EFFECT OF CHANGING SEASONS ON BLOOD PRESSURE IN DIFFERENT *DEHA PRAKRITI*

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***Abstract*:** According to *Ayurveda*, a person's particular constitution, or *Prakriti*, affects their vulnerability to a number of illnesses, including high blood pressure. Blood pressure may be indirectly impacted by anxiety and nervous system problems, which are more common in *Vata Prakriti* people. People with *Pitta Prakriti* are frequently linked to diseases including inflammation, peptic ulcers, and hence high blood pressure. People with *Kapha Prakriti* may be more likely to have respiratory problems, diabetes, and obesity all of which can affect blood pressure. Knowing one's *Prakriti* can aid in the individualised control and prevention of high blood pressure. We have been endowed by nature with a variety of seasons *(Ritus).* Seasonal variations in temperature, humidity, and other environmental conditions affect doshas. In this study we will examine how various seasons affect the blood pressure of various *Prakriti* individuals.

***Index terms*:** *Prakriti*, blood pressure, seasons (*Ritus*).

INTRODUCTION: Because of its holistic approach to the body as a whole unit, *Ayurveda* stands out in this age of medical specialities and super specialities. When viewed in isolation, the body is challenging to understand because of all of its components coexisting in mutual dependency and interaction. With the multifaceted qualities of body, mind, and soul that *Ayurveda* taught centuries ago, humanity has now started to realise this holistic approach to health. Modernisation has made life easier for man in the contemporary era, but he has also paid for it by becoming more susceptible to a variety of lifestyle disorders. His unhealthy lifestyle and severe psychological conditions are the cause of the ailments. Through a variety of psychosomatic pathways, these factors impact a person's mental and physical homeostasis and contribute to a number of lifestyle disorders, including diabetes and hypertension. Blood pressure is the lateral pressure exerted by the flow of blood on the wall of arteries. The two components of blood pressure are the systolic and diastolic blood pressure. A combination of fundamental morphological, physiological, and psychological characteristics makes up the *Prakriti* (Ayurvedic constitution). It is believed to be fixed throughout life and appears in the intrauterine life based on the effect of *Beeja* (genetic) and *Dosha* (body humours, namely *Tridosha*). *Ayurveda* places a high value on customised treatment according to the "*Purusham Purusham Vikshya*" (an individualised approach) philosophy. Each person is a unique creature due to genetic and intrauterine effects. Thus, a person has the corresponding clinical and physiological variations. Individuals who are exposed to any impulses will behave differently depending on the *Prakriti*. It is necessary to investigate, from the perspective of *Prakriti*, the variations in disease resistance, natural onsets of the disease, and the various therapeutic responses. Nature has blessed us with different types of seasons. These seasons have great influences on human beings. This study will enable us to study seasonal variations in blood pressure of different *Prakriti* people and hence assess the vulnerability to diseases like hypertension and response to corresponding therapies. The persistent high blood pressure is defined as hypertension. Clinically when the systolic blood pressure remains above 150 mm Hg and diastolic pressure remains above 90 mm Hg it is considered as hypertension. Hypertension cannot be considered as a *Vyadhi* (disease) as per *Ayurveda* but it can be understood by assessing involved *Doshas*, *Dushyas*, *Srotas* etc. It appears to be an early stage of pathogenesis and a risk factor for development of diseases affecting the heart, brain, kidneys and eyes etc. Improper food habits and modern sedentary lifestyle with or without genetic predisposition provokes and

vitiates all the *Tridoshas* to trigger the pathogenesis of hypertension. It is proposed that hypertension is to be understood as the *Prasara-Avastha* which means spread of vitiated *Doshas* from their specific sites, specifically of *Vyana Vata* and *Prana Vata*, *Sadhaka Pitta* and *Avalambaka Kapha* along with *Rakta* in their disturbed states. The *Avarana* (occlusion of normal functioning) of *Vata Dosha* by *Pitta* and *Kapha* can be seen in the *Rasa-Rakta Dhatus*, which in turn hampers the functioning of the respective *Shrotas* (micro-channels) of circulation.

AIM: To analyse the effect of changing seasons on blood pressure in different deha prakriti.

