

Body Mass Index (BMI) of International Medical Student in OJHA Campus Karachi, Pakistan

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ABSTRACT

Introduction: Measuring body mass index (BMI) by calculating height and weight gives significant information on the health and nutritional status of individuals. Wide range of factors including blood pressure level, heart disease, asthma, headache, backache, joint pain, anesthesia risks, menstrual abnormalities and insulin resistance is associated with increase in BMI.

Objectives: 1) To measure height and weight for Body Mass Index calculation. (2) To compare national data of Body Mass Index

Study Design: Cross sectional study.

Place and Duration of Study: This study was conducted at the Department of Community Medicine, Dow International Medical College(DIMC), Dow university of Health sciences OJHA campus Karachi from April 2012 to April 2013.

Materials and Methods: The sample of the study was 112 medical student selected through random sampling method from DIMC.

Results: BMI trend of American student (10.90%) and Pakistani Local student is slightly different were under weight in local Pakistani student (20.65%). While over weight were more in American student (over weight 29.64%). Majority of local and International students are fall in Normal range (55.35%). It was interesting that obesity in American students (3.70%) and local born students (3.44%) was almost same.

Conclusion: The study concludes that BMI of International student who were born in Pakistani migrant family have different trend. How ever over all majority of students both local and international fall in normal BMI range.

Key Words: Body Mass Index, gastrointestinal surgery, osteopenia and osteoporosis

INTRODUCTION

Measuring body mass index (BMI) by calculating height and weight gives significant information on the health and nutritional status of individuals. Wide range of factors including blood pressure level, heart disease, asthma, headache, backache, joint pain, anesthesia risks, menstrual abnormalities and insulin resistance is associated with increase in BMI.^{1, 2, 3}

BMI is equal or less than 18.5 indicates that weight is may be too low, as a low body mass can decrease body's immune system, which could lead to illness and need physician consultation.^{4, 5} BMI between 18.5 and 24.9 (Normal) considered as an optimal weight associated with longer life, the lowest incidence of serious illness. People with normal BMI are more physically active and attractive then people with BMI higher or in lower ranges.^{5, 6}

BMI between 25 and 29.9 (Overweight) considered at increase risk for variety of illness. They can decrease their weight by exercise and diet.^{7, 8}

BMI between 30 and 34.99 obesity (class 1)

BMI between 35 and 39.99 obesity (class 2)

BMI between 40 and greater (Morbid obesity)^{9, 10, 11}

BMI over 30 (obese) is considered as a risk for serious illnesses such as heart disease, diabetes, high blood pressure, gall bladder disease and some cancers.⁸ The method of treatment depends on level of obesity, overall health condition, and motivation to lose weight.^{12, 13} Treatment includes a combination of diet, exercise, behavior modification and some times weight loss drugs. In some cases of severe obesity, gastrointestinal surgery may be needed.^{11, 13} Losing of 7-10% of body weight may improve many of the problem associated to being overweight, such as high blood pressure, diabetes and arthritis.^{14, 15}

Low BMI in women not only indicates disorder and malnutrition but can also cause osteopenia and osteoporosis. These women are at increase risk of giving premature and under-weight births.^{13, 15} Low BMI is also associated with iron deficiency anemia and is characterized by a wide range of hematological and non hematological symptoms.^{16, 17} Non hematological Iron deficiency symptoms in any age may have significant impacts on learning abilities of students and

consequently their progress through the stage of higher education.^{18, 19, 20}

MATERIALS AND METHODS

Study Design: This study was a Cross sectional study.

Duration of study: April 2012 to April 2013

Place of study: Department of Community Medicine, Dow International Medical College (DIMC), Dow university of Health sciences OJHA campus Karachi.

Sample size: The sample of the study was 112 medical student selected through random sampling method from DIMC.

Data collection procedure: Demographic feature, height and weight measurement was recorded in pre design and pre tested Performa comprising information on demographic feature, height and weight measurement. Country of origin and age

Data analysis: SPSS 16 version.

Inclusion criteria: Those student who gave consent for study voluntary were Included in the study.

Exclusion criteria: Those who were unwilling to participate in the study were excluded.

