Original Article

Assessment of Body Mass Index (BMI) in Under-graduate Medical Students

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Abstract

Background: Dietary habits and physical activity play an important role in maintaining a healthy body mass index. Studies among medical students worldwide report high burden of underweight (10 to 20.5%) and obesity (11.7 to 23.1%).

Objective: To assess the nutritional status of the undergraduate medical students in Dhaka city.

Methodology: The present study was a descriptive type of cross sectional study conducted at Dhaka Community Medical College and Hospital, Dhaka during February to April 2014. The target population consisted of 287 students from first, second year and third year (age 19-21 years) was included.

Results: Of total 287 students, 152(53%) were male and 135(47%) female. About half of the respondents were found with healthy weight 139(48.43%) whereas obese and overweight were respectively 58(20.21%), 33(11.50%) with average BMI 21.7245(±3.485). Statistically highly significant (p= <0.001) relationship between BMI category and sex, educational status of the students were found.

Conclusion: Awareness programme are needed to rectify the situation so the students can have normal BMI and decreased incidence of clinical problems associated abnormal BMI.

Key words: *Nutritional status; Medical students; Risk factors; Diet; Physical activity.*

Introduction:

Body mass index is a valuable tool to assess the nutritional status of an individual. It can be conveniently used to identify those who are underweight, overweight or obese.[1] Obesity has become a disease of public health concern for both developed and developing countries. Globally, obesity has been estimated to be the fifth leading cause of mortality. The World Health Organization estimates that 1.1 billion adults living in both developed and developing countries are overweight in which 300 million of them are obese. The prevalence of obesity in the USA has increased from 12.0% to 19.8% and half of its adult population is now overweight or obese. This growing epidemic is not only found in adults but also among children and young adults. The prevalence of obesity among school-aged children has more than tripled since the 1970s.[2]

Childhood overweight affects self-esteem and has negative consequences on cognitive and social development.[3] Conditions such as type 2 diabetes mellitus, hypertension, and hypercholesterolemia, which were seen primarily in adults, are becoming more common among children as the prevalence of obesity increases.[4] Because childhood obesity often persists into adulthood, a rising number of adults will be at increased risk of these conditions as well as of cardiovascular disease, osteoarthritis and certain types of cancer. As a whole, the obesity epidemic constitutes a substantial decrease in the quality of life and life expectancy and accounts for billions of dollars in provision of health care.[5] Due to difficulty of curing obesity in adults and the many long-term adverse effects of childhood obesity, the prevention of childhood obesity has been recognized as a public health priority.[6] In many developing countries, the progression of the nutritional transition has been detected, characterized by reduction of the prevalence of nutritional deficiencies and the more expressive occurrence of overweight and obesity, not only in the adult population, but also among children and

adolescent, which are fundamentally related to changes in lifestyle and eating habits.[5]

The prevalence of malnutrition in Bangladesh is among the highest in the world. Millions of children and women suffer from one or more forms of malnutrition including low birth weight, wasting, stunting, underweight, vitamin A deficiency, iodine deficiency disorder and anemia. Today malnutrition not only affects individual but its effects are passed from one generation to the next as malnourished mothers give birth to infants who struggle to develop and thrive. If these children are girls, they often grow up to become malnourished mothers themselves. Globally, malnutrition is attributed to almost one-half of all child deaths. Survivors are left vulnerable to illnesses, stunted growth and intellectual impairment.[7] The deprivation to women starts from birth in Bangladesh. The socioeconomic, health and nutritional status of women depict gloomy pictures throughout their life. It has been recognized that infants, children and women of the reproductive age constitute the most vulnerable group from the stand point of nutrition. Malnutrition is the outcome of many complex biological and social processes. The roots of malnutrition run deep into its social soil and it is a matter of thought that malnutrition has not been changed significantly during the last two decades.[8] The purpose of the study was to assess the nutritional status of the medical students in Dhaka city. So the findings of the study might provide a comprehensive picture on nutrition of students, which could inform and guide the concerned authorities for undertaking appropriate measures to improve the situation.

