



Physiology

A STUDY ON PREVALENCE OF OBESITY BASED ON BODY MASS INDEX (BMI) AMONG HEALTHY YOUNG ADULTS AND ITS RELATION WITH THE LEVEL OF BLOOD PRESSURE.

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ABSTRACT Overweight and obesity are now the fifth leading risk for global deaths. BMI provides the most useful measure of overweight and obesity as it is the same for both sexes and for all ages of adults. A study was carried out among 384 healthy young adults with an objective to measure the prevalence of obesity based on BMI and to ascertain the relation between BMI and level of the blood pressure. The study population was grouped according to IOTF classification of obesity for Asians. Blood pressure was categorized as per 7th JNC. Based on BMI, Prevalence of obesity in males was 46.67% (112), in female was 44.44% (64) with male preponderance. Overall, Prevalence of obesity was 45.83% (176) In both male and female both SBP and DBP showed increasing trend with increase in BMI which was more marked in obese group in both the sexes.

KEYWORDS : BMI, SBP, DBP

INTRODUCTION:

Once considered a high-income country problem, overweight and obesity are now on the rise in low and middle-income countries and are the fifth leading risk for global deaths. At least 3.4 million adults die each year as a result of being overweight or obese.¹ BMI provides the most useful measure of overweight and obesity as it is the same for both sexes and for all ages of adults.²

The International Obesity Taskforce in its publication “**The Asia-Pacific Perspective: Redefining obesity and its treatment.**”³ provided classifications, which lowered the cut-off points for obesity in Asian population. The Government of India also adopted this new IOTF⁴ classification of BMI and classified Indian population accordingly in National Family Health Survey 3.

Weight gain is often associated with increased level of LDL, VLDL, TG, cholesterol and decreased level of HDL, which in the long run give rise to increase in peripheral resistance, cardiac output, sympathetic nervous system tone and subsequently high BP.⁵

(BP increases with increase in BMI and obese people have a higher prevalence of high blood pressure.⁶)

Though relation between obesity and high BP is a global phenomenon, regarding the relation of BMI with the level of BP among normotensive population, there is paucity of studies from this part of the country. With this background the present study was planned with the following -

Objectives:

1. To study the prevalence of obesity based on BMI among healthy young adults
2. To ascertain the relation between BMI and the level of blood pressure.

MATERIALS & METHODS:

The study was conducted in the Department of Physiology, Assam Medical College and Hospital, Dibrugarh from June 2013 to May 2014. This community based cross sectional study was carried out among 384 healthy young adults of age 18-24 years of both sexes. Those who were smokers or had a positive family history of hypertension were excluded.

Parameters:

- a. Height:** measured with anthropometer having gradation (0-200) cm measured to the nearest .5cm.
- b. Body weight:** recorded on standardized weighing machine with a least count of 1/2kg.
- c. Body Mass Index:** calculated by the formula $BMI = Wt \text{ in kg} / (Ht \text{ in meter})^2$ and classified as per IOTF⁴

meter)² and classified as per IOTF⁴

d. Blood Pressure:

Both SBP & DBP were recorded. 3 readings were taken at 5min & the average of three readings was considered as the BP of the individual. BP was categorized as per 7th JNC.⁸

Statistical analysis: The data were organized in Microsoft excel and analysed by applying appropriate statistical tests by using Statistical Package of Social Sciences (SPSS version 20). Results were expressed in terms of mean±SD, percentage and also in the form of diagrams. One way ANOVA was used for multiple group comparisons followed by Post-hoc-Bonferroni test for group wise comparisons. Pearson's correlation coefficient was calculated.

RESULTS & OBSERVATIONS:

The study population was grouped according to IOTF classification of obesity for Asians.⁹ BMI<18.5 as underweight/group I, BMI 18.5-22.9 as normal/group II, BMI 23-24.9 as preobese/group III, BMI 25-29.9 as obese I/group IV and BMI>30 as obese II/group V.

Accordingly, prevalence of obesity (BMI>25kg/m²) in male was 46.67% (112 out of 240 male were obese) while prevalence of obesity in female (BMI>25kg/m²) was 44.44% (64 out of 144 female were obese)

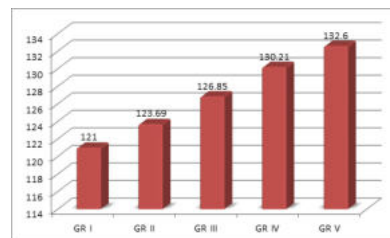


Figure 1: Distribution of SBP in male :

Highest mean SBP was recorded in Obese2 group and lowest in the underweight group. Mean SBP increased with increased BMI in male.