RESULTS

Table 1 related to frequency of 112 students from 6 foreign countries and Pakistan the majority of student were from America (55), and Canada (12)

Table 2 shows that BMI of 112 students was recorded and calculated . According to table, 55 (49.10 %) student were from America, 12 were from Canada, 8

from UAE, 4 from Saudi Arabia, 3 from Hong Kong, 1 from Australia and 29 were from Pakistan. Regarding BMI and weight status 15 were under weight, 62 were normal, 29 were overweight and 7 were obese. Over weight 16 were from America, 5 in Pakistan and 8 were from other countries. Under weight were 6 from America, 6 from Pakistan and 3 from other countries. So the BMI trend of American student (10.90%) and Pakistani Local student is slightly different were under weight in local Pakistani student (20.65%). While over weight were more in American student (over weight 29.64%). Majority of local and International students are fall in Normal range (55.35%). It was interesting that obesity in American students (3.70%) and local born students (3.44%) was almost same.

Table 3 Shows mean age which was 20.33 years ± 5.85 and mean BMI was 22.39 ± 17.38 which is also within the normal range of BMI but tilted (BMI between 18.5 and 24.9) towards overweight.

Table No.1: Showing Country of origin

Country	No; of medical student
Pakistan	29
America	55
Canada	12
United Arab Emirate	8
Hong Kong	3
Saudi Arabia	4
Australia	1
Total	112

Table No.2: Showing country BMI and weight status

Country	Underweight BMI <18.5	Normal BMI 18.5 to 24.9	Over weight BMI 25 to 29.9	Obese BMI over 30	Total Student
America	6 (10.90%)	30(54.54%)	16(29.64%)	3(3.70%)	55 (49.10%)
Canada	2 (16.66%)	8 (66.68%)	2 (16.66%)	00.00	12 (10.80%)
U.A.E	1 (12.5%)	2(25 %)	3 (37.5%)	2 (25%)	8 (7.14%)
Saudi Arabia	00.00	1 (25%)	2 (50%)	1 (25%)	4 (3.55%)
Hong Kong	00.00	2 (66.66%)	1 (33.4%)	00.00	3 (2.68%)
Australia	00.00	1 (100%)	00.00	00.00	1 (.89%)
Pakistan	6 (20.65%)	18 (62.06%)	4 (13.79%)	1(3.44%)	29 (25.84%)
Total	15	62	28	7	112

Table No.3: Showing mean BMI and Mean age of International student

Characteristic	Mean	SD
Age in years	20.33	5.85
BMI	22.39	17.38

DISCUSSION

Our study covered 6 foreign countries and Pakistan from where these students are admitted in Dow international Medical College. These students are basically from the families who migrated from Pakistan to these countries. Sixteen students are from Pakistan

but there parents and close family members are working in foreign countries. Majority of students are from America because medical education in USA is costly and of longer duration. The Mean BMI of these students was 22.3 ± 17.38 and mean age was 20.33 year ± 5.85 . The mean BMI shows that students are of normal height and weight but when we analyze further 31 % , they were overweight and obese when we compared it with similar studies from Pakistan India, Thailand and USA . Result from Nishter medical college Multan shows that 8.73 were obese and 71 were of normal weight and 21. 1 % was under weight.¹⁹ As compare to 9% obese student from Multan our study

showed 31.1% overweight/obese which is 3 times higher.

In similar study Conducted in the Dow medical college on local students 17.4 % were overweight which is twice low percentage then our study²⁰. Another similar study from Thailand the BMI of the student was (BMI in Thais, which was 18.5-24.9, average BMI in both male and female medical students were within normal range) also showed average or mean BMI is in the normal limits similar to our study²¹. A result of a cross sectional study in South Indian medical college from medical college shows 39 % medical student were overweight²². This study when compared with Lahore study done at Lahore medical and dental college in 2011²³ showed 60% were normal 27 % were overweight and 7% were obese. Our study was also show similar trend. Result of American study shows that average BMI was 24.2 at each of Body Composition and Physical Fitness in a Cohort of US Military Medical Students, which is close to our study result.²⁴

CONCLUSION

The study concludes that BMI of International student who were born in Pakistani migrant family have different trend. However majority of students both local and international fall in normal BMI range.