Materials and methods:

The present study was a descriptive type of cross sectional study to assess the nutritional status of Under-graduate medical students conducted at Dhaka Community Medical College and Hospital, Dhaka during February to April 2014. The target population consisted of 287 students from first, second year and third year (age 19-21 years) was included. Sample size was detected by using formula $n=Z^2pq/d^2$. Convenient sampling technique was used in the study for data collection. Only interested students were interviewed and information regarding age, sex, height in meters and weight in kilograms of each subject was collected. Verbal informed consent was taken from the respondents by explaining the purpose of the study. Assurance had been given that the confidentiality concerning their information would be maintained strictly. A semi structured pretested questionnaire was developed to collect data from face to face interview. The measurements were taken under supervision using a standardized weighing machine, height measuring scale and measuring tape. Body mass index (BMI) was calculated using the formula weight (in kilogram)/height^2 (in meter), given by World Health Organization (WHO)[9] criteria (table 1). Collected data were checked, verified & then enter into the computer. Only the fully completed questionnaire was entered into the computer for final analysis which was carried out with the help of SPSS (Statistical Package of Social Science, version-17) windows software program.

Table: 1 Classification of nutritional status according to BMI (WHO criteria)

BMI (Kg/m^2)	Nutritional status
< 18.5	Under nutrition
18.5 - 24.9	Normal
25.0 - 29.9	Over nutrition
30.0 - 34.5	Mild obesity
35.0 - 39.0	Moderate obesity
≥40.0	Severe/ morbid obesity

1. Weight was measured using kg weight scale.
2. Height was determined using a length measuring tape in cm.
3. The BMI calculating formula was weight in kg divided by square of height in meter.

BMI 18.5 - 24.9 kg/m^2 are considered normal. A BMI below 18.5 kg/m^2 is called under nutrition. BMI ≥30.0 kg/m^2 indicates obesity, which is ranked as sever or morbid when BMI is ≥40.0 kg/m^2.

Result:

A total of 287 medical students were participated in the study with the age ranged from 19 to 21 years. Among them 152(53%) were male and 135(47%) were female.

Table: 2 Sex distribution of the students (n=287)

Sex of the students	Frequency	Percentage
Male	152	53
Female	135	47

Figure: 1 Distribution of the respondents by category of Body Mass Index (n=287)

About half of the students were found with healthy weight 139(48.43%) whereas obese and overweight was respectively 58(20.21%) and 33(11.50%). Male mean height was 161.97 (±4.621) centimeters and in female 148.85 (±7.019) centimeters. Average body weight of the respondents was 52.42 (±8.34) kg.

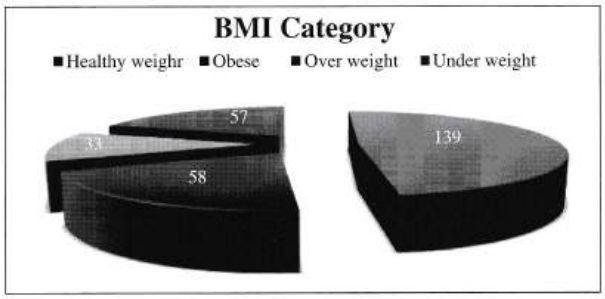

Figure.1 Distribution of the students by category of BMI

Mean BMI of both sexes was 21.7245(±3.485), individually in male 20.41 (±3.077) and in female 23.11 (±3.060). The proportion of obesity is one third of the female 46(33.1%) which is higher than male 12(8.1%) respondent. The proportion of underweight found in male 46(31.1%) which is higher than female 11(7.9%). The relationship between BMI category and sex of the students found statistically significant (χ^2=49.48, p <0.001).