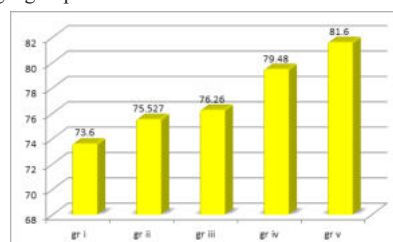
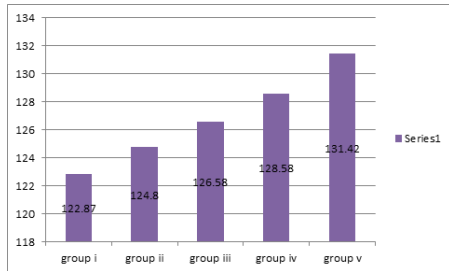
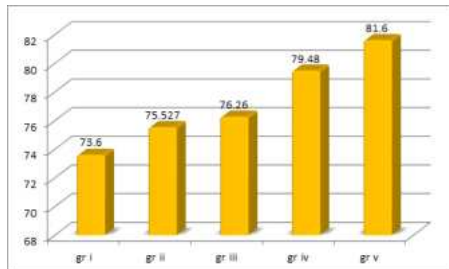


Figure 2: Distribution of SBP in female:

Highest mean SBP was recorded in Obese2 and lowest in underweight group. SBP increased with increased BMI in female.

**Figure 3:** Distribution of DBP in male:

Highest mean DBP was recorded in Obese2 group and lowest in underweight group. Mean DBP increased with increased BMI in male.

**Figure 4:** Distribution of DBP in female:

Highest mean DBP was recorded in Obese2 group and lowest in underweight group. Mean DBP increased with increased BMI in female.

Table 1: Correlation of SBP with BMI in male and female:

Correlation of SBP with BMI	Pearson's Correlation coefficient r	P value
Male	.825	<.001
Female	.760	<.001

There was a significant positive correlation between SBP and BMI in both male and female.

Table 2: Correlation of DBP with BMI in male and female:

Correlation of DBP with BMI	Pearsons Correlation coefficient r	P value
Male	.577	<.001
Female	.537	<.001

There was a significant positive correlation between DBP and BMI in both male and female.

DISCUSSION:

Present study evaluated 384 subjects (male=240 female=144), and found Prevalence of obesity in male 46.67% (112), in female 44.44% (64) with male preponderance. Both SBP and DBP showed increasing trend with increase in BMI which was more marked in obese2 group of both the sexes.

Similar findings were noted in US National Health and Nutrition Examination Surveys¹⁰, the INTERSALT Study¹¹, and study by Benda R.et.al.¹²

On comparison of SBP in male between groups II and III; groups II and IV; groups II and V; group III and IV, groups III and V; and groups IV and V, a rise in SBP with BMI was observed, which was statistically very highly significant ($p<0.001$).

On comparison of DBP in male between groups II and V; groups III and V; and groups IV and V, an increase in DBP with BMI was observed which was statistically very highly significant. On comparison between groups II and III; groups II and IV; groups III and IV an increase in DBP with BMI was observed which was statistically non-significant.

On comparison of SBP in female between groups II and IV; groups II

and V; and groups III and V; a rise in SBP with BMI was observed which was statistically very highly significant ($p<0.001$). On comparison between groups IV and V a rise in SBP with BMI was observed that was highly significant. On comparison between groups II and III; and groups II and IV, an increase in SBP with BMI was observed that was statistically non-significant.

On comparison of DBP in female between groups II and IV and groups II and V, an increase in DBP with BMI was observed which was statistically very highly significant. On comparison between groups III and V a rise in DBP with BMI was observed which was statistically highly significant. On comparison between groups II and III; groups III and IV; and groups IV and V an increase in DBP with BMI was observed which was statistically non-significant.

In the present study, a significant positive correlation of SBP and DBP with BMI was noted both in male and female.

Similar findings were noted in the Ethiopia STEPS study¹³ and studies by Benmohammad K et.al.¹⁴; Alireza Moafi et.al.¹⁵ and Suman Dua et.al.¹⁶

CONCLUSION:

Body mass index is an important predictor of obesity. Both Systolic and Diastolic blood pressure are positively and significantly correlated with body mass index in both male and female.

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