Estimation of Body Mass Index (BMI) in Medical Students

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ABSTRACT

Objectives: To determine the BMI status of undergraduate medical students.
Design: A descriptive cross sectional study.
Place of study: Lahore Medical & Dental College (LMDC), Lahore.
Duration of study: January to March, 2011.
Methodology: Body weight and height were of 136 fourth year MBBS students measured and body mass index (BMI) values were calculated by dividing weight with (height). Under weight, normal weight, 0verweight and obesity were defined using WHO international standard BMI cut-offs. Additional information including gender and age were obtained using a structured proforma. Data was entered and cleaned using SPSS version 16 computer package. Data was presented in the form of graphs and described in numbers and percentages.
Results: Among the MBBS students interviewed, 70% were in the age group 20 to 22 years and 57% were females. The mean height of the students was167.7 metres (sd= 10.8); males 176.6 meters (sd= 6.3) and females 160.90 meters (sd= 8.4). The mean weight of the students was 67.7 kg (sd=14.1); males 72.14 kg (sd=13.3) and females 60.79 kg (sd=12.7. Overall, 60% of students were within the normal weight range overweight (66% males and 56% females). Around 27% male and female students were overweight. Obesity was found in 7% of students (3% males and 9% females). The 6% underweight students included 8% males and 3% females.
Conclusion: Being overweight is a rising problem of male and female medical students. Both obesity and under weight issues are more common in female students.
Key words: BMI, medical students, underweight, overweight, obesity

INTRODUCTION

Body fat is an essential part of 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] 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.[3-6] 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 height.[2] Among the many indices used to assess obesity, BMI has shown strongest correlation with continuous hypertension in both genders.[3] Based on the World Health Organization (WHO) BMI cut-offs for the international classification of body weight, a BMI < 18.5 kg/m^2 is categorized as *underweight,* 18.5–24.9 kg/m^2 as *normal*, and ≥ 25.0 kg/m^2 as

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overweight, which is further classified as *pre-obese* (25.0–29.9 kg/m^2), *obese Class I* (30.0–35.9 kg/m^2), *obese Class II* (36.0–39.9 kg/m^2), and *obese Class III* (≥40 kg/m^2).[7] The data regarding the BMI status of adolescent and young adults in Pakistan is scanty, 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[8].

METHODOLOGY

A descriptive cross-sectional survey was conducted at Lahore Medical and Dental College (LMDC), Lahore, between October 2009 and January 2010. The study population consisted of all 136 fourth year MBBS students, at LMDC. A structured proforma was used to collect and record information on age, sex, height in meters and weight in kilograms, of each subject. Body Mass Index (BMI) was calculated using the formula weight (kg)/height^2 (m^2). Using cut off points modified from WHO criteria[7], BMI less than 18.49 was considered underweight, 19-24.99 normal, 25-29.9 was overweight and 30 or above obese. Data was entered and cleaned in SPSS Version 16. Data was presented in the form of graphs. Descriptive statistics was used in terms of numbers and percentages.

RESULT

Among the 136 study participants of the study, 95(70%) were in the age group 20 to 22 years and 41(30%) were ≥23 years of age. Out of 136 students, 59(43%) were males and 77(57%) were females (M: F = 0.7:1). As shown in Figure I, the mean height of the students was167.7 metres (sd=10.8) and their mean weight was 67.7 (sd=14.1). The mean height of males was 176.6 meters (sd= 6.3) and their mean weight was 72.14 kg (sd=13.3). The mean height of females was 160.90 meters (sd= 8.4) and their mean weight was 60.79 kg (sd=12.7). As seen in Figure II, when classified according to BMI, 60% of students were within the normal weight range. Compared to them, 27% students were overweight. Obesity was present in 7% of students, while 6% of them were underweight. When classified according to gender, the average BMI of male students was 23.2 (sd 3.8) and female students was 23.5 (sd 4.9).

