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TO STUDY THE EFFECT OF PRANAYAMA ON RAKTBHARA (HYPERTENSION)

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ABSTRACT

A healthful long life of 100 years has been the cherished wish of human race from antiquity. Ayurveda is a comprehensive science of life developed to ensure 'Arogya' i.e. healthy life in all its dimensions, which was considered essential for achieving the four instincts of life- Dharma, Artha, kama, Moksha. Ayurveda deals with the total psycho-spiritual somatic entity and stands for the relief of all the three categories of miseries viz. adhyatimika, adhidavika and adhibhautika. Yoga and Ayurveda are allied disciplines. Both have advocated mantra, japa, samadhi etc as the mean of achieving their objectives. In the modern era, human life is full of various mental stresses and strains. Struggle for existence give rise to increased mental stress and the end results of all this is mental ill health diseases like hypertension, diabetes and other psychosomatic diseases. The 21th century is described as the age of anxiety and stress. The modern man is constantly facing symbolic stress. This stress and strain of day to day life affects one's bodily organs through several psycho-physical mechanisms. The progress of medical science has helped us to eradicate disease like plague, smallpox etc., but stress related diseases are rapidly increasing. Among the several psychosomatic diseases, the cardiovascular disorder like Hypertension is quite significant. 'Hypertension' (persistent raised arterial pressure) although, the handy literature is not observed in Ayurvedic classic, review of previous theoretical and clinical works on this topic point out certain mode of involvement of dosha and Dushya in the genesis of it. Most of the efforts show a prime role of vata in association with remaining dosha pitta and kapha. Also, Charak opined to treat such disease without nomenclature by judging the involvement of dosha Dushya only (Cha.Su.20). The term Essential Hypertension is reserved for about 95 %

of hypertensive's, in which no immediately evident underlying renal or adrenal cause can be found for the raised Blood Pressure. It can be only detected on routine medical check-up or when patient goes to hospital with its dangerous complications like stroke, angina, myocardial infarction etc. Hypertension is a instrumental diagnosis that became apparent to modern physicians only in late 19th century when Riva rocci & Korotokoff joined stethoscope to sphygmomanometer to produce a non-invasive reliable technique of blood pressure measurement probably that's why no direct reference of hypertension is found in Ayurveda which is almost 5000 years old but this disease no doubt must had been occurred in ancient times may be not in the same frequency and intensity. Ayurveda being a life science has evolved over the years and new diseases were identified and described by later Ayurvedic scholars e.g. the diseases like Amavata and Annadrava shula and Parinama shula described by madhavkara as disease for the first time in 19th century, in his commentary madhava nidana. Similarly the disease phiranga is described in 16th century for the first time by bhavmishra in his commentary Bhavpraksha after the invasion of Indian soil by foreigners. Similar attempts are made by Ayurvedic scholars to describe hypertension on Ayurvedic fundamentals with the help of modern knowledge about hypertension.

KEYWORDS: Ayurveda, Pranayama, hypertension, Yoga.

INTRODUCTION

Ayurveda and Yoga are the ancient disciplines designed to bring balance and health to the physical, mental, emotional, and spiritual dimensions of the individual. Yoga is often depicted metaphorically as a tree and comprises eight aspects, or ''limbs:'' yama (universal ethics), niyama (individual ethics), asana (physical postures), pranayama (breath control), pratyahara (control of the senses), dharana (concentration), dhyana (meditation), and samadhi (bliss). A growing body of research evidence supports the belief that certain yoga techniques may improve physical and mental health through down-regulation of the hypothalamic pituitary–adrenal (HPA) axis and the sympathetic nervous system (SNS). The HPA axis and SNS are triggered as a response to a physical or psychological demand (stressor), leading to a cascade of physiological, behavioral, and psychological effects, primarily as a result of the release of cortisol and catecholamine's (epinephrine and nor epinephrine). This response leads to the mobilization of energy needed to combat the stress through the classic ''fight or flight'' syndrome. Over time, the constant state of hypervigilence resulting from repeated firing of the HPA axis and SNS can lead to dysregulation of the system and ultimately

diseases such as obesity, diabetes, autoimmune disorders, depression, substance abuse, and cardiovascular disease.

There are numerous studies which have shown that yoga, especially Pranayama, have an immediate downregulating effect on both the SNS/HPA axis response to stress. Studies show that Pranayama yoga decreases levels of salivary cortisol, blood glucose, as well as plasma rennin levels, and 24-hour urine nor epinephrine and epinephrine levels. Pranayama significantly decreases heart rate and systolic and diastolic blood pressure. Pranayama reverses the negative impact of stress on the immune system by increasing levels of immunoglobulin A as well as natural killer cells. Pranayama has been found to decrease markers of inflammation such as high sensitivity C-reactive protein as well as inflammatory cytokines such as interleukin-6 and lymphocyte-1B.

