermia (*Ksheena Shukra*) and ultimately ending up with infertility. Approximately 20% of cases of infertility are entirely due to a male factor, with an additional 30% to 40% of cases involving both male and female factors. Therefore, a male factor is present in one half of infertile couples. **Aim:** To assess the role of demographic profile, changes in life style habits, dietary patterns, occupational and social background in increasing prevalence of oligozoospermia and Infertility at Jamnagar region. **Materials and Methods:** A observational study was conducted on 340 oligozoospermic patients of Jamnagar region. A clinical Proforma was prepared and detailed history of each patient fulfilling the diagnostic criteria was taken along with demographic profile. **Observations and Conclusion:** The obtained data reveals that, certain faulty dietary and life style regimes of this region and addiction like tobacco are responsible in manifestation of oligozoospermia. Hence awareness regarding healthy life style is must for the effective control of this condition.

Key words: Ayurveda, diet and lifestyle, Infertility, Ksheena Shukra, oligozoospermia

Introduction

The number of people with oligozoospermia is increasing due to premature aging, urbanization, and increasing prevalence of obesity, addiction i.e. tobacco, alcohol etc. and mentally stressful life. Infertility is defined as the inability of a couple even after 1 year of coital activity without contraception (Mosher and Pratt 1991). It differs from barrenness by its reversible character. Primary infertility is concluded when the couple never had a child, whereas secondary infertility appears in the case where sterility occurs after one or several pregnancies. Now a day due to very fast life all schedule of human beings had changed dramatically and this change have adverse effect on *Shukravah Srotas* and on *Shukra*.

In males with oligozoospermia, the aim is to improve seminal parameters and sperm concentration in particular. Management of infertility in modern medical science includes hormonal supplementation and assisted reproductive techniques. It has its own limitations and adverse effects too. More over their results are limited up to 30 to 40% & it is very expensive also. So a common man cannot afford. Special branch of *Ayurveda* called *Vajeekarana* can contribute something to solve this problem. Mainly changes in the dietary pattern and lifestyle modification can get better result to couple.

Aim and Objectives

To assess the role of demographic profile, changes in life style habits, dietary patterns, occupational and social background in increasing prevalence of oligozoospermia and Infertility at Jamnagar region.

Materials and Methods

For the present study, 340 male patients complaining of symptoms of Ksheena Shukra or suffering from primary or secondary infertility for more than one year were selected irrespective of religion, caste from the O.P.D of Kayachikitsa Department or referred from SRPT Department of I.P.G.T.& R.A. hospital, Jamnagar between year of October, 2014 to January, 2017. The patients having sperm count less than 15 million/ml were registered after taking their consent. All participants were interviewed in the local language by a single person. A proforma was

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prepared, including the present and past medical history of siblings, medications, diet pattern and lifestyle etc., of patients in light of etiological factors explained for *Ksheena Shukra* in *Ayurvedic* texts. Written informed consent was taken from patients as per the Helsinki declaration after offering sufficient explanations about the study and its aims.

A detailed research Proforma was prepared incorporating all the points of history taking, physical examination. Ethical clearance was obtained from Institutional Ethics Committee of Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar – 361008; Vide Ref- PGT/7/-A/2013-14/1767 was taken. The study has also been registered in CTRI (Clinical Trials Registry- India)

Inclusion and Exclusion criteria

For this study, male Patient of age between 20-50 years having Sperm count <15 million/ml (according to WHO-2010) and patient with clinical presentation of *Ksheena Shukra* (Oligozoospermia) i.e. *Daurbalya* (Weakness), *Shukra Avisarga* (Unable to ejaculate semen), *Pandu* etc were selected.

Patient of Age below 20 and above 50 years and having Sperm count >15 million/ml, azoospermia and aspermia, suffering from varicocele, accessory sex gland infection, sexually transmitted diseases, severe systemic diseases etc. Genetic disorders like Klinfelter's syndrome, taking treatment for major psychiatric illness, History of previous medications and trauma leading to oligozoospermia were excluded from the study.

Observations

Demographic data:

Total 340 male patients of *Ksheena Shukra* (Oligozoospermia) were registered for the present study, Observations related to principle variables viz., age, religion, Education status, occupation, marital status, socioeconomic status, Habitat *Desha* (habitat), chronicity, family history, addiction, *Nidra* (sleeping habits), *Ahara* (type of diet), frequency of food, *Viruddh Ahara* (dietetic incompatibilities), *Satmya* (wholesomeness), *Satva* (mental ability), *Agni* (appetite), *Bala* (physical strength), *Rasapriyata* (liking of taste), *Deha Prakriti* and *Manasa Prakriti* (physical and mental constitution), detail sexual history are depicted in the Tables .

Table No. 1: Demographic data of 340 patients of Ksheena Shukra (Oligozoospermia):

		Total n=340	%
Age group(in years)	Early (Yuvana) (20-30)	202	59.41
	Middle (Sampurnata) (31-40)	102	30
	Late (Parihani) (41-50)	36	10.58
Religion	Hindu	292	85.88
	Muslim	48	14.12
Education	Illiterate	6	1.76
	Primary	67	19.70
	Secondary	120	35.29
	Higher secondary	92	27.05
	Graduate	55	16.17
Socio-Economic status	Poor	174	51.17
	Lower Middle	112	32.94
	Middle	54	15.88
Occupation	Factory Labour	146	42.94
	Serviceman	62	18.23
	Businessman	78	22.94
	Farmer	54	15.88
Habitat	Rural	104	30.58
	Urban	236	69.41

Table No. 2: Data of Infertile of 340 patients of Ksheena Shukra (Oligozoospermia):

		Total n=340	%
Type of infertility	Primary	272	80
	Secondary	68	20
Chronicity	Primary Infertility – 272 Patients		
	1-3 year	129	37.94
	4-6 year	100	29.41
	7-10 year	36	10.58
	>10 year	7	2.05
	Secondary infertility 68 patient		
	1-3 year	38	11.17
	4-6 year	30	8.83
Hygiene of Partner	Healthy	298	87.65
	Poor	42	12.35
Age of marriage(In year)	16-20	94	27.64
	21-25	41	12.05
	26- 30	167	49.11
	>30	38	11.17
Sperm Count (million / ml)	0-5 Million	92	27.05
	6-10 Million	188	55.29
	11-15 million	60	17.64
Srotodushti	*Rasavaha*	192	56.47
	Purishvaha	122	35.88
	Mutravaha	24	7.05
	Shukravaha	340	100

Personal history data:

Table No. 3: Agni wise distribution of 340 patients of Ksheena Shukra (Oligozoospermia):

		Total n=340	%
Agni	*Vishama*	180	52.94
	Tikshna	92	27.05
	Manda	68	20
Koshtha	*Mridu*	134	39.41
	Madhyama	14	4.11
	Kroora	192	56.47
Diet	Vegetarian	276	81.17
	Mixed	64	18.82
Food habit	*Samashana*	5	1.47
	Vishmashana	155	45.58
	Adhyashana	63	18.52
	Viruddhashana	117	34.41
Sleep pattern	Sound	52	15.29
	Disturbed	176	51.75
	Delayed	112	32.94