Fig. 1: Frequency distribution of 136 medical students according to mean height and weight
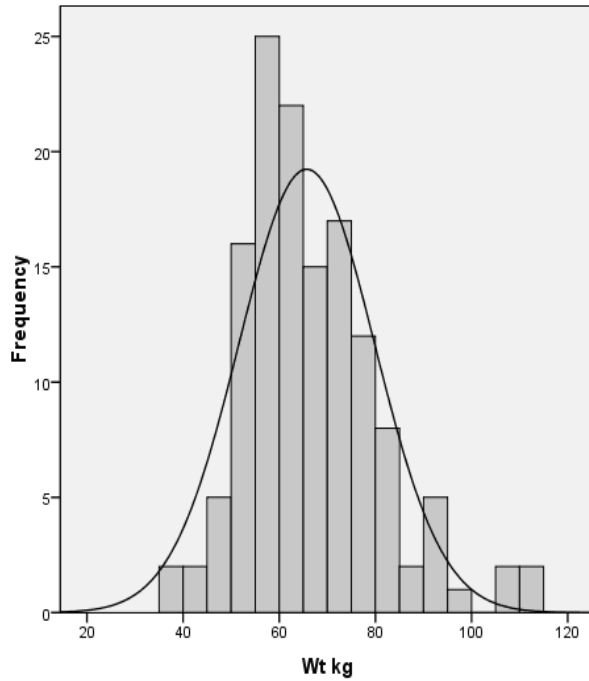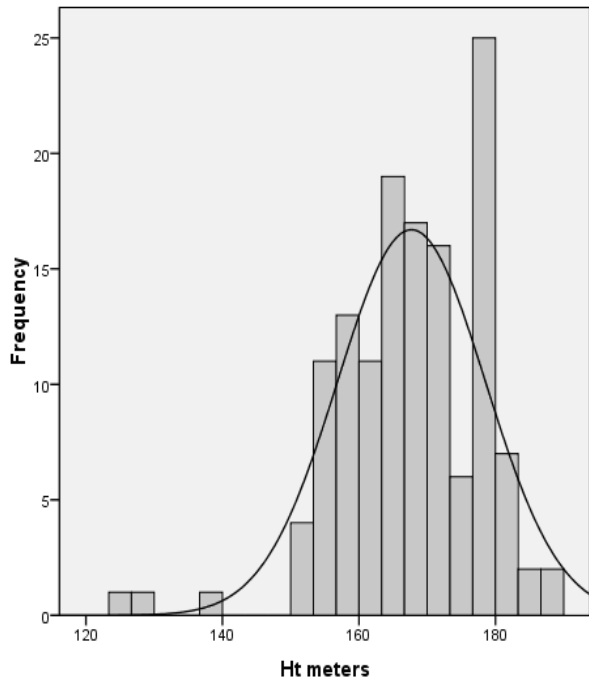