Keeping in view the seriousness of the problem, an attempt has been made through this project to study the effect of Pranayama on hypertension to evaluate the lacuna i.e. to find out the possibilities related and associated with this topic for a safe and effective management by following the dincharya and the ritucharya in the light of modern science.

MATERIAL AND METHODS

References related to proposed title are collected from classical books of ayurveda, yoga books; various publications, books, library, modern books, Samhita, research papers, internet, webinars, patanjali yoga sutra, and proceedings of seminars related to topic are collected.

REVIEW OF HYPERTENSION

Hypertension is a disease of CVS. By going through the literature of ayurveda, we will find the detailed and scientific description of CVS system. The blood circulation is known to Indian scholars since the time of Veda the original root of ayurveda. Dhamanis are called so due to pulsations, Srotas due to porosity or leaking and siras due to swift flow. Due to these functional similarities Dhamanis can be compared with arteries, siras can be compared with veins and Srotas as perceived as the channels for transporting the dhatus undergoing metabolism. There are hundred of veins and thousand of arteries (Dhamanis) in the body these thousand of arteries and veins transverse through the whole body. They contain blood which reaches to all parts of the body be it in upper portion or lower portion or middle parts of the body. The flow of blood in the body resembles the flow of a river. The entire circulatory system and respiratory system is referred as hansa in Vedic literature.

Accordingly it is explained that wings of hansa resembles lungs, body resembles heart, neck, trachea and beak resembles larynx. The knowledge regarding blood circulation and CVS system is enriched during Samhita period of Ayurveda. It is during this period detailed scientific description of anatomy and physiology of CVS is described in ayurveda. Rakta is Drava Dhatu. Therefore it has natural property of flowing. To maintain the circulation up to end tissue, additional force is required which is provided by the contraction and relaxation of the heart. In Ayurveda three doshas Vata, Pitta and Kapha, seven Dhatus and three Malas are considered as the root cause of all the functions of body. According to Sushruta formation of heart of a foetus occurs by the essence of Kapha and Asruk. Therefore both Kapha & Asruk should be in its normal state to maintain the normal function of heart. Muscles of heart is nourished by the essence of Rakta. Kapha resembles properties like Oja, retain the Bala of heart, which is utilized for the Rasa Rakta Samhanana. Hridaya is considered as Chetana sthana. This principle also believed to similar with modern one. In modern science the movement of heart is considered myogenic, where as other muscles of the body only work after giving stimulation by nervous system. The heart is considered as a vital organ of the body, the words Mahat, Artha are synonymous. In Brihadaranyak upnishada, an intersting and remarkable description of hridya is incorporated. Physiology of the heart can be explained by its Vyutpatti The three Dhatus Hri, Da and Ya combinely form the word Hridaya that shows the three main functions of heart viz. Aharana (receives), Dana (gives) and Ayana (movement).

PHYSIOLOGY OF BLOOD VESSELS

Arteries and veins to some degree can regulate their inner diameter by contraction of the muscular layer. This changes the blood flow to downstream organs, and is determined by the autonomic. Vasodilatation and vasoconstriction are also used antagonistically as methods of thermoregulation. Oxygen (bound to hemoglobin in red blood cells) is the most critical nutrient carried by the blood. In all arteries apart from the pulmonary artery, hemoglobin is highly saturated (95-100%) with oxygen. In all veins apart from the pulmonary vein, the hemoglobin is de saturated at about 75%. The blood pressure in blood vessels is traditionally expressed in millimetres of mercury (1 mmHg = 133 Pa). In the arterial system, this is usually around 120 mmHg systolic and 80 mmHg. In contrasts, pressures in the venous system are constant and rarely exceed 10 mmHg**.** Vasoconstriction is the constriction of blood vessels, by contracting the vascular smooth muscle in the vessel walls. It is regulated by vasoconstrictors. Vasodilatation is a similar process mediated by antagonistically acting

mediators. The most prominent vasodilator is nitric oxide. Permeability of the endothelium is pivotal in the release of nutrients to the tissue. It is also increased in inflammation in response to histamine, prostaglandins and interleukins, which leads to most of the symptoms of inflammation.