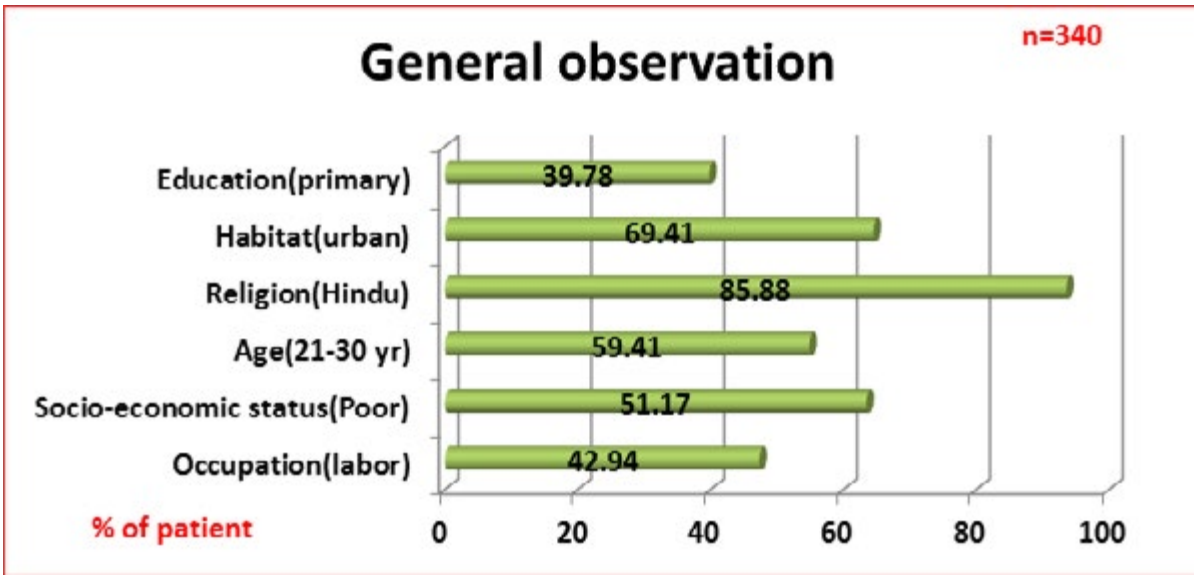
Hours of night sleep	Less than 6 Hrs	196	57.64
	6-8 Hrs	122	35.88
	8 or More than 8 Hrs	22	6.47
Desha	*Jangala*	41	12.05
	Anoopa	299	87.94
	Sadharana	0	0
Dominant Rasa in diet	*Madhura*	112	32.94
	Amla	95	27.94
	Lavana	138	40.58
	Katu	98	28.82
	Tikta	19	5.58
	Kashaya	23	6.76
Exercise	No	17	5
	Heavy	197	57.94
	Light	23	7.35
	Regular	36	10.58
	Irregular	67	19.70
Addiction	Chewing tobacco	147	43.23
	Smoking tobacco	123	36.17
	Alcohol	49	14.41
	No addiction	21	6.17
Bath habit	By warm water	219	64.41
	By cold water	121	35.58
Nature of Underwear worn	Tight	197	57.94
	Loose	143	42.05
Type of undergarments worn	Cotton	256	75.29
	Synthetic	84	24.70
Defecation habit	Regular	24	7.05
	Irregular	103	30,29
	Loose motion	0	0
	Constipation	213	62.64
Psycological status	Stress	84	24.70
	Fear	32	9.41
	Anger	92	27.05
	Worry	132	38.82
Exertion	Mild	51	15
	Moderate	87	25.58
	Severe	202	59.41
Nature of work	Mental exertion	139	40.88
	Physical exertion	171	50.29
	Both	30	8.82
Working condition	Normal	40	11.76
	Air conditioner	87	25.58
	Under Sunlight	156	45.88
	Near furnace	57	16.76

Table No 4- : Dashvidh Pariksha wise observation of data

Dashvidh Bhava		Total n=340	%
Dehaprakriti	*Vata Pittaja*	192	56.47
	Vata Kaphaja	111	32.64
	Pitta Kaphaja	37	10.88
Sara	*Pravara*	104	30.58
	Madhyama	210	61.76
	Avara	26	7.64
Satva	*Pravara*	47	13.82
	Madhyama	186	54.70
	Avara	107	31.47
Pramana	*Pravara*	36	10.58
	Madhyama	205	60.29
	Avara	99	29.11
Samhanana	*Pravara*	95	27.94
	Madhyama	211	62.05
	Avara	34	10
Satamya	*Pravara*	47	13.82
	Madhyama	175	51.47
	Avara	118	34.70
Abhayavahara Shakti	*Pravara*	92	27.05
	Madhyama	192	56.47
	Avara	56	16.47
Jaranashakti	*Pravara*	83	24.11
	Madhyama	188	55.29
	Avara	69	20.29

Discussion

Figure 1: General observation- Demographic presentation



Age: The patients selected for this study were having eligibility criteria of age group between 20-50 years. The mean age of total patients (n=340) was 29 years. The observation from the present study shows that maximum patients reported for the present clinical study belonged to the age group of 21-30 years who were married; which is decade for the beginning of marriage life and active reproductive life. Study shown that fertility rate for men in their 30s has increased by 21% and for men aged ≥ 40 years, the rate has increased nearly 30%. In contrast, the fertility rate in men younger than age 30 years has decreased by 15%.[3] Age of the male partner can be significant impact on reproduction. Increasing male age is associated with increased time to conception also reflects the age-related increase in acquired medical conditions i.e. decreases in semen quality, and increasing rates of DNA fragmentation seen in sperm. It leads to incidence of birth defects and chromosomal abnormalities.[4]

Education: Majority of the patients in the present study had secondary education. Low educational standards lead to a number of myths and misconceptions regarding progeny which contributes to the problem.

Habitat: 69.41% of the patients were from urban life style, includes irregular eating and sleeping habit, lack of exercise, consumption of fast food, cold drinks etc. and stress with fast life which may hamper the metabolism and become a cause of poor nutritional status and oligozoospermia.[5] Study suggested the role of lifestyle factors and reproductive toxicants in deterioration of semen quality as well as inducing oxidative and DNA damage in sperm. Free radical generation induced by various lifestyle factors and reproductive toxicants might be associated with the impairment of semen quality .[6]

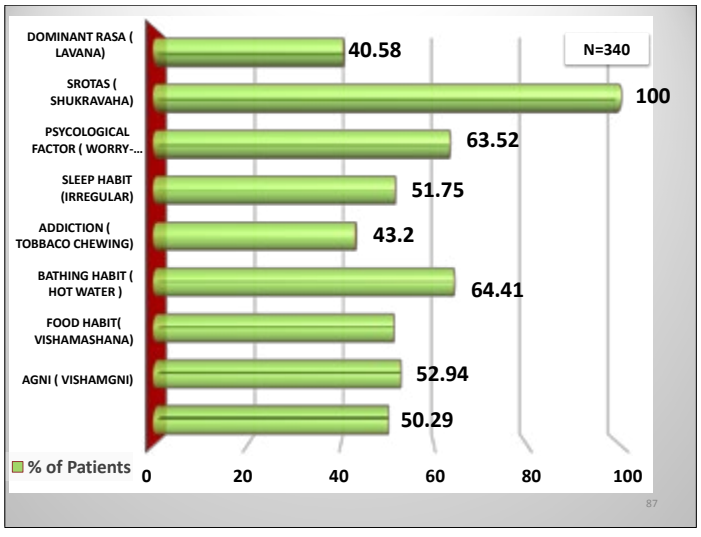
Religion wise distribution of the subjects showed that most of them belonged to the Hindu community, followed by the Muslim community. From this data it cannot be inferred that the problem is more predominant among the Hindus as this was due to the geographical predominance of Hindu community in the area.

