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Association of body mass index and blood pressure between sedentary and hard-working women in Murshidabad district of West Bengal, India

Priyanka Das, Swapna Putatunda, Smritiratan Tripathy

Department of Physiology, Berhampore Girls' College, Berhampore, Murshidabad-742101, West Bengal, India.

priyanka.physiology@berhamporegirlscollege.ac.in , swapna.physiology@berhamporegirlscollege.ac.in , smritiratan_tripathy@yahoo.com

Abstract- This study was made on both sedentary and hard-working people. Load carrying workers working in our college premises were randomly taken as the representative of hard-working people. As part of the sedentary working women both teaching and non-teaching staff of the college were randomly taken for the study purpose. The parameters were studied on different age groups (21-40 years, 41-60 years). Correlation coefficient has been determined to find out the degree of association between blood pressure and body mass index (BMI). These two age groups show significant positive correlation between body mass index (BMI) and Blood pressure (BP), both systolic blood pressure (SBP) and diastolic blood pressure (DBP) in both working women. The observed positive association between BMI and blood pressure indicates that BMI may serve as a useful, non-invasive predictor for assessing the likelihood of hypertension in adult women.

Keywords- Sedentary working women, hard-working women, body mass index, blood pressure.

I. Introduction

Sitting is primarily involved in a sedentary job. Walking and standing is required occasionally. On the other hand, hard work is defined as an extra load on the body for the needs of different work activities. There are marked physiological changes such as heart rate, blood pressure, stroke volume, sweating also loss of much energy etc. are observed in the various types of hard working than sedentary types of work. Hard working such as soil digging by hoe, load carrying, van rickshaw pulling, running etc needed too much energy than sedentary work.

Blood pressure is an important parameter indicating the cardiac functioning of the body. Body fitness is one of the major factor for the development of hypertension. Hypertension is associated with a high incidence of stroke and one of major cause behind coronary heart disease[1]. Here the adiposity and body built are assessed by a simple anthropometric index like body mass index (BMI). It has been known that obese person is likely to develop hypertension and whether the person is obese, overweight or not, it may be assessed from determination of BMI. Developing countries are facing the double burden of hypertension and other cardiovascular disease along with infection and malnutrition. BMI is positively and independently associated with morbidity and mortality from hypertension, cardiovascular disease, type II diabetes mellitus and other chronic disease[2].

There is an increase in prevalence rates of overweight and obesity across globe. Overweight and high BP both have independent fatal health consequences as they carry serious risks factors for several non-communicable diseases such as heart disease, stroke, type II diabetes mellitus, and even death[3]. The objective of this study was to determine the correlation of BMI and BP of both sedentary and hard-working women of two age groups (21-40 years and 41-60 years), and it would be helpful to the prevention and control of hypertension in developing countries.

To fulfill the objective of the present study, we selected load carrying workers as hard-working people and college teaching and non-teaching staff as sedentary people. To investigate the association between blood pressure and BMI we have taken in account the systolic blood pressure (SBP), diastolic blood pressure (DBP), pulse pressure (PP), mean arterial pressure (MAP), height and weight.

II. Materials and Methods:

***Site of working*:** The present work was carried out in Berhampore Girls' College premises. During the study period a huge number of hard/heavy workers were engaged in building construction of the college. They were selected randomly as subject under hard worker group.

***Subject Selection*:** This was made only on adult female group. We selected load carrying workers working in our college premises as hard working people and college teaching and non-teaching staff as sedentary workers. The total number of subjects selected for this survey was 160. The subjects were divided into two major groups:

(i) Sedentary (teaching and non-teaching staffs) (n=80)

(ii) Hard working (load carrying worker) (n=80)

The number of each group was 80. Each group was again subdivided into different age group viz., age group 21-40 years (n=40) and age group 41-60 years (n=40). Pregnant women were excluded from this study.

***Determination of Blood Pressure*:** The blood pressure of all subjects has been measured with the help of instrument-sphygmomanometer. From the systolic and diastolic blood pressure, mean arterial pressure (MAP) and pulse pressure (PP) was measured.