YOGA, PRANAYAMA AND ITS BENEFITS

The word yoga is derived from the Sanskrit root ***yujira*** meaning to unite, to combine or to integrate union of the individual soul or consciousness with the cosmic, divine or supreme soul. According to *Patanjali*, Yoga is the state of ceasation of all fluctuations in the mental being. *Patanjali* describes in detail the art and science of *Astanga yoga* including a series of *Bahiranga* and *Antaranga.*

According to Ayurveda most of the diseases are Psychosomatic, they are related to both body as well as mind. It considers body and mind as two interrelated aspects of one unit. Similarly if the body is unhealthy and distressed, the mind does not remain unaffected. In fact, most of the bodily diseases are born out of conflicted and disturbed states of mind because the root of the bodily disease exists in the mind itself. Yoga, therefore it is an art which brings an incoherent state. It is the communion of the human soul with Divinity. Yoga is the science of human being in depth, the science of conscious evolution or the science of human possibilities. It is a unique science that it encompasses matter, life and consciousness in one sweep and bridges the gap between science and spiritually. Thus Yoga may be considered as a system of mental, physical and spiritual developments. According to Rele (1968) the ultimate aim of Yoga is to prepare the body to achieve that tranquility of mind which may be necessary for the realization of supreme.

Yoga is described in different ways in different contexts.

1. *Vaidic yoga*
2. *Jaina yoga*
3. *boudha yoga*
4. *Karma yoga*
5. *Gyana yoga*
6. *Bhakti yoga*
7. *Mantra yoga*
8. *Laya yoga,*
9. *Hatha yoga*

10. Raja yoga

The more practical approach as regards to ethics and art of Yoga has been described by Patanjali in his Yoga Sutras through Astanga Yoga. He describes eight steps on pursuit of Path of Yoga. These Astangas are also referred in certain Upanisads. These eight steps are:

1. *Yama* - Abstinences
2. *Niyama* - Observances
3. *Asana* - Body postures
4. *Pranayama* - Energy control
5. *Pratyahara* - Abstraction
6. *Dharana* - Concentration
7. *Dhyana* - Meditation
8. *Samadhi* - Absolute contemplation

Pranayama

It is the next important step in the practice of yoga. Tejobindu upanishada keeps Pranayama as step 4 in schedule of yoga practice. The astanga yoga of patanjali also considers Pranayama as step 4 in the comprehensive practice of yoga. The mandala brahama, amrtananda yogakundali, darsana and sandilyo upnisada describe the recaka, puraka and kumbhaka components of Pranayama sometimes in view of three dimensions Pranayama is considered ‘’trividh’. Ordinarily puraka refers to an input of atmospheric air inside the body and recaka refers to the exhalation of air inhaled earlier. On the other hand in certain upnisadas, the term puraka is used to affirm godly state. “***Brahmaivasmiti ya vrittih puraka vayurucyate”*** (Tejobindu1\23-33) Dhyanavindu upanisada designate, puraka, kumbhaka and recaka as Brahma, Vishnu and Rudra respectively. In certain upanisada pranayama and kumbhaka have been use synonymous. Two types of Pranayama described by yogasutra of patanjali are Sahita (Recaka-puraka yukta kumbhaka pranayama) further classified into:

- Suryabheda
- Ujjai
- Sitali and Bhastika

Kevala (recaka puraka vivarjita kumbhaka pranayama)

In the context of pranayama nadis have been considered to be of great importance. Different upanisada have described nadichakra in the context of pranayama and pranayama has been

considered as nadi shuddhi different text have described different number of nadis using different names. Among these ***ida*** and ***pingla*** have been considered important and Sushumna being the most important. It has been postulated that the tenfold vayu flows through these nadis. The pranayama (prana-breath ayam-pause) is concerned with controlled breathing exercises and in broader sense the control of vital force prana. Basically pranayama consists of 3 phases namely:

- Puraka (inhalation)
- Kumbhaka (pause)
- Recaka (exhalation)

The best proportion of time to be allotted to these three steps is 1:4:2 respectively for inhaling, controlling, and exhaling the breath. But primarily following types of pranayama have been described as mentioned below

- Nadi shudhi.
- Ujjai
- Suryabhedi
- Sitkari
- Sitali
- Bhastrika
- Bhramari
- Murcha
- Plavni

Though Pranayama is primarily a system of breathing exercise. It is practiced in a specialised manner and accordingly, it yields comprehensive effects including systemic physiological vitalization of psychosomatic relaxation.