Socio-economic status: Majority of the patients were belonging to poor socioeconomic class (51.17%). These category of patients select public hospitals because they are unaffordable to current costly private diagnostic and medical facilities. Persons in the conditions of poverty, eat less nutritious cheaper food which are usually *Vata* provoking. It is also noted that malnutrition causes hypogonadism which lead lto decrease of leydig-cell function which cause reduce stimulation of LH ultimately resulting into decrease testosterone secretion causing oligozoospermia.[7] This is supported by findings that very low caloric or protein deficiency causes hypogonadism and decreases the function of Leydig cell, which may resulting into hampered testosterone secretion and further leads to infertility.[8]

Occupation: Majority of the subjects 42.94% were labour.It is believed that the workers who are working in hot temperature zone are more prone to testicular hyperthermic changes. Further a decrease in sperm output in testicular hyperthermia has also been reported.[9] Workers (factory labour) who are working in hot temperature zone are more prone to testicular hyperthermic changes. Further a decrease in sperm output in testicular hyperthermia has also been reported. In situations of extreme heat, the scrotum's natural cooling mechanisms may be insufficient to prevent a rise in testicular temperature. The increased testicular temperature may affect both the quality and quantity of sperm produced. Drivers are thought to be at greater risk of infertility because long periods of sitting can increase testicular heat, as the testicles are insulated by the thighs whilst a man is seated.[10]

Discussion on personal history:

Figure-2: General observation- Personal History



Nature of work: Maximum number of patient (50.29%) were doing heavy physical exertion like a daily lifting of heavy weight or working under direct strong sun heat or furnace. The sun has actually been linked in a positive way to testosterone, indicating that can help to create a healthier sperm count by having some natural exposure to the sun. However, don't overdo it. Overheated testicles create a reduced sperm count.[11]

Men who took part in physical activity for at least seven hours each week had higher concentration of sperm in their semen. Researchers found that one form of outdoor exercise actually can decrease male fertility Men who lift heavy weights or spend time working or exercising outdoors more than ten hour tended to have a lower-than-average sperm concentration in their semen.[12]

Agni: The 52.94% of patients in the present trial were having *Vishamagni*, probably because of comparative hyperactivity of *Vata* on *Agni*. It may leads to *Vata Prakopa* and vitiated *Agni* causing *Amottpati*, ultimately improper formation of *Dhatu* causing *Shukra Kshaya*, which can also be correlated with vitiation of *Apana Vata.*

Food Habit: Majority of the patients were having faulty food habits (*Vishamashana*) in leading improper formation of '*Rasa*' and subsequently irregular *Dhatu* metamorphosis. The data is also suggestive of the current trend of life style and food habits in present day life style. Majority of patients were vegetarians.

All these factors may result into *Vata* or *Pitta Prakopa* which may directly or indirectly produce *Shukra Kshaya*.

Bathing Habit: Majority of patients had habit of hot water bath 64.41% and habit of wearing tight undergarment pattern observed 75.29%. Studies have reported that regular use of hot bath or sauna bath as a cause of temporary infertility as it impairs spermatogenesis. All the factor like hot bath, exposure to excessive heat, use of synthetic and tight fitting garment which are associated with higher scrotal and testicular temperature hamper spermatogenesis ultimately causing oligozoospermia.[13] Testicle of man cannot function properly if the testicular temperature is hotter or equal to the temperature of body. If the testicular temperature is raised to 98 degrees, sperm production is hampered and sperm requires a lot of time to grow. Exposure to hot water usually takes at least three to nine months to sperm able to function normally again. [14,15,16]

Addiction: Majority of the patients were addicted 43.2% to chewing tobacco followed by 36.17 % having addiction of smoking tobacco. Excessive use of tobacco hampers the normal digestive pattern resulting into malnourish state ultimately resulting into oligozoospermia. A study of infertility evaluation of Indian man who were addicted to tobacco chewing has reported its use with decrease in sperm quality. Cigarette smoke has also effects on spermatogenesis which may be due to toxic substances in the cigarette or the histologic reactions due to hypoxemia induced by smoke.

Sleep habit: 51.75% of the patients were having reduced and disturbed sleeping pattern. This may be due to the worry about the problem and is an indicator of vitiation of *Vata* and hampered function of *Shukra Dhatu* by *uttarottara Dhatu Kshaya* leads to *Shukra Dhatu Kshaya*. Sleep curtailment has been shown to lead to reduced levels of circulating androgens in healthy men and male rodents, and this highlights the biological significance of sleep homeostasis for endocrine regulation. [17]

Psychological factor: Majority of patient 63.52% having psychological factor like stress and worry which factor have been listed as cause of *Ajirna* and hampers metabolism, ultimately causing Oligozoospermia. Experimental studies show that there is suppression of hypothalamic testicular suppression due to stress which results in deranged spermatogenesis leading to oligozoospermia.[18] According to classics, *Chinta* (Stress / Anxiety neurosis), *Shoka* (depression) *Bhaya* (fear) *Avishwa*, *Krodha* (jealous) and *Abhichara* are told as causative factors of *Shukra* and *Shukravaha Srotodushti*. It is claimed that the mental stress constitutes the major part of unknown reasons leading to problems of infertility. Scientists suggest that, stress boost the level of stress hormones – glucocorticoids such as cortisol - that inhibits main sex hormone, gonadotropin releasing hormone (GnRH), and subsequently suppresses sperm count, ovulation and sexual activity. [20]

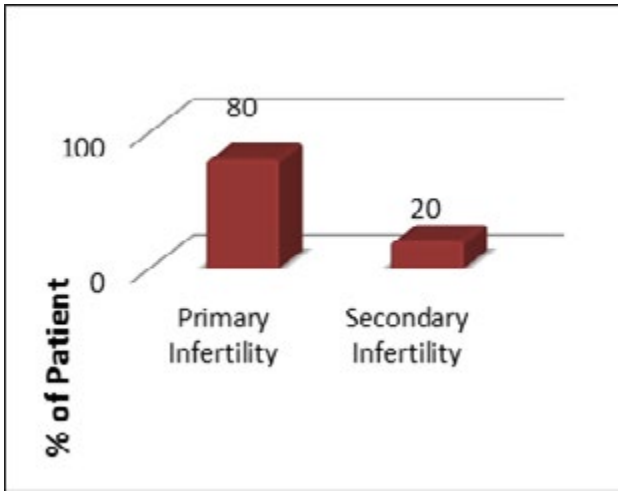
In the present study *Vata Pitta Prakruti* patients was observed in 56.47%. *Vataprakriti Purusha* by nature has low status of *Shukra*. The quickness in all activities is a physiological feature of *Vataprakriti* and hence *Vata Prakriti* individuals are prone to oligozoospermia. *Pittaprakriti Purusha* also possess *Alpashukra* by virtue of *Katu-Amla Rasa* of *Pitta Dosha.*

