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RESEARCH ARTICLE

TO STUDY THE CORRELATION OF BODY MASS INDEX WITH BLOOD PRESSURE

***Dr. Sumanrai and Dr. Shubhangi Mahashabde**

Associate professor, Physiology Department, Amaltas Institute of Medical Sciences, Dewas (m.p.), India

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ABSTRACT

Obesity and in particular obesity have consistently associated with hypertension and increased cardiovascular risk. Based on population studies, risk estimates indicate that at least two-thirds of the prevalence of hypertension can be directly attributed to obesity. Apart from hypertension, abdominal adiposity has also been implicated in the pathogenesis of coronary artery disease, sleep apnoea, stroke and congestive heart failure.

Methodology: The present study was carried out in the department of physiology, Amaltas institute of medical sciences Dewas (M.P.). We have selected the 250 individuals of age groups 14 to 25 years. A randomized cross sectional non interventional study was performed. Data thus obtained were analyzed by Chi square test with the help of SPSS-20 (software Package used for Statistical Analysis) software for statistical analysis.

Results: The results of the present study showed that there was aSignificant association of Body mass index with blood pressure in males only, while in females body mass index failed to show association with blood pressure.

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INTRODUCTION

Prevalence of high blood pressure and obesity are increasing in India in recent years even-though under nutrition contrition to be an important public health issue even in the 21st century. Despite the availability of a few therapeutic agents, the management of obesity is still mainly by change in lifestyle and dietary modification. Physical activity and dietary modification are the cornerstones for management of high blood pressure and obesity. Key measure to determine obesity is high BM. Due to industrialization and urbanization, the standard of living continues to rise particularly in developing countries. This has led to weight gain and obesity, which are posing a threat to the health of citizens. Obesity is perhaps the most prevalent form of malnutrition in developing countries both among adults and children. In this Study we have demonstrated that obesity is related to elevated systolic blood pressure (SBP) and diastolic blood pressure (DBP) elevation.

MATERIAL AND METHODS

The present study was carried out in the department of physiology, Amaltas institute of medical sciences Dewas (M.P.)

****Corresponding author: Dr. Sumanrai,***
Associate professor, Physiology Department, Amaltas institute of medical sciences, Dewas (m.p.), India.

We have selected the 250 individuals of age groups 14 to 25 years from Amaltas institute of medical sciences Dewas (M.P.). A randomized cross sectional non interventional study was performed after taking permission from the ETHICS AND SCIENTIFIC REVIEW COMMITTEE Amaltas institute of medical sciences Dewas (M.P.) an informed consent had been taken from these subjects after explaining the study procedure and written consent was obtained from. And then after taking detailed history, the physical examination including general as well as systemic examination particularly the Cardio-vascular system was done. All the participants were subjected to a self-made questionnaire to get information regarding their personal, present past, family, socioeconomic and medical history in detail. Special information about their exercise schedule was also obtained through the questionnaire regarding type, duration and length of time of exercise.

These subjects were assessed for various physiological parameters mentioned below and a standardized protocol was followed while taking the measurements:

- Height
- Weight
- Blood pressure
- BMI

Instrumentation

This section describes the instruments used in the process of data collection;

Instruments:- Body fat monitor: HNF-306, Body Fat Analyzer accurately measures body fat percentage and body mass index (BMI) using proven bioelectrical impedance method.

Blood Pressure Apparatus: Mercurial sphygmomanometer calibrated in mm Hg.

Weighing Scale: Bathroom weighing scale (Hanson: Model H89DK) for the measurement of subjects in kilograms. The device had a reliability coefficient r=0.80.

Standiometer: The instrument was used for the measurement of height in meters (m) to the nearest 0.1cm. The device had a reliability coefficient r-0.90.

BMI classification: Body Mass Index (BMI) is a simple index of WEIGHT for height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m2).

BMI for Asian population

Normal range-18.50-24.99
Pre-obese-25.00-29.99
Obese->30.00
Obese class I- 30.00 – 34.99
Obese class II- 35.00 – 39.99
Obese class III- >40.00

One limitation of BMI is that it does not take lean body mass, muscle mass or bone density into account when measuring obesity. Body mass index was calculated as weight in kilograms divided by squared height in meters.

BMI – Weight in kg/height in Meters2
Normal weight: BMI between 18.5 to 23.0 kg.m2
Overweight: BMI more than 23.0 kg/m2.