REFERENCES

1. Brown WJ, Mishra G, Kenardy J, Dobson A. Relationships between body mass index and well-being in young Australian women. *Int J Obes Relat Metab Disord* 2000;24(10):1360–8.
2. 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.
3. Angelopoulos PD, Milionis HJ, Grammatikaki E, Moschonis G, Manios Y. Changes in BMI and blood pressure after a school based intervention: the CHILDREN study. *Eur J Public Health* 2009; 19(3):319-25.
4. Yusuf S, Reddy S, Ounpuu S, Anand S. Global burden of cardiovascular diseases: part I: general considerations, the epidemiologic transition, risk factors, and impact of urbanization. *Circulation* 2001;104: 2746-53.
5. Moafi A, Rahgozar S, Ghias M, et al. A Study on Body Mass Index, Blood Pressure, and Red Blood Cell Indices in New Entering Students of the University of Isfahan. *Int J Prev Med* 2011;2(4): 280–285.
6. Bloomgarden ZT. Gut hormones, obesity, polycystic ovarian syndrome, malignancy, and lipodystrophy syndromes. *Diabetes Care* 2007; 30:1934-1939.
7. National Institutes of Health (NIH), National Heart, Lung, and Blood Institute (NHLBI). The practical guide: identification, evaluation, and treatment of overweight and obesity in adults. Bethesda: National Institutes of Health. 2000, NIH publication 00-4084
8. Lebovitz HE. Metabolic Surgery for Type 2 Diabetes with BMI <35 kg/m²: An Endocrinologist's Perspective.
9. Kuczmarski RJ, Flegal KM. Criteria for definition of overweight in transition: background and recommendations for the United States. *Am J Clin Nutr* 2000;72(5):1074–1081.
10. Zhu SK, Wang Z, Heshka S, Heo M, Faith MS, Heymsfield SB. Waist circumference and obesity-associated risk factors among whites in the third National Health and Nutrition Examination Survey: clinical action thresholds. *Am J Clin Nutr* 2002; 76(4):743–749.
11. Zhu S, Heymsfield SB, Toyoshima H, Wang Z, Pietrobelli A, Heshka S. Race-ethnicity-specific waist circumference cutoffs for identifying cardiovascular disease risk factors. *Am J Clin Nutr* 2005;81(2):409–415.
12. Lear SA, Humphries KH, Kohli S, Chockalingam A, Frohlich JJ, Birmingham CL. Visceral adipose tissue accumulation differs according to ethnic background: results of the Multicultural Community Health Assessment Trial (M-CHAT) *Am J Clin Nutr* 2007;86(2):353–359.
13. Bays HE, Chapman RH, Grandy S. The relationship of body mass index to diabetes mellitus, hypertension and dyslipidaemia: comparison of data from two national surveys. *Int J Clin Pract* 2007;61(5):737–747.
14. Mokdad AH, Ford ES, Bowman BA, et al. Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *JAMA*. 2003;289(1):76-9.
15. Centers for Disease Control and Prevention. National Diabetes Fact Sheet: General Information and National Estimates on Diabetes in the United States, 2000. Atlanta, Ga: US Dept of Health and Human Services, Centers for Disease Control and Prevention; 2002.
16. Resnick HE, Valsania P, Halter JB, Lin X. Relation of weight gain and weight loss on subsequent diabetes risk in overweight adults. *J Epidemiol Community Health*. 2000;54:596-602.
17. Akramipour R, Rezaei M, Rahimi Z. Prevalence of iron deficiency anemia among adolescent schoolgirls from Kermanshah, Western Iran. *Hematol* 2008;13(6): 352-5.
18. Andrews NC, Ullrich CK, Fleming MD. Disorders of Iron metabolism and sideroblastic anemia. In: Lux SE, editor. *Hematology of infancy and*