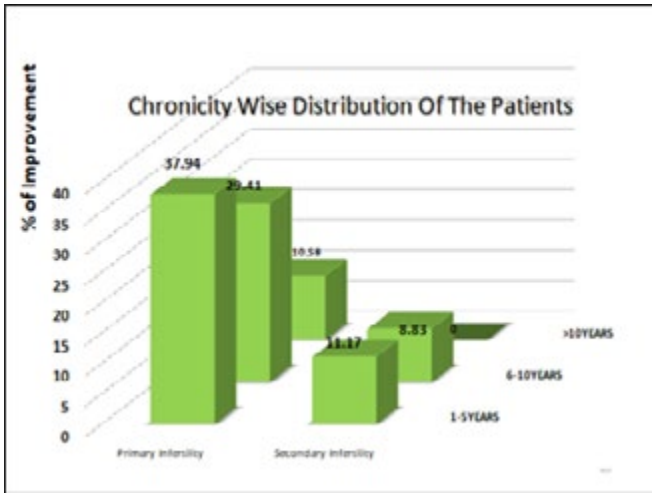
Dietary Habits Rasa dominancy, and Type of Diet: Majority 40.58 % and 28.82% patients had *Lavana* and *Katu Rasa* prominence diet respectively. In Ayurvedic classics, excessive intake of *Lavana, Amla, Kshara* are *Nidana* of *Shukravaha Srotas.*[24] The study reports low sperm count in the low salt diet, increased abnormal sperm cells in

low salt and high salt diet as well as oxidative stress in the epididymis of both low salt and high salt diet. These suggest that both high salt and low salt diet might play a negative role in the fertility of male rats.[25]

Srotas: In this clinical study, 100% Patients had the involvement of *Shukravaha Srotas*. 56.47% of patients had involvement of *Rasavaha Srotas*, 35.88% of Patients had the involvement of *Purishvaha Srotas*, while 7.05% had that of *Mutravaha Srotas* involvement. This supports the classical statement that this condition arises by affect on bother all the *Dhatus* along with *Shukra Dhatu* resulting due to *Dhatwagni Mandhya* occurring due to the *Uttarottara Dhatu Poshana* leading to *Ksheena shukra*. [26]

Type of Infertility and Its Chronicity: Majority (80%) patients had Primary Infertility while 20% patients had Secondary Infertility. In present study, Primary infertility was reported from 1-3 years duration in 37.94% patients, 4-6 years in 29.41% patients, 7-10 years duration in 10.58% patients and more than 10 years in 2.05% patients. Whereas in Secondary Infertility was reported between 1-3 years duration in 11.17% patients, 4-6 years in 8.83% patients. After unsuccessful attempts, most secondary infertile patients drop the intention to have next child due to expenses and availability of time. Primary infertile patients repeatedly visit different hospitals in the hope of child. In a study conducted in India revealed that seventy-five per cent of couples had duration of infertility of more than two years prior to embarking on investigations.





Conclusion

Modified and urban lifestyle and increased stress levels have started to take a toll on everyone's mental and physical health. Also day-to-day unhealthy dietary habits, working stress, environmental factors i.e. increased temperature, sleep disturbance affect the male sexual activity leads to fertility problems. Hence, modification in the diet and life style of infertile patients in accordance to traditional system of medicine can prevent the disease related to male reproductive system i.e. Oligozoospermia (*Ksheena Shukra*) and infertility.

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Case Report

Ayurvedic management of Bala Pakshaghata (Childhood Hemiplegia): A Case Report

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Abstract

A seven year old boy attended the Kaumarabhritya OPD of All India Institute of Ayurveda with chief complaints of weakness in the left side of the body, difficulty in walking with speech difficulty along with intentional coarse tremors in the left hand. The patient was diagnosed with Recurrent (PCA territory) stroke with Broca's aphasia three years back. He had multiple episodes of generalized tonic clonic seizures needing emergency hospitalization for one month following recurrent stroke 3 years back. Physical examination showed weakness in the left upper and lower limbs with no atrophy. Neurological examination revealed normal tone in all the four limbs, power was decreased in left upper and lower limbs. Deep tendon reflexes were sluggish in the affected limb. Babinski sign was positive unilaterally on left leg. His sensory functions were normal. Finger – nose test and Heel – shin test were positive, Dysdiadocokinesia and Dysmetria were present in left side. MRI Brain revealed chronic infarcts in right thalamic, cerebellar and mid brain region. EEG report showed Right frontal epilepsy. The patient was taking Acetylsalicylic acid 100 mg HS and Tab. phenytoin75 mg OD for the past three years. The patient was admitted in the Kaumarabhritya IPD, and was managed with internal medications and Panchakarma based procedures. The FUGL-MEYER Assessment scale was used to score the post stroke physical performance before treatment and at the time of discharge. The patient got significant improvement after the treatment.

Keywords: Stroke, Broca's Aphasia, *Panchkarma, Ayurveda*

Introduction:

The term *Pakshaghata* literally means paralysis of one half of the body. Here "*Paksha*" denotes the half of the body right or left and "*Aghata*" means injury or impairment, it may be of the impairment of *Karmendriya, Gyanendriyas* or *Manas. Gyanendriyas* are considered as part of the *Sangnavahasrotas* (sensory system) and *Karmendriya* are considered as part of the *Cheshtavahasrotas* (motor system) and *Manas* is supposed to control and guide the both, *Gyanendriya* and *Karmendriya*[1]. The disease *Pakshaghata* is explained and well explored in all the *Brihatrayees*. *Acharya Charaka* categorized *Pakshaghata* as a *Vatavyadhi* of *Nanatmaja* variety[2] and *Sushruta* categorized *vatavyadhi* as *Mahagada*[3].

Pakshaghata can be correlated with hemiplegia which is the commonest manifestation of cerebrovascular accident (stroke)[4]. Stroke is defined by the world health organization as a clinical syndrome consisting of rapidly developing clinical signs of focal disturbance of cerebral function lasting more than 24 hours or leading to death with no apparent cause other than a vascular origin[5]. The burden of lifestyle disorders are increasing day by-day, and stroke is the one among them. It is the 3rd most cause of death and disability world-wide[6] and the prevalence of stroke in India is approximately 40- 270 per 100000 people[7].

Here is a case study of a child suffering from *Bala Pakshagata* (childhood hemiplegia) due to Recurrent (PCA territory) stroke with Broca's aphasia, who has shown a remarkable improvement with Ayurvedic treatment.