***Measurement of Anthropometric parameters*:** Body height and body weight were measured without foot wear and minimum clothing with a standard weighing machine (Crown) and a height measuring stand. Blood pressure was measured using standard sphygmomanometer (Mark) and stethoscope (Right Care, Mark)[4].

***Statistical Analysis*:** The mean values and standard deviations of different parameters e.g, height, weight, systolic blood pressure, diastolic blood pressure has been determined for both working groups. The correlation of BMI to different components of blood pressure for sedentary and hard-working women. The correlation has been determined by Pearson's product moment correlation coefficient (r). The significance of correlation between BMI and blood pressure has been estimated by 't' test.

III. Results

The mean and standard deviation for weight, height, SBP, DBP, MAP, PP, BMI have been shown in Table 1. Table 2 shows correlations of BMI with SBP and DBP in both groups.

Table 1: The physiological parameters of both Sedentary and hard-working women. The data is represented in mean ± SD.

Parameters	21-40 years		41-60 years	
	Sedentary (n=40)	Hard working (n=40)	Sedentary (n=40)	Hard working (n=40)
Weight (Kg)	46.12 ± 8.2	39.87 ± 5.2	44.62 ± 9.6	39.6 ± 5.8
Height (Cm)	151.95 ± 6.2	147.5 ± 5.4	149.02 ± 6.1	146.39 ± 5.2
SBP (mmHg)	110 ± 5.7	113.32 ± 4.9	144.12 ± 6.1	140.8 ± 5.5
DBP (mmHg)	70.12 ± 5.8	68.38 ± 4.8	78.7 ± 6.2	82.4 ± 4.2
Pulse Pressure (mmHg)	39.88 ± 7.4	44.94 ± 8.6	65.42 ± 9.5	58.4 ± 8.6
MAP (mmHg)	83.41 ± 5.4	83.36 ± 8.6	100.51 ± 9.2	101.87 ± 6.4
BMI (kg/m²)	21.03 ± 2.3	18.31 ± 1.5	20.28 ± 2.1	17.63 ± 1.8

Table 2: Correlation coefficient (r) of BMI with SBP, DBP The physiological parameters of both Sedentary and hard-working women.

Parameters	21-40 years		41-60 years	
	Sedentary (n=40)	Hard working (n=40)	Sedentary (n=40)	Hard working (n=40)
SBP (mmHg)	0.37	0.23	0.34	0.32
Level of Significance	P<0.05	P<0.05	P<0.05	P<0.05
DBP (mmHg)	0.34	0.19	0.31	0.30
Level of Significance	P<0.05	P<0.05	P<0.05	P<0.05

IV. Discussion

From the result presented in table-1, it may be noted that the mean body weight and height appears to be higher in both age and groups of sedentary women in contrast with that of hard-working women. In lower age group, SBP is slightly higher in hard working women than that of sedentary women. Higher age group of sedentary women shows slightly higher SBP than that of hard-working women. In 21-40 years, age group DBP is marginally higher in sedentary women than that of counterparts whereas in higher age groups hard working women shows higher value than that of sedentary people. BMI shows greater value in sedentary women than that of hard-working women. Hard working women are thin in respect of BMI. From the results presented in table-2 it may be revealed that in both sedentary and hard-working women there is a significant positive correlation between BMI and blood pressure as well as between SBP and DBP. It may also be noted that degree of association between BMI and SBP as well as BMI and DBP are more or less similar in upper age groups among both working people. On the other hand, in lower age group the degree of association of above parameters is comparatively lower in hard working women than sedentary workers. It also be found that the age-specific prevalence of hypertension increased consistently with increasing age (41-60 years). Consistent with other studies, we found significant positive correlations between BMI and SBP/DBP in both sedentary and hard-working women[5,6].

V. Conclusion

This study, conducted on a limited sample of adult women, reveals important physiological distinctions between sedentary and hard-working occupational groups. These findings suggest a potentially lower risk of developing hypertension and other cardiovascular diseases among the studied population. Moreover, the observed positive association between BMI and blood pressure indicates that BMI may serve as a useful, non-invasive predictor for assessing the likelihood of hypertension in adult women. Further large-scale and longitudinal studies are recommended to validate and expand upon these findings.

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