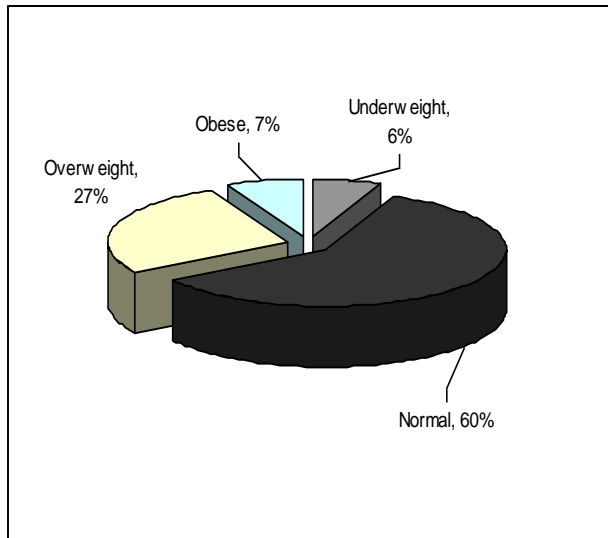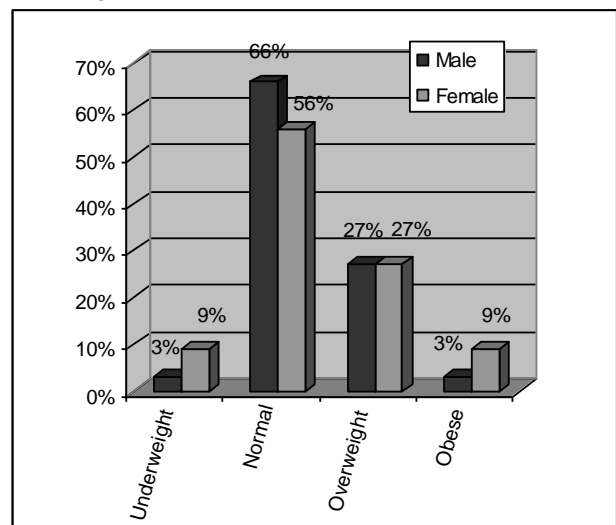Fig. II: Classification of 136, students according to their BMI

Fig. III: Classification of 59 male and 77 female students according to their BMI

As seen in Figure III, among the students within the normal BMI range, 66% were male and 56% were females. Compared to them, 27% male and female students were overweight. Obesity was found in 3% of male and 9% of female students. The underweight students included 8% males and 3% females.

DISCUSSION

In the present study most students (60%) had a normal BMI. A study conducted at Dow medical college[9] showed similar results with 59% of students having normal BMI. Reporting from a Malaysian medical college, Boo et al. reported that 69% of students had a normal BMI[10].

In the present study, Obesity was only found among 7% of students (3% of males and 9% of females). A similar study from Malaysia reported medical students' obesity to be around 8% (5% in males and 2% in females).[10] Two comparable studies conducted in Karachi elicited obesity at about 3% among public sector medical students[9] and 13% in a private sector medical school.[11] Gupta et al. reported 3% obesity among medical students of Kolkata[12] while Chhabra et al. reported obesity to be 2% among medical students of Delhi.[13] Abdalla and Mohamed in their study on medical students of Ribat University, Khartoum, reported obesity to be 9%[14].

In our study, the problem of being over weight was equally shared by males and females (27%). In similar studies, frequency of overweight medical students were reported by Gupta et al. to be 17.5%[12] according to Chhabra et al. it was 12%[13] and Abdalla and Mohamed stated it to be 18%[14].

In the current study, underweight students were around 6%, (3% males and 8% females). According to Boo et al. in a Malaysian study, 15% of medical students were underweight (7% males and 24% females)[10]. This could be due to the current trend for slimness rather than malnutrition. This trend was also highlighted by Minhas et al. in a similar study Dow medical college Karachi.[9] Being under weight has many important medical implications as it has been reported that it could lead to psychological and physical disorders including infertility[15-18].

CONCLUSION

The study highlights the fact that obesity is not a major problem among the medical students but being over-weight is coming up as a significant problem in both male and female students. However, more female students were obese or underweight. Keeping in view that now about 80% of medical students belong to female gender, this is a significant finding and needs better education and awareness.

RECOMMENDATIONS

1. Emphasis should be on promoting low intensity long duration physical activity that can be conveniently incorporated into daily life. Formal exercise should be encouraged, but at the same time, activities should be enjoyable in order to encourage regular participation and discourage sedentary lifestyle.
2. Advice about dietary intake should include guidance about avoiding the over-consumption of energy dense diets rich in fat and refined products and low in fiber.
3. Health education should incorporate all the above-mentioned points in an understandable and appealing way in order to maximize its impact in the community.
4. More broad based studies should be conducted in medical colleges and in the general population so as to establish guidelines on nutrition and weight status for the Pakistani people.