Case Report

A 7 year old boy attended the *Kaumarabhritya* OPD of All India Institute of Ayurveda with chief complaints of weakness in the left side of the body, difficulty in speaking along with intentional coarse tremors in the left hand for 3 years.

He was delivered through normal vaginal delivery at hospital. There was no history of birth asphyxia or pathological jaundice. Vaccination was completed up to the age. His growth and development milestones were appropriate for age.

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At the age of 3 years 7 months, he had sudden fall in the school followed by inability to move left lower and upper limb with deviation of mouth to left side. No history of preceding seizure, vomiting, fever. Non Contrast Computerized Tomography (NCCT) head was normal and didn't show any abnormality. MRI brain showed acute infarct in right thalamus. Over a period of one month, he had improvement in power of left side in the form that the child could do cycling. 45 days later he had occasional tremulousness movements of bilateral upper and lower limbs preceding two episodes of vomiting.

On 19/11/2014, he had multiple episodes of seizures following which the child went in minimally conscious state and admitted in emergency. CT head revealed acute infarct in right cerebellum and basal ganglia with compression of fourth ventricle and aqueduct causing mild obstruction hydrocephalus.

On 20/11/2014 he was referred from Pushpanjali Hospital and Research center, Agra to AIIMS, New Delhi on mechanical ventilator for further management. He was treated in the AIIMS emergency and later shifted to Safdurjung Hospital. The child remained in minimal conscious state during the emergency treatment and transfer. He remained admitted in ICU for 21 days. Doppler carotid study was normal. Coagulation profile was also normal. He was advised regular physiotherapy and speech therapy upon discharge. He was given Tab. Phenytoin75 mg. OD and Tab. Acetyl Salicylic acid 100 mg. HS.

On 24/12/2014 MRI brain revealed right side pons, thalamic, cerebellar and right midbrain chronic infarcts. He was diagnosed with Recurrent (PCA territory) stroke with Broca's aphasia, leading to left hemiparesis and left facial palsy.

A detailed physical examination showed weakness in the left upper and lower limbs with no atrophy. Respiratory, Cardio-vascular and Genito-Urinary system did not show any abnormality. Per abdomen examination was normal. Neurological examination revealed normal tone in all 4 limbs, Power in upper right limb-4/5, Left limb-4/5, lower right limb 4/5, left limb 3/5. Deep tendon reflexes were sluggish in the affected limb. Babinski sign was present unilaterally (left). His sensory functions were normal. Finger – nose test, Heel – Shin test was positive, dysdiadochokinesia, dysmetria was present in Left side. He had hemiplegic gait.

The FUGL-MEYER Assessment was used to score the post stroke physical performance before treatment and at the time of discharge.

Management of the Condition:

The patient was admitted in the *Kaumarabhritya* IPD Ward, AIIA on 21/12/2017. *Panchakarma* procedures with oral medications were planned considering the involved *Doshas*.

- *Rukshana* therapy comprising of *Udwartan*[8] (Dry Powdered massage) for three days, followed by *Sarvanga Abhyanga* and *Nadi Sweda* for 21 days. *Matra Basti*[9] was done for fourteen days followed by *Shirodhara* with *Ksheerbala taila* for fourteen days.
- *Udwartana* was done with *Kolakulatthadi churna*[10] that was made warm and rubbed firmly all over the body for 20 to 25 minutes.
- *Sarvanga Abhyanga* was done with *Ksheerbala Taila* 11 for 20 minutes, followed by *Nadi Sweda* with *Dashmoola Kwatha* 12 for 10 minutes.
- *Matra Basti* 20 ml with *Ksheerbala taila* was given for 14 days in combination with *Sarvanga Abhyanga* and *Nadi Sweda*.

Table 1: Intervention

PANCHKARMA INTERVENTION	
22.12.2017 -24.12.2017	*Udwartana* with *Kola Kulathadi Choorna*
25.12.2017– 14.01.2018	*Sarvanga Abhyanga* with *Ksheerbala Taila* + *Sarvanaga Nadi Sweda* with *Dashmoola Kwatha Churna*
01.01.2018– 14.01.2018	*Matra Basti* with *Ksheerbala Taila*
05.01.2018– 18.01.2018	*Shirodhara* with *Ksheerbala Taila*

ORAL MEDICATION					
Duration	**Medicine**	**Dose**	**Frequency**	**Anupana**	**Remarks**
22.12.2017 – 18.01.2018	*Chitrakadi Vati*	250 mg	TID	Warm Water	After Food
	Gandharva Hastadi Kwatha	10 ml	BD	-	Empty Stomach
	Lavana Bhaskar Churna	3 gm	TID	Warm Water	Before Food
	Taleeshadi Churna	3 gm	QID	Honey	Before Food
	Laxmi Vilas Rasa			Honey	
22.01.2017 – 05.01.2018	Cap. Palsineuron (Mahavatvidhwans, Sameerpannag, Ekangveer Ras etc)	1 Cap	BD	Honey	After Food

Assessment: The criterion of assessment was based on the FUGL-MEYER13 Assessment scale and was done on the first day of starting treatment (21.01.2017) and at the time of discharge (18.01.2018).

The total score obtained before treatment was 52 and at the end of treatment was 88 out of 124. The patient got marked improvement during the course of the treatment.

	Pre Treatment Score	**Pre Treatment Score**	**Max. Score**
Motor Function Upper Extremity	**13**	**38**	**66**
Motor Function Lower Extremity	**15**	**26**	**34**
Total Motor Score	**28**	**64**	**100**
Sensation Score	**24**	**24**	**24**
Total Motor and Sensory Score	**52**	**88**	**124**

Discussion

Hemiplegia is the commonest manifestation of a 'stroke' with neurological deficit affecting the face, limbs and trunk on one side or either side of the body. In Ayurveda, it is described under "*Pakshaghata*" or "*Pakshavadha*" where *Vata* after getting aggravated, dries up the *Sira* and *Snayu* (tendons) of one half of the body, making that side incapable of functioning with or without loss of sensation.[14] The general principle of treatment of *Vata Vyadhi* was followed in this case which includes *Snehana, Swedana, Mridu Sodhana*.[15]

The present case study deals with the efficacy of Ayurvedic treatment in chronic case of left side hemiparesis caused due to stroke. Patient has been taking anti-convulsants before starting Ayurvedic treatment and those medicines were continued during the course of treatment.

Patient has features of *Aama* i.e. *Agni sada, Aruchi, Vivandha* and *Tandra*. Based on these features oral medications were started for *Pachana, Vatanulomana* and bringing back the *Niraamavastha. Rukshana* therapy involving *Udwartana* was carried out to eliminate the *Kaphaja Lakshanas. Sarvanga Abhyanga* (Oleation / *Snehana*) with *Ksheerbala taila* along with *Swedana* was done to promote muscle strength of the whole body especially the affected side. It also helps in the *Shaman* of *Vata Dosha*.

