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A CROSS SECTIONAL STUDY COMPARING THE VARIATION OF BLOOD PRESSURE IN SUMMER AND WINTER MONTHS AMONG THE PARAMEDICAL STAFF OF GAUHATI MEDICAL COLLEGE

Physiology

KEYWORDS: Normotensive male, blood pressure, winter and summer, age group 20-45 yrs, sphygmomanometer

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ABSTRACT

Background: The objective of my study was to observe whether seasonal variation of temperature has got any effect on blood pressure.

Method: 100 healthy normotensive individuals (age group 20-45 years) were selected randomly from Guwahati city. At first blood pressure of each individual was measured in winter season and then in the summer season using the mercury sphygmomanometer and stethoscope.

Result: Both systolic and diastolic blood pressure were found to be higher in winter than summer season and the difference was found to be statistically significant (<0.05).

Conclusion: We can conclude that blood pressure is higher in winter than summer in same subject, so risk of development of hypertension in subject with borderline hypertension is more during winter season. So we have to do regular checkup of BP of a borderline hypertensive person during the winter season more frequently than the summer season.

INTRODUCTION:

Blood pressure is defined as lateralized pressure exerted by column of blood on the walls of arteries during flowing through it. Numerous surveys and studies have documented the correlation between temperature and blood pressure in various countries among adults, the elderly, and children. Blood pressure generally is higher in the winter and lower in the summer. That's because low temperatures cause our blood vessels to narrow, which increases blood pressure because more pressure is needed to force blood through your narrowed veins and arteries. In addition to cold weather, blood pressure may also be affected by a sudden change in weather patterns, such as a weather front or a storm. Our body and blood vessels may react to abrupt changes in humidity, atmospheric pressure, cloud cover or wind in much the same way it reacts to cold. These weather-related variations in blood pressure are more common in people age 65 and older .[3] Taking seasonal variations in blood pressure into account will increase the meaningful information collected in population surveys and mass screenings. It will also result in more personalized management of antihypertensive medications tailored to the individual. Patients in the borderline to mild hypertensive range often need pharmacologic treatment only in winter.[10] Seasonal variations of BP in normal subjects and patient with chronic disease and also in hypertensive cases have been studied. (15,16)

Till date the mercury sphygmomanometer is regarded as the gold standard.[6]. In clinical practice the measurement of blood pressure by the century-old technique of Riva-Rocci/Korotkoff is dependent on the accurate transmission and interpretation of a signal (Korotkoff sound or pulse wave) from a subject via a device (the sphygmomanometer) to an observer.[1]Although most common method of measuring blood pressure is palpatory, but only systolic pressure can be measured with this method.[8,13,14] Sphygmomanometry is an important clinical procedure that indirectly measures blood pressure which provides information about the cardiovascular system in normal and diseased states. It estimates the blood pressure by noting the pressure that has to be applied circumferentially on the arm to occlude the blood flow in the underlying brachial artery.[2,9] Regarding the effects of various levels of mercury sphygmomanometer during BP measurements [6] and different postures like supine, sitting and standing have got any effect on BP [5] have been studied. Whether there is any difference in the systolic and diastolic blood pressure in home and office workers have also been studied.[4] The Conventional versus Automated Measurement of BP in the Office (CAMBO) study was also designed to evaluate the impact of AOBP measurement on the management of patients in routine, community-based, clinical practice.[11] Variability regarding different BP measurement first and second time in same occasion [7] and Relationship of 24-hour blood pressure mean and variability to severity of target-organ damage in hypertension have been studied already.[12]

MATERIALS AND METHODS:

Sphygmomanometer instrument and stethoscope were used for our study. The study was conducted in Guwahati city, Assam for duration of 6 months. Hundred (100) healthy Normotensive individuals between 20-45 years were selected randomly from Guwahati city. Study was performed after obtaining full written and informed consent from them.