OBJECTIVES:

1. To evaluate the *Prakriti* of different people using standardised CCRAS performa.
2. To study about blood pressure and *Prakriti* in detail from various literatures, commentaries, etc.
3. To assess blood pressure of different *Prakriti* people in different seasons.
4. To analyse the effect of changing seasons on blood pressure in different *Deha Prakriti*.

REVIEW OF LITERATURE:

PRAKRITI- '*Prakriti'* is one's own innate natural constitution with which he/she is born and this remains unchanged. This constitution is controlled by one's own physiology. In development of fetii/foetus, due to its own reasons *Doshas* intensify. This non-pathogenic intensified status of *Dosha* remains constant from birth till death and this is *Prakriti*.

There are two types of prakriti:

Sharirik Prakriti	***Manasik Prakriti***
Ek doshaj- Vataj Prakriti *Pittaj Prakriti* *Kaphaj Prakriti* *Samsargaj- Vataj pittaj Prakriti* *Pittaj kaphaj Prakriti* *Vataj kaphaj Prakriti* *Samdhatuj- Tridoshaj Prakriti*	*Satvik Prakriti* *Rajasik Prakriti* *Tamasik Prakriti*

***RITU*(SEASONS) *VIBHAJAN*:** One *Samvatsar* (year) is divided into two *Kala* i.e.,

1. *Aadan Kala*

2. *Visarga Kala*

Each *Kala* is divided into three *Ritu*(seasons)

Aadan Kala	*Visarga* Kala
1. *Shishira Ritu* (January - February) 2. *Vasant Ritu* (March-April) 3.*Greesma Ritu* (May- June)	1. *Hemant Ritu* (November- December) 2. *Sharad Ritu* (September- October) 3. *Varsha Ritu* (July –August)

BLOOD PRESSURE- The force exerted by the blood against any unit area of the arterial vessel wall is called as Blood Pressure. The highest pressure is achieved during systole and is referred to as the systolic pressure while the lowest pressure occurs in diastole and is referred to as the diastolic pressure. Systolic and Diastolic blood pressure have different determinants; this is illustrated by the fact that they alter differentially; For example, with strenuous whole body isotonic exercise, the diastolic blood pressure may fall while the systolic blood pressure rises. Systolic blood pressure is determined by cardiac output that increases during strenuous exercise. In contrast, diastolic blood pressure is determined by Total peripheral Resistance (TPR). TPR falls during strenuous exercise because of vasodilatation in skeletal muscles and in the skin (for thermoregulation), as a result, the diastolic pressure falls. Vascular pressures, including arterial blood pressure, are influenced by

posture and gravity. In the healthy young adult, the pressure, at the top of each pulse, called the systolic pressure, is about 120mmHg. At the lowest point of each pulse, called the diastolic pressure, it is about 80mmHg. The difference between these two pressures, about 40mmHg, is called the Pulse Pressure.