Matra Basti with *Ksheerbala Taila* (20 ml) was performed for 14 days. *Matrabasti* promotes strength, without calling for any strict regimen of diet and also causes easy elimination of *Mala* and *Mutra*. It performs the function of *Brimhana* and cures *Vatavyadhi*.[16]

Vagbhattasays the *Virya* of *Basti* is conveyed to *Apana* and then to *SamanaVata*, which may regulate the function of *Agni*. It then goes to *Udana, Vyana* and *Prana*, thus providing its efficacy all over the body. At the same time *Basti* by Pacifying *Vata*, Restores the disturbed *Kapha* and *Pitta* at their original seats and thus helps in breaking the pathogenesis.

Thus according to Ayurveda, the ingredients used in the *Basti*, through their potency gets absorbed and then, through the general circulation, reaches at the site of the lesion and relieves the disease.[17]

Shirodhara with *Ksheerbala Taila* was done for 14 days for 30 minutes. *Shirodhara* is a therapy which pacifies the aggravated *Vata Dosha* in *Shira* which helps in relaxing the nervous system. It balances the *Pranavayu* around the *Shira*.[18]

Results

The combination of oral medications and *Panchakarma* therapies provided significant relief to the patient. The hemiplegic gait was corrected. Speech improved significantly. Increase in the strength of the affected left lower and upper limb was found at the end of the treatment. The increase in the after treatment score assessed on FUGL-MEYER Assessment scale shows the efficacy of Ayurvedic management in the treatment of hemiplegia or hemiparesis with significant outcomes. The options of fully treating hemiplegia/hemiparesis due to stroke are limited in contemporary science. Ayurveda has the potential to be the primary management in the cases of hemiplegia along with use of allopathic drugs. The treatment plan followed in this case was just an initial step and the results obtained are highly encouraging.

Conclusion

Acharya Charaka, Sushruta and *Vagabhata* have described *Vatavyadhi* as *Mahagada* or *Maharoga* and it has been also told that all *Maharogas* are *Dushchikitsya* in nature. *Pakshaghata* is also a type of *Vata Vyadhi*. Combined therapy (Oral Medications and *Panchakarma* therapies) gave promising results in this case of *Pakshaghata*. The result observed in this case was encouraging.

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Conflict of Interest: None Declared.

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Case Report

Clinical evaluation of the effect of Kukkutanda Swedana and Nasya along with Samanausadhi in the management of Bell's Palsy (Ardita Vata): A Pilot Study

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Abstract
Bell's palsy is the commonest disorder of facial nerve causing unexplained unilateral isolated facial weakness. The exact pathogenesis is still not clear and the effect of treatment in the contemporary system of medicine is also controversial. Similar condition is explained in Ayurvedic literature in the name of *Ardita* which is mentioned as a nanatmaja vata *Vyadhi*. In the present clinical study with pre-test and post-test design, 12 patients suffering from Bell's palsy were selected after initial screening. *Kukkutanda swedana* and *Anutaila nasya* was administered for 14 days. *Yogendra ras, Ekangaveer ras* and *Cap Ksheerabala* 101 *avarti* as *Samana ausadhi* was given throughout the treatment period and follow – up period. Patients were observed for a total period of 30 days with assessment on 0-day and 30th day. The assessment of results was made by adopting the standard methods of international scoring (Sunnybrook facial grading system and House Brackman facial grading system). After statistical evaluation significant improvement was observed in the parameters which indicate the effectiveness of the therapy.
Keywords: *Anutaila nasya, Ardita,* Bell's palsy, *Kukkutanda swedana*.

Introduction:
Bell's palsy is an acute onset peripheral (LMN) facial weakness of unknown cause and the diagnosis can be established without difficulty in patients with unexplained unilateral isolated facial weakness. The onset is sudden and the symptoms reach its peak within few days. Additional symptoms may include pain in or behind the ear, numbness or tingling in the affected side of the face, hyperacusis and disturbed taste on the ipsilateral anterior part of the tongue.[1] The motor deficit is almost always unilateral in Bell's palsy, with both upper (fore head) and lower parts of the face affected.[2] If forehead strength is preserved, a central (UMN) cause is suspected.[3]

Bells palsy is the most common disorder affecting the Facial Nerve and is responsible for 80% of all facial mono neuropathies.[2] Epidemiological studies report that Bell's palsy affects 11-40 individuals per 100,000 every year[4] with highest incidence usually in the 15 to 45 year age group[5] and either sex is affected equally.[1] Left and right sides of the face are affected equally.[6] The disease frequency increases in winter and fewer cases are generally reported in summer.[7]

Despite of extensive study of the condition, the exact pathogenesis of Bell's palsy is still controversial. Infection (herpes simplex type – 1),[8] nerve compression[9] and auto immunity[10] may all play a role, yet the exact influence of these factors remains unclear. Without intervention, approximately 70% patients get full recovery.[11] In the contemporary system of medicine drug treatment is controversial with most sources recommending a combination of corticosteroids and anti viral medication.[12] Some studies show that early treatment with prednisolone can hasten recovery and reduce long term sequelae and there may be some added benefit in adding anti viral with prednisolone[13] but the quality of evidence is low to moderate.[12]

In Ayurveda, the same condition is mentioned as *Ardita*, which is considered as one of the eighty *nanatmaja vata vyadhi. Sushruta* mentioned that due to different vitiating factors when vata dosha gets vitiated and takes shelter in the *sandhi* (joints) present in *shira* (head), *nasa* (nose) *ostha* (lips), *chibuka* (chin), *lalata* (fore head) and *ekshana* (eye) and makes the face *vakra* (deviated) toward any side, the condition is called *Ardita*. He has further added that there may be involuntary movement of the head (*shiraschalati*), speech abnormality (*vak-sanga*), abnormality in the eyes and other parts of the effected side of the face, pain in the effected side especially over the jaw and cervical area.[14] *Vagbhata* in *Astanga Hridaya* further added about the abnormal movement of the eye and eye lid (*stabdha netrata*) and probable altered perception of smell and hearing in the effected side. In the effected side there may be dribbling of saliva from the angle of the mouth and improper closure of the effected eye.[15]

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Madhavakar has just simply followed the description of *Sushruta* in this regard.[16] While describing *Ardita, Charaka* has mentioned its association with *Pakshaghata* and commented that it may affect only the half side of the face and the ipsilateral hemiparesis may also be there along with facial involvement.[17] *Charaka's* description of *Ardita* seems to include both idiopathic peripheral facial paralysis and post CVA hemiparesis with 7th cranial nerve palsy.