Table: 2 Distribution of the respondents by sex and Body Mass Index (n=287)

Sex of the student	BMI category					
	Under weight n(%)	Healthy weight n(%)	Over weight n(%)	Obese n(%)	χ^2	P value
Male	46(31.1)	80(54.1)	10(6.8)	12(8.1)	49.4	<0.001
Female	11(7.9)	59(42.4)	23(16.5)	46(33.1)		

The highest proportion of obesity was found in 1st year MBBS students 48(26.5%) and lowest in 3rd year students 2(3.3%). On the other hand the proportion of underweight was highest in 2nd year students 11(23.9 %) and lowest in 3rd year 6(10%). This association was tested by χ^2 and was found significant (p <0.001).

Table: 3 Distribution of the respondents by educational status and Body Mass Index

Educational Sex of the student	BMI category					
	Under weight n(%)	Healthy weight n(%)	Over weight n(%)	Obese n(%)	χ^2	P value
1st year	40(22.1)	73(40.3)	20(11)	48(26.5)	86.63	<0.001
2nd year	11(23.9)	25(54.3)	2(4.3)	8(17.4)		
3rd year	6(10)	41(68.3)	11(18.3)	2(3.3)		

Discussion:

Medical students are the future doctors and role models of the society, whose lifestyle and health conditions are highly valued by the general public in the country. However, due to the very demanding course and time schedules of the medical degree, medical students are known to be involved in less physical activity and more sedentary life style. This may be reflected in their BMI status.[10] A total of 287 medical students were participated in the study with the age ranged from 19 to

21 years to assess their nutritional status. Among them 152(53%) were male and 135(47%) were female. About half of the students were found with healthy weight 139(48.43%) whereas obese and overweight was respectively 58(20.21%) and 33(11.50%). Male mean height was 161.97 (±4.621) centimeters and in female 148.85 (±7.019) centimeters. Average body weight of the respondents was 52.42 (±8.34) kg. Mean Body Mass Index (BMI) of the respondents was 21.72 (±3.48). Almost twenty percent were obese, which was almost similar to the Thai study.[11] The distribution of BMI among undergraduate medical students is similar to that reported by Kokila et al.[12] The prevalence of overweight and obesity is consistent with that reported by Boo et al (Malaysia)[13] and Padamsree et al (Vizianagaram).[14] The current study findings in light of previous studies point to an increasing trend in the prevalence of overweight and obesity among medical students. The higher prevalence in the study could also be due to the use of WHO advised BMI criteria for Asians. Gore et al[15] reports a higher prevalence of overweight (41.1%) using the same criteria. Nevertheless, it is an issue of concern requiring appropriate action considering that one third of the present study participants were overweight and obese and only 20% are underweight. A BMI value of over 30 kg/m^2 has been shown to be a risk factor for hypertension, heart disease, diabetes mellitus, cardiovascular disease, gall bladder disease and various types of cancer. On the other hand, a low BMI (underweight BMI < 18.5 kg/m^2) has been associated with a higher risk of hip fracture in women.[16, 17] In relation to sex of the respondent proportion of overweight was more in female (16.5%) than male (6.8%). The difference of BMI category regarding sex of the respondent was also found consistent with other studies.[18] In the study the relationship between BMI category, sex and educational status of the students were found as statistically highly significant (p= <0.001).

The present study has a few limitations. The study was conducted among 1st, 2nd and 3rd year, students, so the trend of weight over the years could not be studied. The study population being a sample from one college in an urban area of Dhaka city may not be representative of all medical students of the country. However, the study confirms the high prevalence of both underweight and overweight among medical students and the role of unhealthy dietary practices and inadequate physical activity. A detailed dietary history including the quantity of food items was not taken.

Conclusion:

The high occurrence of underweight, overweight and obesity with poor dietary practices and low physical activity levels among the study participants is an issue of serious concern. These observations show that medical students despite adequate knowledge are not motivated enough to modify their lifestyle behavior. The students should be encouraged to adopt healthy dietary practices and undertake moderate to vigorous physical activity and various outdoor sports activities. There is a need to undertake a larger study involving all the medical students, to identify the trends in the prevalence of overweight and plan necessary action. Considering that lifestyle risk factors play an important role in overweight and obesity, there is a need for regionally and nationally representative prevalence studies of lifestyle risk factors among different groups of population.

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