The heart has its pacemaker (SA node) that generates electrical impulses on its own, which makes the heart contract during the systole. This self-excitatory function of the heart can be attributed to the functioning of the *Vata Dosha*, in particular the *Vyana Vata* as it is seated in the heart and is responsible for blood circulation. Charaka clearly describes that *Vyana Vata*, a component of *Vata Dosha* constantly forces the blood out of the heart and distributes it. Thus it can be said that the systolic BP attained during contraction of the heart is controlled by *Vata* (*Vyana Vata*). Though the SA node generates impulses on its own, the rate of its impulse generation is controlled by the autonomic nervous system via sympathetic and para-sympathetic nerve fibres emerging from the brain. It is the *Prana Vata* situated in the *Moordha* (Brain) that controls the *Hridaya* (heart) and does *Dhamani Dharana* (arterial perpetuation) and thus heart rate is controlled by *Prana Vata*. In this context it can be understood as *Vyana Vata* and *Prana Vata* denote the nervous control of circulation because *Vata*, in general, denotes all neural mechanisms. The diastole is attained when the heart muscles relax. Here, diastolic blood pressure is only due to blood flowing through the narrow structures of the chambers of the heart and arteries and there is no active push by the heart. Thus diastolic BP can be taken under the domain of *Kapha Dosha* (*Kapha* maintains the structural integrity of body organs), mainly the *Avalambaka Kapha* because it is the resistance offered by the structure of the heart and the blood vessels that controls the diastolic blood pressure. Thus the peripheral resistance (faced by blood in the blood vessels) determines the diastolic BP. This is mainly influenced by the diameter and elasticity of the blood vessels which can be considered under the purview of *Kapha Dosha*. The vascular tone is also controlled by the autonomic nervous system which alters the diameter of the arteries as and when required. As *Dhamani Dharana* is a function of *Prana Vata*, the peripheral resistance offered by the arteries due to vasoconstriction caused by sympathetic action of nerves can be understood as a function of *Prana Vata*. The Auto-rhythmicity of the heart is due to the action potential created by the rapid influx of Na^+ and Ca^{++} ions and efflux of K^+ ions across the membrane of the SA node. The involvement of these chemical ions can be taken under the purview of *Pitta* due to its *Tikshna* (rapidness) *Drava* (fluidity)and *Sara* (diffusion/dispersion) *Guna*, mainly *Sadhaka Pitta* situated in the heart. The basal metabolic rate (BMR) has a direct but imperfect positive correlation with the pulse rate and pulse pressure of the heart. This means to say that variations in the basal metabolic rate cause changes in blood pressure as well. Thus the basal metabolic rate can be understood as a result of the action of *Agni* or *Pitta*, more precisely, *Pachaka Pitta*. The blood volume and viscosity can be determined by the quality and quantity of the *Rasa* and *Rakta Dhatus*. These also determine the cardiac output. The heart (*Hridaya*) and the blood vessels (*Rasavaha Dhamanis*) form the *Prana Vaha Srotas* and their *Srotomulas* which are mainly involved in the blood circulation along with that *Medovaha Srotas, Murarvaha Srotas, Swedavaha srotas* and *Udakavaha Srotas* play an important role.

The clinician determines systolic and diastolic pressures through indirect means, usually by the auscultatory method.

MATERIAL AND METHODS: The study was conducted on 45 healthy participants in the 20–40 age range, both male and female, regardless of gender. The volunteers received comprehensive information about the study's goals and procedures. *Prakriti* was determined and classified as *Vataj*, *Pittaj*, and *Kaphaj*. The majority of the subjects were students going about their regular lives or studying. None of them participated in rigorous outdoor activities or were athletes.

Experiment took place in the months of November-December (*Hemant Ritu*) as season 1, and repeated with the same subjects in May-June *(Greeshma Ritu*) as season 2, and July-August (*Varsha Ritu)* as season 3 to assess the effect of different seasons on blood pressure of different prakriti people. Blood pressure was recorded by auscultatory method using sphygmomanometer. The study took place at the department of *Kriya Sharir*, Patanjali Ayurveda College, Haridwar, Uttarakhand.

OBSERVATIONS AND RESULTS: The study was conducted on 45 healthy volunteers of different prakriti. Although no significant change was observed in systolic blood pressure in different seasons, the diastolic pressure showed some increase in winter season *(Hemant Ritu)*. *Prakriti* wise analysis showed significant increase in blood pressure of *Pitta Prakriti* people in winter season (*Hemant ritu*) than in summer season (*Greeshma Ritu*) and rainy season (*Varsha* R*itu*).

Table showing variations in Systolic Blood pressure in three different seasons:

Season I Mean ± SD	Season II Mean ± SD	Season III Mean ± SD	Season IvsII Mean±SD	SeasonIvsIII Mean±SD	SeasonIIvsIII Mean±SD
116.22±8.58	114.41±9.55	115.1±10.51	t = 1.172 p = 0.248	t = 0.715 p = 0.479	t = 0.146 p = 0.885

Table showing variation in Systolic Blood pressure (BP) in three different seasons as per Prakriti group:

Prakriti Group	SBP (mm Hg) Mean ± SD			Within group comparison Paired t-test		
	Season1 Nov/dec	Season2 May/jun	Season3 July/aug	Season I vs II	Season I vs III	Season II vs III
Group 1 V (n=15)	116.00 ± 5.56	108.40 ± 6.84	114.00 ± 9.93	t=2.661 p=0.056 NS	t=0.151 p=0.889 NS	t=0.899 p=0.438 NS
Group 2 P (n=15)	116.55 ± 9.68	115.80 ± 12.88	115.11 ± 12.32	t=0.243 p=0.377 NS	t=0.78 p=0.435 NS	t=0.41 p=0.659 NS
Group 3 K (n=15)	115.87 ± 8.22	114.22 ± 4.87	115.36 ± 8.53	t=0.866 p=0.378 NS	t=0.161 p=0.865 NS	t=0.304 p=0.766 NS
Between the group comparison one way ANNOVA significant pair (p<0.05)	f=0.032 p=0.966 NS	f=1.264 p=0.295 NS	f=0.026 p=0.975 NS			