- childhood. 7th ed. Philadelphia: WB. Sanders; 2009.p.521-70.
19. Agaoglu L, Torun O, Unuvar E, Sefil Y, Demir D. Effects of iron deficiency anemia on cognitive function in children. *Arzneimittelforschung* 2007; 57(6A): 426-30.
 20. Khedr E, Hamed SA, Elbeih E, El-Shereef H, Ahmad Y, Ahmed S. Iron states and cognitive abilities in young adults: neuropsychological and neurophysiological assessment. *Eur Arch Psychiatry Clin Neurosci* 2008;258(8): 489-96.
 21. 6. Nelson M. Anaemia in adolescent girls: effects on cognitive function and activity. *Proc Nutr Soc* 1996; 55(1B): 359-67.
 22. 7. Agaoglu L, Torun O, Unuvar E, Sefil Y, Demir D. Effects of iron deficiency anemia on cognitive function in children. *Arzneimittelforschung*. 2007;57(6A):426-30.
 23. Khedr E, Hamed SA, Elbeih E, El-Shereef H, Ahmad Y, Ahmed S. Iron states and cognitive abilities in young adults: neuropsychological and neurophysiological assessment. *Eur Arch Psychiatry Clin Neurosci* 2008;258(8):489-96.
 24. 9. Safavi M, Mahmoodi M, Roshandel A. Assessment of body image and its relationship with eating disorders among female students of Islamic Azad University, Tehran center branch. *Med J Islamic Azad Univ* 2009;2(19):129-34.
 25. Wang Z, Byrne NM, Kenardy JA, Hills AP. Influences of ethnicity and socioeconomic status on the body dissatisfaction and eating behavior of Australian children and adolescents. *Eat Behav* 2005;6(1):23-33.
 26. El Ansari W, El Ashker S, Moseley L. Associations between physical activity and health parameters in adolescent pupils in Egypt. *Int J Environ Res Public Health* 2010;7(4):1649-69.
 27. Nwachukwu DC, Nwagha UI, Obikili EN, Ejezie FE, Okwuosa CN, Nweke ML, et al. Assessment of body mass index and blood pressure among university students in, Enugu, South East, Nigeria. *Niger J Med* 2010;19(2):148-52.
 28. Shams S, Asheri H, Kianmehr A, Ziaee V, Koochakzadeh L, Monajemzadeh M, et al. The prevalence of iron deficiency anemia in female medical students in Tehran. *Singapore Med J* 2010; 51(2):116-9.
 29. Goudarzi A, Mehrabi MR, Goudarzi K. The effect of iron deficiency anemia on intelligence quotient (IQ) in under 17 years old students. *Pak J Biol Sci* 2008;11(10):1398-400.
 30. Poreba R, Gac P, Zawadzki M, Poreba M, Derkacz A, Pawlas K, et al. Life style and cardiovascular risk factors among students of Wroclaw postgraduate schools. *Pol Arch MedWewn* 2008; 118: 102-10.
 31. Yusuf S, Reddy S, Ounpuu S, Anand S. Global burden of cardiovascular diseases: Part II: variations in cardiovascular disease by specific ethnic groups and geographic regions and prevention strategies. *Circulation* 2001; 104: 2855-64.
 32. Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet* 2004; 364: 937-52.
 33. Mirmiran P, Noori N, Zavareh MB, Azizi F. Fruit and vegetable consumption and risk factors for cardiovascular disease. *Metabolism* 2009; 58: 460-8.
 34. Lobelo F, Duperly J, Frank E. Physical activity habits of doctors and medical students influence their counselling practices. *Br J Sports Med* 2009; 43: 89-92.
 35. Nadeem M, Faheem Sh.M, Naheed.R. Analysis of body mass index in medical student at Nishter Medical College, Multan. *Nishtar Med J* 2009;3: 22-24.
 36. Raza S, Sheikh M.A, Hussain F.M et al. Dietary modification, Body Mass Index (BMI), Blood Pressure (BP) and cardiovascular risk in medical students of a government medical college of Karachi. *J Pak Med Assoc* 2010;60(11):970-4.
 37. Vatanashevanopakorn C, Sathirawit P, Chearskul S et al. Body Composition, Muscular Strength and Cardiovascular Strength of the Second-Year Medical Students at Faculty of Medicine Siriraj Hospital, Mahidol University. *Siriraj Med J* 2010; 62:241-244.
 38. DAUD S, JAVAID F. Estimation of Body Mass Index (BMI) in Medical Students. *PJMHS* 2012; 5:702-5.
 39. Mitchell S, Eide R, Olsen C, Stephens M. Body composition and physical fitness in a cohort of US military medical students. *J Am Board Fam Med* 2008;21(2):165-7.

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