In *Ardita, Navana nasya*, application of *Murdhni taila (Shiro-abhyanga, Shiro seka, Shiro pichu, Shiro vasti)*[19], *Tarpana (srotra – akshi tarpana)*[20], *Nadisweda* (specially *ksheera dhuma*)[21] and *Upanaha* using *anupa mamsa* is advised as the main line of treatment.[18]

According to *Sushruta Ardita* with more than three years of chronicity becomes incurable.[14]

Aims and Objectives

To assess the effect of *kukkutanda swedana* and *nasya* along with *samanausadhi* in the management of Bell's palsy (*Ardita vata*)

Materials and Methods

Materials:

For *mukhabyanga*: *Mahamasha taila*[22]

For *Kukkutanda sweda*[23]:

1. *Kukkutanda* (hen's egg)
2. *Jambira* (lemon)
3. *Tila taila* (sesame oil)
4. *Saindhava* (rock salt)
5. Cotton cloth (18" x 18")

For Nasya: Anu taila[24], dhuma varti

Shamana ausadhi:

1. *Yogendra ras*[25]
2. *Ekangaveer ras*[26]
3. *Cap Ksheerabala* 101 *avarti*[27]

Method

Source of data: The patients attending the OPD and IPD of Panchakarma department, Ayurveda Hospital, NEIAH, Shillong were screened and registered for the study after fulfilling the inclusion and exclusion criteria.

Inclusion criteria:

- Patients of all age groups
- Patients fulfilling the diagnostic criteria of Bell's palsy

Exclusion criteria:

- Uncontrolled Diabetes mellitus
- Severe metabolic disorders
- Uncontrolled Hypertension
- Psychiatric disorder
- Malignancy
- Epilepsy
- Space occupying lesion of brain
- Cerebro-Vascular Accident (stroke)
- Central (Upper Motor Neuron) Facial Nerve palsy
- Chronicity more than three (3) years

Diagnostic criteria:

Diagnosis was made based on the clinical features of Bell's palsy.

Investigations:

Hemogram, selective biochemical tests including Blood Sugar Levels (Fasting and Postprandial), Liver Function Test, Renal Function Test, Urine Routine Examination, Thyroid profile were carried out before treatment to exclude other conditions.

Drug preparation and administration:
Procedure of *Kukkutanda swedana* and administration of *Anu taila Nasya*, were done following classical references and traditional practices. *Yogendra ras*, *Ekangaveer ras*, cap *Ksheerabala* 101 *avarti, Mahamasha taila* were procured from GMP certified company.

Procedure of *Kukkutanda sweda*:
50 ml *Tila taila* is taken in a frying pan and made hot; 12 eggs are fried and mixed with 10gm *saindhava lavana*. After that six *jambira* are cut into small pieces and added. Two *pauttalis* are made by this mixture.

After *mukhabhyanga* with *Mahamasha taila, swedana* was done to the face and neck taking proper care of the eyes with these pauttali for 20 minutes.

Intervention:
The patients who were selected for the study were administered *Mukhabhyanga* with *Mahamasha taila* as a *purva karma* followed by *Kukkutanda swedana* along with *Anutaila nasya* for 14 days. From the very first day the *shamana* medicines were started. *Yogendra ras* 125 mg was given once daily in the morning in empty stomach with honey, *Ekangaveer* ras was given in the dose of 125 mg thrice daily after food with warm water. Cap *Ksheerabala* 101 *avarti*, one capsule was administered twice daily in empty stomach with warm water. All the *samana aushadhi* were continued for 30 days.

Assessment Criteria:
Patients were observed for 30 days. Assessment was done initially on '0' day i.e., before the medical intervention and on the 30th day. Assessment was done based on 1. Sunnybrook facial grading system[28,29] and 2. House Brackman facial grading system.[30]

Observation and result:
The assessment of results was made by adopting the standard international scoring methods specially designed for Bell's palsy (House Brackman Facial Grading and Sunnybrook facial grading system) and Paired - t test was used for statistical significance.

1. **Effect of therapy in terms of House Brackman Facial Grading:** The effect of treatment on the House Brackman Facial Grading scale after the treatment on the 30th day was extremely significant.

Table 1: Effect of treatment in terms of House Brackman Facial Grading on 30th day

N	MEAN ± SD		MD	t	p
	0 - day	30th day			
12	3.667±0.888	1.833±0.577	1.833	8.848	<0.0001

2. **Effect of treatment in terms of Sunnybrook Facial Grading:** The effect of treatment on the Sunnybrook Facial Grading scale after the treatment on the 30th day was extremely significant.

Table 2: Effect of treatment in terms of Sunnybrook Facial Grading on 30th day

N	MEAN ± SD		MD	t	p
	0 - day	30th day			
12	24.750 ±8.604	54.667±6.946	29.917	10.952	<0.0001

Discussion
In the present study among 12 patients, 7 patients were males and 5 patients were females. 2 patients were of the age group of 20 years to 30 years, 5 patients were 30 to 40 years, 2 patients were 40 to 50 years and 3 patients were above the age group of 50 years. Only one patient came within seven days of onset. Two patients were having the disease for more than seven days but less than one month. Four patients were suffering for more than one month but less than six months, three patients were suffering for more than six months but less than a year and two patients were having chronicity of more than one year.

Among 12 patients 10 patients gave history of previous treatment for the condition mainly using corticosteroid and antiviral. 2 patients did not take any other treatment earlier for this condition.

Five patients have given history of exposer to cold air while travelling before developing the condition while

seven patients did not give any such specific history.

After treatment better improvement was observed in patients who had lesser chronicity of the disease. Patients with lesser age showed early and better response to the treatment on the other hand in patients with more than 40 years of age the improvement was slow.

Conclusion

In the present study twelve (12) patients suffering from Bell's palsy were treated with *Kukkutanda swedana* and *Anutaila nasya* along with *Samana ausadhi*. Patients were followed for a total period of one month. The observations and results were analysed statistically and significant improvement was found. So it can be concluded that this treatment modality is effective in the management of Bell's palsy. No major adverse or side effects were encountered during this treatment period. In this study, as the sample size is very small, so similar study with a big sample size and with a control group is needed to establish this treatment modality in the management of Bell's palsy.