DISCUSSION

Research evidence supports the belief that Nadi Shuddhi pranayama techniques may improve physical and mental health through **down-regulation of the hypothalamic– pituitary–adrenal (HPA) axis** and **the sympathetic nervous system (SNS).**

The HPA axis and SNS are triggered as a response to a physical or psycho logic demand (stressor), leading to a cascade of physiologic, behavioural, and psychological effects, primarily as a result of the release of

1. **Cortisol**
2. **Catecholamine's (epinephrine and nor epinephrine).** This response leads to the mobilization of energy needed to combat the stressor through the classic ''fight or flight'' syndrome.
3. **Rennin- angiotensin-aldosterone**
4. **Vasopressin (ADH)**

Over time, the constant state of hypervigilence resulting from repeated firing of the HPA axis and SNS can lead to dysregulation of the system and ultimately diseases such as **obesity, diabetes, autoimmune disorders, depression, substance abuse, and cardiovascular disease.**

It has been hypothesized that some yoga exercises cause a shift toward parasympathetic nervous system dominance, possibly via **direct vagal stimulation.**

Pranayama easily achieves voluntary control over autonomic nervous system and relieves stress. Pranayama practices have been found very useful in resolving emotional conflicts and neurotic tendencies. There is not a single modern medicine available as such which could do all this so safely as pranayama. It may be contingent that *Nadi shuddhi pranayama* plays an important role in reducing both systolic and diastolic blood pressure.

SUMMARY

The present study entitled "**To study the effect of Pranayama on raktbhara (hypertension)** was pursued with following aims and objects.

To study the aetio-pathogenesis of Essential Hypertension in light of both *Ayurvedic* and modern medical science perspectives. To reduce hypertension with Nadi shuddhi Pranayama exercise. To evaluate the changes or reduction in systolic and diastolic blood pressure after practicing Nadi shudhi pranayama. The research methodology was derived essentially from the exhaustive Ayurvedic literature. Proper planning and methodical execution of the principles aid in the texts were followed while conducting study. For better understanding of concept in order to facilitate the study pattern, the study has incorporated further in parts viz.

Introduction, review of hypertension, Nadi shuddhi pranayama, Clinical study, Discussion, Summary and Conclusion.

The introduction part deals with the incidence and understanding of EHT in terms of Ayurvedic fundamentals. The review of hypertension deals with the details of nidana, poorvarupa, samprapti, rupa, chikitsa and updrava of hypertension according to modern and ayurvedic literatures. Nadi shuddhi Pranayama have been described in detail under the heading of Yoga and Pranayama.

CONCLUSION

At the verge of completion of this study, the ultimate conclusion can be drawn from the deductive reasoning of the applicable information and none unreliable data comprehended in the present study. A critical look back at the historical review shows that *Rasavikshepana, Anudhavana* etc words resembling with blood circulation were prevalent in classics, also knowledge of *Nadi* and function of Dhamani (Dhamni vyakaran) has been described in ancient *Ayurvedic* literature. On objecting the cardinal sign and symptomatology of the disease to *Ayurvedic* fundamentals, it is evident that there is predominance of *Vata Pradhana Dosha* its accompaniment with *Rasa Rakta dusti.* Life style changes are also the main origin of psychosomatic disorder. Deskbound life style is the foremost reason at the back of this, which are all come under umbrella of *Gramya aahara vikruti* explained by *acharayas* in ancient science. Role of mandagni is the principal source at the back of every disease that told by acharyas, which causes uttapti of Aama. Aama in the Rasa Rakta Dhatu increases the viscosity and also pressure to combat this. *Dhamani uplepa* is one of the main incidences in Hypetension and is stated in *Kapha Nanatmaja vyadhi.* Hence, the Hypetension can be assigned as *Tridoshaja vyadhi* with predominance of *Vata.* Since this disease involves persistent elevation of blood pressure. The Blood pressure depends on the force of contraction of *Hridaya* and *Dhamanis* at primary level. ***Vata doshas*** is main cause of this condition. Apart from general *nidana* for *Vata kopa,* the incidence of ***Rasa Rakta dushti*** also is to be taken into account as *Rasa & Rakta* are *dushyas.* As most of the patients hailed from age group of above 50 years, though ageing is an important factor in occurrence of Essential Hypertension. Blood pressure tended to rise after one week of discontinuation of *Nadi shuddhi pranayama*. Thus it is proposed that this procedure should be practised for longer duration. A permanent solution is not expectable. For this *Acharyas* have prescribed ***Aachar rasayana*** as life style modification model. Pranayama produces a significant fall in blood

pressure level of hypertensive patients of all the prakriti and has definite role in prevention and management of hypertension. Pre hypertensives and stage-I form of uncomplicated hypertension can be managed alone by pranayama and other life style modifications. In complicated cases and stage-II hypertension, Pranayama should be used with anti-hypertensive drugs.

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