



Original Article

Pattern of Body Mass Index in Students of a Private Medical College of Bangladesh

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Abstract

Objectives: To determine the BMI status of the students of Rajshahi Islami Bank Medical College and to calculate frequency of different BMI categories.

Methodology: A cross-sectional questionnaire based study was carried out in medical students of Rajshahi Islami Bank Medical College, Rajshahi. Body weight and height were measured and body mass index (BMI) values were calculated by dividing weight with (height)². Overweight and obesity were defined using WHO international standard BMI cut-offs.

Results: The overall prevalence of underweight students was 29.9% out of which 9.6% fell under the category of severely underweight (BMI of <16.5). In overweight category there were 8%. The frequency of students falling in Obese Class I, II & III was 2.7%, 0.6% & 0.0% respectively. It was found that more female students compared to male students were underweight. In the overweight and obese categories there was a preponderance of male students. A positive correlation was found between perception of obesity amongst parents and overweight obese students.

Conclusion: According to this study, underweight, especially in girls, should be considered a serious health problem among adolescent students which needs to be addressed. Obesity on the other hand does not seem to be a major issue amongst them.

KEY WORDS: Body Mass Index, Obesity, Under-weight, Medical Students.

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Introduction

Body fat is an essential part of the body. Fat performs quite a important functions in the body. It provides an important energy source, acts as a heat insulator and shock absorber, is the source of estradiol in women and produces numerous hormones such as adiponectin, resistin and leptin. Too much or too little fat in the body poses problems. Obesity has been found to closely correlate with the level of body fat.^{1,2} Body mass

index (BMI) is commonly used to define obesity (also known as Quetelet Index), other methods used are waist circumference, CT, MRI, absorptiometry and life insurance tables.³⁻⁷ BMI describes relative weight for height, is not gender specific and is significantly correlated with total body fat content. It is also the most widely accepted means of assessing obesity measured by dividing weight by height². Among the many indices used to assess obesity, BMI has shown

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strongest correlation with continuous hypertension in both genders.⁸ Obesity and its associated morbidities are leading causes of cardiovascular disease, type II diabetes, hypertension, osteoarthritis, anesthesia risks, menstrual abnormalities as well as some types of cancers including those of colon and breast.⁸⁻¹⁰ Underweight is classified as having a BMI <18.5. Among the adolescent population of Pakistan, underweight is more frequent than obesity, whereas the opposite is true for adults.^{5,6} The data regarding the BMI status of adolescent population of Bangladesh is rare, a study with small sample size has reported the frequency of overweight at 12.6% and there is a need to determine the BMI of this group of population with a large number subjects for accuracy.¹¹ The current study was designed to determine the BMI status of the students of Rajshahi Islami Bank Medical College, Rajshahi, Bangladesh belonging to divergent socio-economical background. This will also help generate the base line data for adolescent group for the country.

Material and Methods

This was a cross-sectional questionnaire based study and was conducted from 1st Jan till April 30th 2011, medical students of Rajshahi Islami Bank Medical College (IBMC), Rajshahi, Bangladesh. The study population included all medical students of IBMC Rajshahi. Questionnaire was handed over to the students in lecture halls while they entered the hall and their weight and height was recorded while they left the hall. This procedure was repeated for each class for three times on three different days to improve enrollments. Students were also contacted during the breaks, in common room and canteen to participate in study. Each student was enrolled only once. Ethical approvals for the study were obtained.

Body weight and height were measured to the nearest 0.1 kg and 0.5 cm using Standard

calibrated scales and a non-stretch tape fixed to a flat vertical wall, respectively. To minimize error in measurement, scales were checked for accuracy by weighing an object of known weight. SPSS version 16.0 software was used for statistical analysis of data. In this study, parametric variables were analyzed using the Student's t-test. Differences in the prevalence rates of underweight, overweight and obesity between males and females were tested by chi square statistics. Difference in the prevalence rates of obesity between obese students and their parents were tested by ANOVA statistics. Linear regression was used to examine the correlation of BMI of participating students with their perception regarding obesity in their parents. All values are presented as mean \pm standard deviation. And a 'P' value less than 0.05 was considered statistically significant.

BMI was calculated by dividing weight in kilograms by height in meters squared.

Respondents were classified on the basis of current WHO BMI cut-off points:¹²

<16.00 kg/m ²	(severe underweight)
16.00-16.99 kg/m ²	(moderate underweight)
17.00-18.49 kg/m ²	(mild underweight)
18.50-24.99 kg/m ²	(normal range)
25.00 kg/m ²	(overweight)
25.00-29.99 kg/m ²	(pre obese)
30.00 kg/m ²	(obesity)
30.00-34.99 kg/m ²	(obese class I)
35.00-39.99 kg/m ²	(obese class II)
>40.00 kg/m ²	(obese class III)

Results

Among the 450 medical students to whom the questionnaire was administered, 392 completely enrolled the study.