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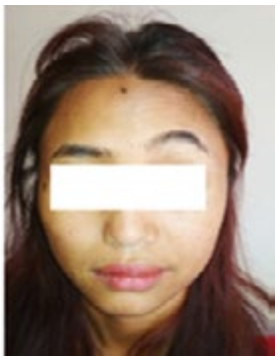
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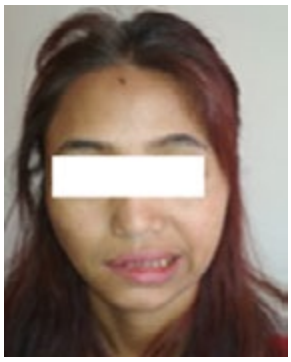
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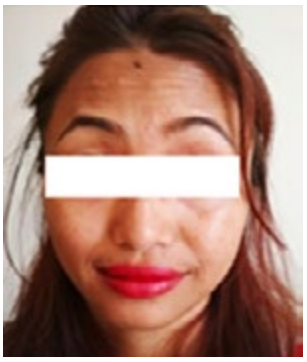
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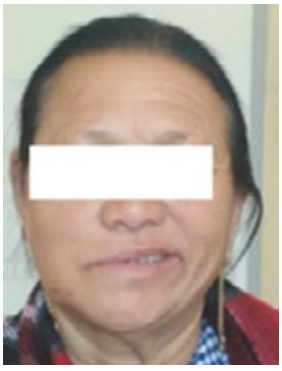
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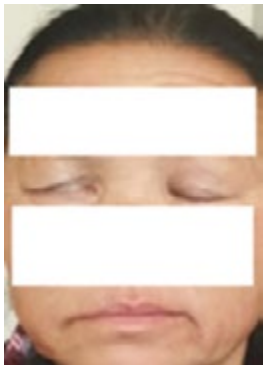
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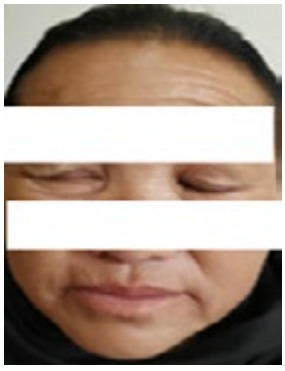
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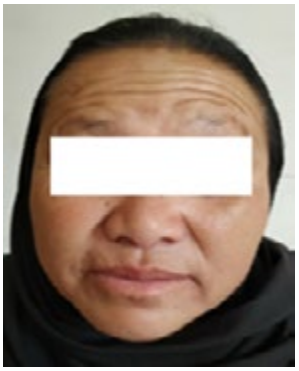
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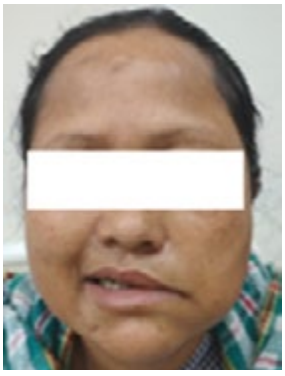
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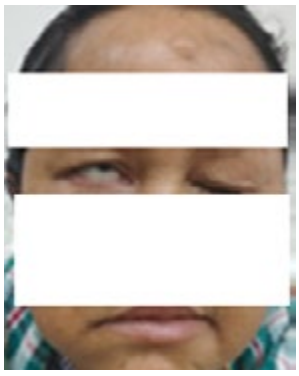
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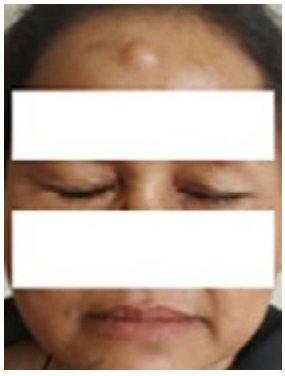
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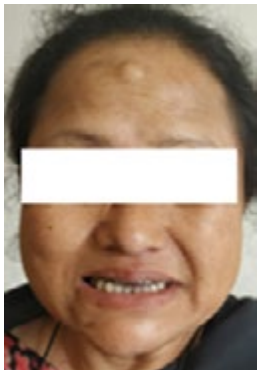
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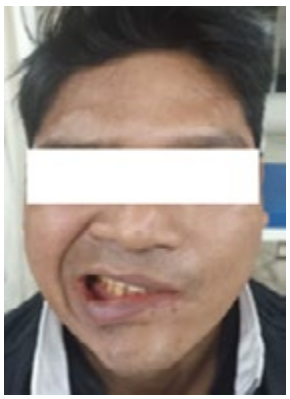
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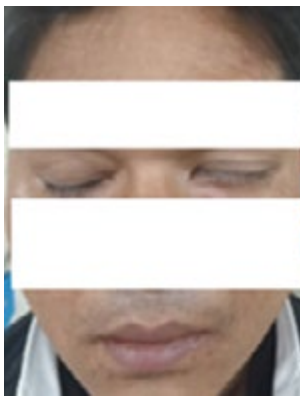
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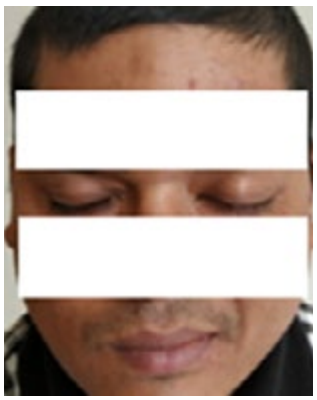
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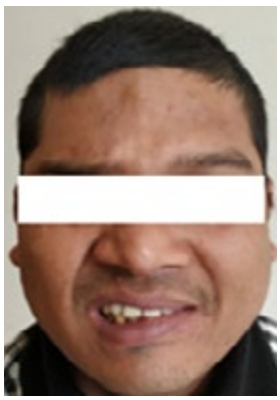
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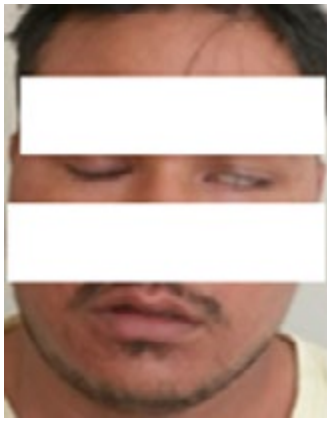

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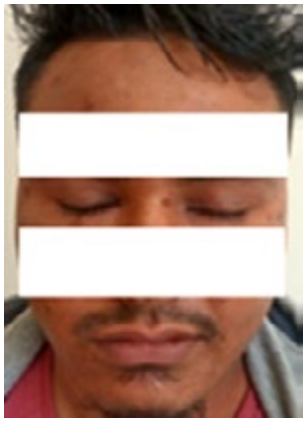

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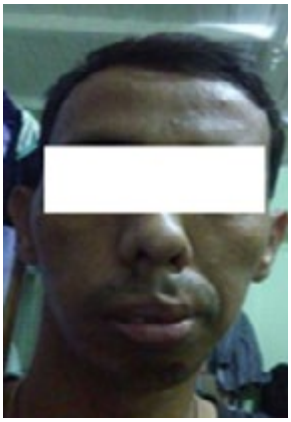

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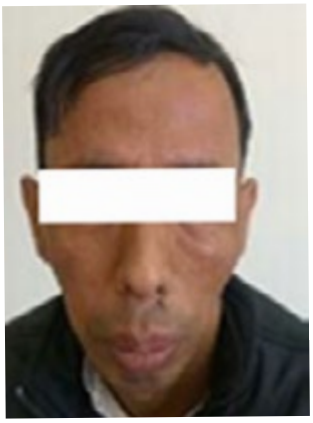

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3. Issue with supplement: Payne DK, Sullivan MD, Massie MJ. Women's psychological reactions to breast cancer. Semin Oncol 1996; 23(1, Suppl 2):89-97.
4. Books and Other Monographs
    - Personal author(s): Ringsven MK, Bond D. Gerontology and leadership skills for nurses. 2nd ed. Albany (NY): Delmar Publishers; 1996.
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1. Journal article on the Internet
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2. Monograph on the Internet
   Foley KM, Gelband H, editors. Improving palliative care for cancer [monograph on the Internet]. Washington: National Academy Press; 2001 [cited 2002 Jul 9]. Available from: http://www.nap.edu/books/0309074029/html/.

3. Homepage/Web site
   Cancer-Pain.org [homepage on the Internet]. New York: Association of Cancer Online Resources, Inc.; c2000-01 [updated 2002 May 16; cited 2002 Jul 9]. Available from: http://www.cancerpain.org/

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