Table showing variations in Diastolic Blood Pressure in three different seasons:

Season I Mean ± SD	Season II Mean ± SD	Season III Mean ± SD	Season IvsII Mean±SD	SeasonIvsIII Mean±SD	SeasonIIvsIII Mean±SD
80.32±6.05	76.54±7.55	76.60±8.23	t = 3.422 p = 0.001	t = 2.690 p = 0.011	t = 0.313 p = 0.830

Table showing variations in Diastolic Blood Pressure (BP) in three different seasons as per Prakriti group:

Prakriti Group	DBP (mm Hg) Mean ± SD			Within group comparison Paired t-test		
	Season1 Nov/dec	Season2 May/jun	Season3 July/aug	Season I vs II	Season I vs III	Season II vs III
Group 1 V (n=15)	78.00 ± 1.40	71.6 ± 6.55	75.54 ± 7.88	t=2.764 p=0.051 NS	t=0.837 p=0.464 NS	t=0.610 p=0.585 NS
Group 2 P (n=15)	80.22 ± 5.57	76.08 ± 8.85	76.20 ± 9.88	t=2.472 p=0.023 S	t=1.816 p=0.085 NS	t=0.091 p=0.928 NS
Group 3 K (n=15)	81.05 ± 7.32	78.44 ± 5.46	77.86 ± 8.53	t=1.475 p=0.158 NS	t=1.756 p=0.10 NS	t=0.791 p=0.441 NS
Between the group comparison one way ANNOVA significant pair (p<0.05)	f=0.491 p=0.616 NS	f=1.743 p=0.188 NS	f=0.138 p=0.874 NS			

DISCUSSION

All *Prakriti* groups tend to have greater diastolic blood pressure during the winter months, but *Pitta Prakriti* showed a statistically significant variation in diastolic blood pressure between the winter and summer. Vasoconstriction and elevated sympathetic nerve activity during the colder months could be the cause. During cold weather when temperature drops, blood vessels temporarily constrict (vasoconstriction) to conserve heat. This narrowing of arteries and veins increases the resistance to blood flow, forcing the heart to work harder and leading to a rise in blood pressure. Conversely during hot weather it causes blood vessels to expand (vasodilation) to release heat. This reduces resistance and allows blood to flow more easily, resulting in a decrease in blood pressure. Other seasonal factors beyond temperature can affect BP including: 1. Dietary changes: People may consume more calorie-dense, salty foods during colder months. 2. Physical activity: Reduced physical activity in winter can contribute to higher BP. 3. Weight gain: Seasonal weight gain is also a contributing factor. 4. Stress and seasonal depression: These can also play a role in elevated blood pressure.

The physiological and psychological characteristics that *Pitta Prakriti* individuals inherit may have an impact on the variations in diastolic blood pressure. *Pitta*-predominant individuals may be more susceptible to hypertension. This is because *Pitta* is associated with fire and heat, and an imbalance can lead to conditions related to inflammation and elevated blood pressure. There was no scientific proof to substantiate the variations in blood pressure among the various *Prakriti* groups. However, it can be postulated that people who are *Pitta Prakriti* dislike sunlight, their eyes turn red easily when they are angry, they drink wine and are exposed to sunlight, they feel comfortable in chilly environments, and they may be more prone to high blood pressure.

CONCLUSION

One of the main risk factors for cardiovascular illnesses, such as coronary heart disease (CHD), is hypertension, which also doubles the risk of peripheral artery disease, renal failure, ischemic and haemorrhagic stroke, and congestive heart failure (CHF). However, a sizable portion of the hypertensive population receives insufficient or no treatment. The current study emphasized how the seasons affect blood pressure of different *Prakriti* people. The risk of cardiovascular and renal illness can be decreased by strict

commitment to a healthy lifestyle and appropriate therapy. Hence proper management of blood pressure in *Hemant Ritu* in *Pitta Prakriti* people can lead to a healthier community.

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