Statistical Analysis

Data thus obtained were analyzed by Chi square test with the help of SPSS-20 (software Package used for Statistical Analysis) software for statistical analysis.

Significant figures

Decision to retain or reject the null hypothesis was made at P≤0.05 alfalevel of significance.
Significant when p value P≤0.05
Strongly significant when p value P≤0.05

OBSERVATION

The present study was carried out in the Department of Physiology Amaltas institute of medical sciences Dewas. Total 250 medical students were selected to do the study. And finally all 250 participants completed the study and data thus collected were tabulated and analyzed statistically. Chi squared equals 13.097 with 1 degree of freedom.The two-tailed p value equals 0.0003 The association between rows (groups) and columns (outcomes) is considered to be extremely statistically significant. The above table shows that out of 175 male medical students, 110 students having blood pressure ≤ 120 mmHg and body mass index (BMI) ≤ 24.99 is in normal range. The 23 students having blood pressure ≤ 120 mmHg but their body mass index is >25. The 22 male students having blood pressure >120 mmHg but their body mass index ≤ 24.99 is in normal range. Total 20 male students shown both blood pressure and body mass index on higher side.

The association between rows (groups) and columns (outcomes) is considered to be extremely statistically significant. The above table shows that out of 75 female medical students, 45 students having blood pressure ≤ 120 mmHg and body mass index ≤ 24.99 is in normal range. The 13 students having blood pressure ≤ 120 mmHg but their body mass index is >25. The 9 female students having blood pressure >120 mmHg but their body mass index ≤ 24.99 is in normal range. Total 8 female students shown both blood pressure and body mass index on higher side.

RESULTS

The purpose of this study was to investigate the relationship between waist circumference, waist hip ratio and systolic Blood Pressure of 250medical students of 18 to 25 years of age group of AMALTAS INSTITUTE OF MEDICAL SCIENCES,DEWAS. Result of the study shows that: Significant association of Body mass index with blood pressure in males only, while in females body mass index failed to show association with blood pressure.

Table 1. Correlation between body mass index (BMI) and systolic blood pressure (for males)

BodyMass index (BMI)	Systolic blood pressure,≤ 120 mmHg	Systolic blood pressure,>120 mmHg	Chi square test	P value
Normal (≤ 24.99)	110	22	13.097	0.0003
High (>25)	23	20		
Total (175)	133	42		

Table 2. Correlation between body mass index (BMI) and systolic blood pressure (for females)

Body Mass index (BMI)	Systolic blood pressure,≤ 120 mmHg	Systolic blood pressure, >120 mmHg	Chi square test	P value
Normal (≤ 24.99)	45	9		
High (>25)	13	8	1.935	0.1643
Total (75)	58	17		

Chi squared equals 1.935 with 1 degree of freedom.

DISCUSSION

On doing the study of correlation between Body Mass Index (BMI) and systolic blood pressure the TABLE-1 shows that chi squared equals 13.097 with one degree of freedom and the two tailed P value is 0.0003 which is <0.05, it means that there is extremely statistically significant correlation between body mass index and systolic blood pressure of young male students. Out of 175 male students, 20 having BMI >25 and their systolic blood pressure is >120 mmHg so these are having risk of developing cardiovascular problems.

Body mass index (BMI) is positively and independently associated with morbidity and mortality from hypertension, cardiovascular disease, type II diabetes mellitus and other chronic disease. In Caucasian populations, Hoffmans MD and Stevens J et al found a strong association has been depicted between BMI and blood pressure. A similar association has also been demonstrated among Asian populations. Between BMI and BP, whereas others suggested a BMI threshold at which level the relationship with BP begins. Correlations between BMI and BP in very lean populations in Africa and Asia have also been reported in earlier studies. On doing the study between Body Mass Index (BMI) and blood the TABLE -2 shows that chi squared equals 1.397 with one degree of freedom and the two tailed P value is 0.2372 which is >0.05, is means that there is no statistically significant correlation between body mass index and systolic blood pressure of young female students. The study done by Wilsgaard et al showed the relation between BMI and blood pressure was stronger in females than males (89) However, in our study, the increased blood pressure was more positively correlated with BMI in males while in females it was not significantly associated (P value is 0.2372 which is >0.005).

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