

Original article

Assessment of BMI in Medical students and its correlation with Blood pressure

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Abstract:

Overweight and obesity represent a rapidly growing threat to the world population and reached epidemic proportion in many Asian countries. These countries are facing grave burden of obesity related disorders like Hypertension, Diabetes mellitus, CVD which develop at a younger age than in western population. Concern grows that the current dramatic rise of obesity among adolescents portends a future wave of increasing cardiovascular disease. Body mass index has been identified by World Health Organization as most useful epidemiological measure of obesity. The present cross sectional study was conducted in the Department of Biochemistry in Dhaka National Medical College during the period from January 2012 to June 2012. A total of 205 medical students of Ist & 2nd year, age ranging from 18 to 20 years were recruited in this study as study subjects. We observed frequency and distribution of overweight & obesity among medical students and found that a substantial proportion of medical students were overweight and obese. Among the total 205 study subjects, 130(63.41%) had normal BMI ranging from (18.5-24.9) kg /m², 45(21.95%) were overweight, BMI ranging from (25-29.9) kg/m² and 12(5.85%) were obese BMI > =30 kg/m². The total number of underweight subjects was 45 that correspond to 21.95%. We also examined the relationship of BMI with systolic and diastolic blood pressure. The results of this study showed that BMI is positively correlated with Systolic blood pressure (p=0.039) & there was a linear relationship between BMI & diastolic blood pressure which was also statistically significant (p=0.005). The present findings emphasize the importance of the prevention of obesity in order to prevent future obesity related problems such as hypertension in adolescent.

Key words: BMI, Hypertension, Overweight, Obesity.

Introduction:

Assessment of BMI is an indirect measure to determine the fat content in the body. BMI is a measurement which compares weight and height in both men and women. The healthy range of BMI is between 18.5-24.9 kg/m². It defines people as underweight when BMI is < 18.5, overweight when BMI is in between 25-29.9 and obese when BMI is in between > 30^(1, 2). Obesity is becoming epidemic globally. The original alarm was sounded in 1994 by National Centre for health Statistics in USA & they observed that over a span of 10 years from

1988 to 1999, the prevalence of overweight in adult increased from 55.95% to 64.5%. During the same period, the prevalence of obesity increased from 22.9% to 30.5%³. In obesity there is excess accumulation of fat in the fat cells or in the adipocytes. When the intake of metabolic fuel is greater than expenditure obesity results. Virtually all the organ systems in the body are affected by obesity. Cardiovascular system is most commonly affected. Obesity causes ischemic heart disease, HTN, abnormal cholesterol level and concomitantly reduces the HDL which is the very bad

prognostic marker for cardiovascular diseases⁴. The relevance of both HTN and obesity an important public health challenges is increasing worldwide and also in our country. The growing prevalence of obesity is increasing and recognized as one of the most important risk factors for development of HTN. The exact mechanism of how obesity causes HTN is not known. Obesity might lead to hypertension and cardiovascular disease by activating the renin-angiotensin-aldosterone system, by increasing sympathetic activity, by promoting insulin resistance and leptin resistance, by increased procoagulatory activity and by endothelial dysfunction⁵. Obesity is found to affect a number of hormonal mechanisms such as renin angiotensin aldosterone system which play a key role in controlling the blood volume of the body along with the sympathetic nervous system that controls Na & water retention in the body. Obesity interfere these system which leads to HTN⁶. The present study was carried out in the department of biochemistry in Dhaka National Medical College among the students of 1st and 2nd year to assess their BMI and thus to determine the percentage of obesity existing among them to create awareness regarding obesity and also to make them more concern to prevent it.

Material and method:

The present cross sectional study was conducted in the department of biochemistry, Dhaka national medical college during the period from January 2012 to June 2012. A total of 205 medical students of Ist & 2nd year of Dhaka national medical college (Age between 18 to 20 years) were included in this study as study subjects. Out of them 104 were female & 101 were male. Verbal informed consent was obtained from the study subjects before the commencement of the study. For the assessment of BMI, height, and weight measurements were taken using standard protocols given by Weiner and Lourie⁷.

Stature was measured by anthrop meter to nearest 0.1 cm and weight was measured using portable spring weighing machine, in light clothing and without shoes. Standard mercury sphygmomanometer with appropriate cuff size was used to measure blood pressure. Blood pressure measurement by auscultatory method was done after 5 minutes of allowing the participant to remain in the sitting position.

Statistical analysis:

The data was analyzed by using SPSS version 11. Pearson correlation coefficient test was done to see the correlation of BMI with Systolic blood pressure and diastolic blood pressure.

Results:

The study was conducted on total 205 Medical students of Dhaka National Medical College of similar age ranging from 18 to 20 yrs. Among them 108 subject were in 1st year and 97 subjects were in 2nd year students. Out of total subjects 101 were male and 104 were female which was respectively 49.25% and 50.73%. The height ranging from 1.43 miters to 1.83 miters and weight 38 kg to 107 kg are main determinant factors to asses the BMI.