REFERENCES

1. Neovius M, Rasmussen F. Evaluation of BMI-based classification of adolescent Overweight and obesity: Choice of percentage body fat cutoffs exerts a large influence. The COMPASS study. Eur J Clin Nutr 2008;62:1201-1207.
2. Carroll JF, Chiapa AL, Rodriquez M, Phelps DR, Cardarelli KM, Vishwanatha JK, et
3. al. Visceral fat, waist circumference, and BMI: Impact of race/ethnicity. Obesity (Silver Spring) 2008;16:600-607.
4. Zhou Z, Hu D, Chen J. Association between obesity indices and blood pressure or
5. hypertension: Which index is the best? Public Health Nutr 2008:1-11.
6. van den Berg E, Kloppenborg RP, Kessels RP, Kappelle LJ, Biessels GJ. Type 2 diabetes mellitus, hypertension, dyslipidemia and obesity: A systematic comparison of their impact on cognition. Biochim Biophys Acta 2008;1792:470-481.
7. Bloomgarden ZT. Gut hormones, obesity, polycystic ovarian syndrome, malignancy, and lipodystrophy syndromes. Diabetes Care 2007;30:1934-1939.
8. Jensen MK, Chiuve SE, Rimm EB, et al. Obesity, behavioral lifestyle factors, and risk of acute coronary events. Circulation 2008; 117:3062-9.
9. Overweight, obesity, and health risk. National Task Force on the Prevention and Treatment of Obesity. Arch Intern Med 2000;160:898-904.
10. Aziz J, Siddiqui NA, Siddiqui IA, Omair A. Relation of body mass index with lipid profile and blood pressure in young healthy students at Ziauddin Medical University. J Ayub Med Coll Abbottabad 2003;15:57-59.
11. Minhas HT, Anis D, Jawaid A, Naeem H, Naz M, Zuberi BF. Estimation of body mass index in students

of a public sector medical college in Pakistan. Pak J Med Sci 2010;26(4):918-22.

12. Boo NY, Chia GJQ, Wong LC, Chew RM, Chong W, Loo RCN. The prevalence of obesity among clinical students in a Malaysian medical school. Singapore Med J. 2010; 51(2) : 126-32.

13. Aziz J, Siddiqui NA, Siddiqui IA, Omair A. Relation of body mass index with lipid profile and blood pressure in young healthy students at Ziauddin Medical University. J Ayub Med Coll Abbottabad 2003;15:57-9.

14. Gupta S, Ray1 TG, Saha I. Overweight, Obesity and Influence of Stress on Body Weight Among Undergraduate Medical Students. Ind J Comm Med. 2009; 34(3): 255-7.

15. Chhabra P, Grover VL, Aggarwal K, Kanan AT. Nutritional Status and Blood Pressure of Medical Students in Delhi. Ind J Comm Med 2006;31:248-51.

16. Abdalla SM, Mohamed EY. Obesity Among Medical Students of The National Ribat

17. University, Khartoum 2008. Sudan J Pub Heal. 2010; 5(2):16-9.

18. Sairenchi T, Iso H, Irie F, Fukasawa N, Ota H, Muto T. Underweight as a predictor of diabetes in older adults: A large cohort study. Diabetes Care 2008;31:583-584.

19. Mikolajczyk RT, Richter M. Associations of behavioural, psychosocial and socioeconomic factors with over- and underweight among German adolescents. Int J Public Health 2008;53:214-220.

20. Jokela M, Elovainio M, Kivimaki M. Lower fertility associated with obesity and underweight: The US National Longitudinal Survey of Youth. Am J Clin Nutr 2008;88:886-893.

21. Bosanac P, Kurlender S, Stojanovska L, Hallam K, Norman T, McGrath C, et al. Neuropsychological study of underweight and "weight-recovered" anorexia nervosa compared with bulimia nervosa and normal controls. Int J Eat Disord 2007;40:613-621.