EXCLUSION CRITERIA:

- Medical history of hypertension, anemia, CVS disorders, any other endocrine disorders.
- Positive family history of hypertension.
- Chronic renal disease.
- Subjects not willing to participate.
- Subjects less than 20 yrs and more than 45 yrs.

The ethical clearance: The study was conducted after obtaining ethical clearance from institutional ethical committee.

Method: A total of 100 healthy normotensive individuals willing to participate in the study were randomly selected. Consents were taken from all the individuals before starting the study. By using conventional method First in winter (during December and January), after 5 minutes of rest on the chair blood pressure was taken on the right arm by keeping the diaphragm of the stethoscope over the right cubital fossa which was flexed at the elbow which was supported on a table. Sphygmomanometer was kept at the level of heart. The individual was asked to keep their feet flat on the ground, back was supported from behind by the chair and he was asked to remain relax during the measurement. Again in summer (during April and May) BP was measured by using same method. During both the occasions the Riva rocci cuff was at the level of heart to nullify any effect of gravity on blood pressure measurement.

RESULTS:

Mean systolic BP in winter and summer seasons were found as

119±10 and 118±9 mm of Hg respectively. Mean diastolic BP were found as 74±9 and 73±8 mm of Hg respectively. Values obtained in these two different seasons were compared by paired t-test, revealing statistically significant ($p<0.05$) difference in both systolic and diastolic BP.

TABLE 1- BLOOD PRESSURE IN TWO DIFFERENT SEASONS

Parameters	Winter (Mean± SD) mm of Hg	SUMMER (Mean± SD) mm of Hg	p-value
Systolic BP	119 ± 10	118 ± 9	<0.05
Diastolic BP	74 ± 9	73 ± 8	<0.05

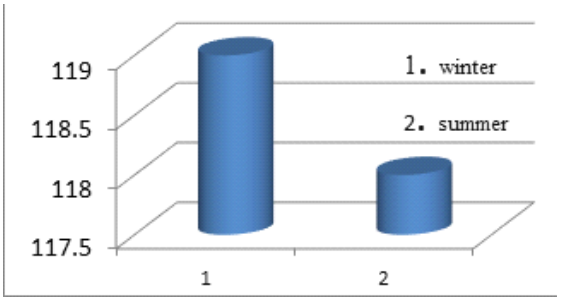

FIGURE 1: SHOWING SEASONAL VARIATION OF SYSTOLIC BLOOD PRESSURE

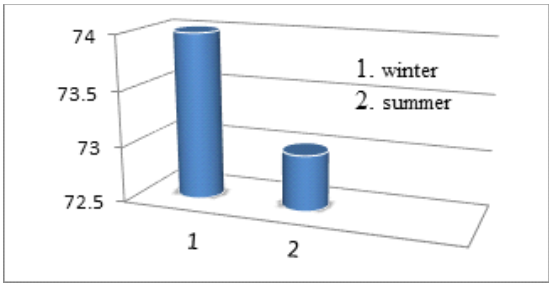

FIGURE 2: SHOWING SEASONAL VARIATION OF DIASTOLIC BLOOD PRESSURE

Blood pressure measurement is very important to diagnosis related to cardiovascular system. With change in season there is increase in the both systolic and diastolic BP in winter season than in summer season. So it is very important to recheck BP in winter season to know whether there is any change in blood pressure. The conventional method of BP measurement gives us the almost accurate value of the respective person's blood pressure.

CONCLUSION & FUTURE SCOPE:

The seasonal variation affect the BP measurement in healthy individuals. As our study has revealed significant higher systolic and diastolic BP in winter season than in summer season so we can conclude that even if we find a borderline or mild grade hypertensive subject in summer season we should recheck the BP of the subject in winter season to note any change in BP as we get higher BP in winter as compared to summers in the same individual. Further studies and similar experiments with larger study groups, among known borderline and mild grade hypertensive persons, among different genders as well as ethnic comparison should be conducted to get more information related to significant variations of BP in relation to two different seasons.

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