Table 1: Frequency and Distribution of study subjects:

Total	Female	Male
205	104 (50.73%)	101 (49.25%)

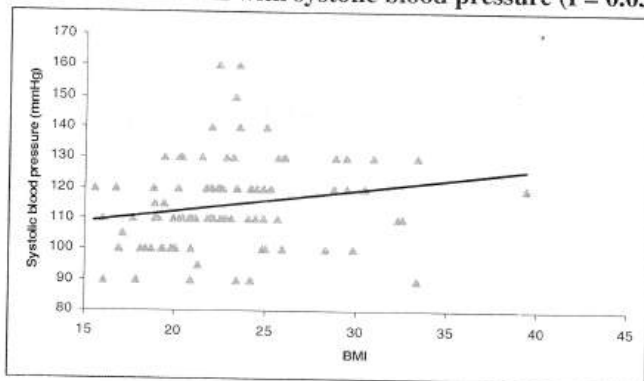
Among the total 205 study subjects, 130(63.41%) had normal BMI ranging from (18.5-24.9) kg /m², 45(21.95%) were over weight, BMI ranging from (25-29.9) kg/m² and 12(5.85%) were obese BMI > =30 kg/m². The total number of under weight subjects was 80 that correspond to 8.78%.

Table 2: Frequency and Distribution of BMI in the study subjects

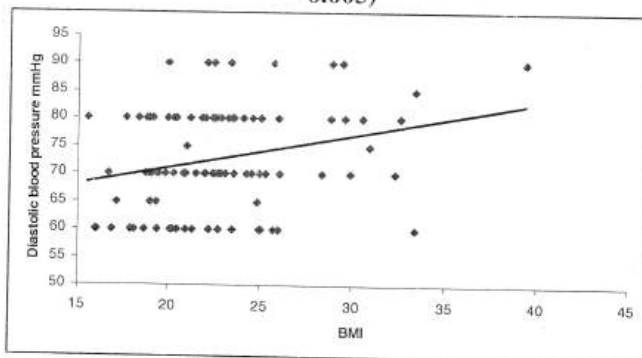
Total students	205(n)
Normal (18.5-24.9)	130 (63.41%)
Underweight (<18.5)	18(8.78%)
Over weight (25-29.9)	45(21.95%)
Obese (>=30)	12(5.85%)

Among the 1st year students 55.45% were male and 44.55% were female. They had family history of diabetes mellitus and hypertension respectively 50.9% and 56.19%. Among the 2nd year students 43.16% were male and 56.84% were female. They had family history of diabetes mellitus and hypertension respectively 68.43% and 52.64%. BMI of both the 1st year and 2nd year showed the positive correlation with systolic and diastolic blood pressure which was statistically significant (p= 0.039, p= 0.005).

Correlation of BMI with systolic blood pressure (P= 0.039)



Correlation of BMI with diastolic blood pressure (P= 0.005)



Discussion:

The study was conducted on 205 Medical students of similar age group ranging from 18-20 years. The mean age of 1st year and 2nd year students were 18.93 and 19.97 years respectively. On the basis of BMI the study revealed that collectively the number of over weight and obese were 45(21.95%), 12(5.85%) respectively, far greater than that of under weight students and almost 25% of the total study subjects. This finding correlates with the observation by Pamela C et al. that 2/3rd of the American people are overweight and 1/3rd are obese and the prevalence of obesity increases with age¹. As adiposity has increased, so the risk of developing associated diseases such as hypertension, diabetes mellitus and cardiovascular disease has also increased. Obesity is not only limited to United States, but rather has increased globally. In fact by some estimates, there are more obese than undernourished individuals worldwide. Overweight and obesity represent a rapidly growing threat to healthy population in an increasing number of countries^[8]. Obesity has become globally epidemic and during the 10 years, obesity has increased dramatically both in children and adult in Europe and USA^{9,10}. The present study revealed a positive correlation with both systolic and diastolic blood pressure which is similar to the study done by Dowling and Pi-Sunyer¹¹. BMI is indirect measures of excess fat content of

the body and it can be computed by dividing the weight in Kg by height in meters square. Medical students are mostly sedentary and the influence of the other environmental factors like increase media exposure, computer uses, decrease physical activity, using of energy saving appliances, sweetened beverages etc play a key role of over weight and obesity.

Conclusion: This study highlights the necessity of physical activities and gymnastics and also suggest to reduce the other environmental influences, thus to prevent the health hazards of obesity. Large scale studies are needed for further evaluation to asses the prevalence of BMI. In view of the fact that medical students are the part of the general population. So studies should be extended to the adult population of Bangladesh.

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