Table-I: Segregation of BMI categories according to gender

Gender * BMI Categories Cross tabulation

BMI Categories	Severely Underweight	Under-weight	Normal	Over-weight	Obese Class I	Obese Class II	Total
Gender							
Male	7(5%)	11(9%)	74(60%)	20(16%)	10(8%)	0(0)	122
Female	27(10%)	60(22%)	134(49.6%)	35(12.9%)	9(3%)	5(1.9%)	270
	34(8.6%)	71(18.1%)	208(53.6%)	55(14%)	19(4.8%)	5(1%)	392

Mean height of students was 160.07 ± 8.26 cm. The mean height of males was 166.97 ± 6.32 cm while that of females was 155.58 ± 6.32 cm. The difference was statistically significant ($P < 0.01$; 95% CI 13.3 to 15.6). The mean weight of students was 56.2 ± 11.9 kg. The mean weight of males was 66.3 ± 12.0 kg and of females was 52.3 ± 9.3 kg. The weight of males was significantly more than that of female students ($P < 0.01$; 95% CI 12.4 to 15.6). The mean BMI of the students was 20.8 ± 3.8 . BMI among males was 21.8 ± 3.9 while that in females was 20.4 ± 3.6 . The difference was statistically significant ($P < 0.01$; 95% CI 0.8 to 1.9). Distribution of students according to the BMI categories showed that 53.6% of students were among the normal BMI category of 18.5-25.0. The frequency of underweight students was 26.7% out of which 8.6% fell under the category of severely underweight with BMI of < 16.5 . In over-weight category there were 8%. The frequency of students falling in Obese Class I, II & III was 4.8%, 1% & 0.0% respectively. The segregation of BMI categories according to gender showed that out of 270 female students 27 (10%) fell in severely underweight group while 7 (5%) out of total 122 male students fell into this category. The trend changes towards male preponderance in higher BMI categories, 16% males were overweight as compared to 12.9% females. The difference in frequency was analyzed by Chi-square test which was significant with $p < 0.01$.

Discussion

Our study showed significant number of students in underweight category with about 26.7% of students falling in this category while obesity at about 5.8% was not found to be a significant problem. An earlier study from a private sector medical university showed similar underweight proportion of 29% but they took the cutoff for underweight of $< 19 \text{ kg/m}^2$ and they also did not reported the subgroup category analysis.¹¹ They reported the obesity at 12.6% by using the cutoff of $> 26 \text{ kg/m}^2$.¹¹ Our study also showed that majority of underweight students were females, this could be due to the current trend for slimness rather than malnutrition. The overweight and obesity were more prevalent

among the male students in our study and similar findings were also observed in Greek adolescents.¹³

The accuracy of self reporting regarding BMI categories has found to be of acceptable in a recent study.¹⁴ In our study we took opinion of students regarding presence of obesity in their parents and found positive correlation of presence of obesity in parents with its presence in studied students.¹⁵ The observed higher frequency of underweight in adolescent age has also been reported from many other countries.¹⁶⁻¹⁹ This has many important medical implications as it has been reported that it could lead to psychological and physical disorders including infertility.²⁰⁻²³ The WHO expert consultation reports that the universal BMI

criteria developed by WHO are not suitable for Asian populations, since such individuals have different associations between BMI, percent-age of body fat, and health risks, from European populations. There is no recommendation, however, for new clear BMI cut-off points for all Asians.²⁴ The proportion of Asian people with a high risk of type 2 diabetes and cardiovascular disease is substantial at BMIs lower than the existing WHO cut-off point for overweight ($e^{25} \text{ kg/m}^2$). Available data do not indicate a clear BMI cut-off point for all Asians for over-weight or obesity. The cut-off point for observed risk varies from 22 kg/m^2 to 25 kg/m^2 in different Asian populations. It is recommended that current WHO BMI cut-off points should be retained as international classifications.²⁵ The findings in our study of significant proportion of underweight especially among the female students are alarming. Studies have shown that there is relation between somatic and psychological variables in such individuals and a suppressed serum leptin levels have been documented in them.²⁶ There is also difference in perception for under-weight status in subjects suffering from it.²⁷⁻²⁸

Conclusion

The study highlights the fact that obesity is not a major problem among the medical students but under-weight is coming up as a significant problem particularly among the female medical students. Keeping in view those about 80% of medical students belong to female gender this is a significant finding and needs better education and awareness.

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