Obesity & Weight Loss Therapy

Overweight and Obesity among Medical Students of Public Sector's Institutes in Karachi, Pakistan

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Abstract

Objectives: To determine the factors associated with overweight and obesity among medical students of public sector's institutes in Karachi, Pakistan.

Methodology: A university based cross-sectional analytic study was conducted in public sector institutes of Karachi. Data was collected from first year to final year medical students through convenient sampling technique by using self administered questionnaire followed by anthropometric measurement. The outcome variable "overweight or obesity" was defined by using South Asian BMI (≥ 23) cut-off points. Logistic regression technique was applied by using software SPSS to determine the factors associated with overweight and obesity among medical students.

Results: A total of 428 medical students participated in study. Prevalence of overweight and obesity among medical students was found to be 14.7%, 12.4% respectively. Among boys it was 47.7% whereas among girls it was 15.9%. The prevalence of overweight and obesity was associated with male gender (adjusted OR=4.96 (95% C.I: 3.02 - 8.15)), lunch taking from college/outside home (adjusted OR=3.67 (95% C.I: 2.44 - 6.61)), snacks taking habit between the meals (adjusted OR=1.95 (95% C.I: 1.03 - 3.68)), and tea drinking habit (adjusted OR=2.50 (95% C.I: 1.38 - 4.54)).

Conclusion: Prevalence of overweight and obesity among medical students was high in our sample population. Multifaceted efforts are required to target this high risk group of medical students to prevent obesity and its related morbidity and mortality.

Keywords: Overweight; Obesity; Risk factors; Medical students; Pakistan

Introduction

Overweight and obesity is an excessive amount of body fat that places an individual at a greater health risk [1]. It is usually expressed by Body Mass Index (BMI) which is calculated by dividing the weight of an individual in Kilograms by his/her height given in meter square [2]. The ideal body weight of individual would be of BMI between 18.5 to 24.99 Kg/m^2 and BMI ≥ 25 to 30 Kg/m^2 would be considered as overweight and BMI >30 Kg/m^2 would be considered as obese [3].

Problem of overweight and obesity has been recognized as public health problem worldwide due to the fact that it increases the risk of chronic diseases such as Cardiovascular Diseases (CVD), stroke, diabetes, sleep apnoea, osteoarthritis, and many types of cancer [4-7]. It has also been said it decreases the productivity of a country by reducing life expectancy of individuals [8]. It is predicted that the prevalence of overweight and obesity will rise and by 2015 there will be approximately 2.3 billion overweight and more than 700 million obese individuals worldwide [9].

A global rise has been observed in prevalence of overweight and obesity [10]. The United States is at the top of the list of countries, approximately more than two-thirds of U.S. adults population is overweight and/or obese (BMI ≥ 25) [11]. In Australia, 60% of adults aged 25 years and over was overweight or obese [12]. Similarly in Canada nearly 60% of the adults and 26.3% of the children aged 2-17 years were above normal weight [13,14]. Similarly, prevalence of overweight and obesity in European countries were reported to be 10-27% among men and 10-38% among women [15].

Previously, obesity was viewed as a problem of developed countries, but in the last few decades its rising trend has been observed in developing countries as well [16]. The prevalence of overweight and obesity in China has risen to 27.3% in China [17]. Data from Eastern Mediterranean Region shown that prevalence of obesity in Saudi Arabia was 16% and 24% in men and women respectively and in Kuwait its prevalence were 32% and 44% in men and women respectively [18,19]. Similarly, prevalence of overweight and obesity among Iranian population was found to be 26.3% [20].

Apart from the general population, prevalence of overweight and obesity is also on the rise among medical professional even at a higher rate than general population [21,22]. It is alarming as they are the role models for the general population to follow in terms of a healthy weight and diet [22,23]. A study conducted among Greek medical students, reported 40% and 23% prevalence of overweight and obesity among males and female [24]. A study conducted among medical students at National Ribat University, Khartoum found 17.8% and 9.2% prevalence of overweight and obesity respectively [25]. Similarly, a study from Iran conducted among female medical students in Guilan reported 12.8% and 0.4% prevalence of overweight and obesity [26]. Research from the United Arab Emirates reported 24% prevalence of overweight and obesity among medical students [27]. Similar study from Malaysian medical school reported 30.1% prevalence of overweight and obesity among medical students [28].

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As far as Pakistan is concerned, the overall prevalence of overweight and obesity was found to be 25% in the general population [29] whereas a higher prevalence of overweight (31%) and obesity (28.2%) has been reported among postgraduate medical trainee doctors [22]. A study from Karachi, reported that 44% of male and 61% of female students of private medical college were overweight and obese [30]. Similarly, another study from private medical university reported a 41.7% prevalence of overweight and obesity among medical students [23].

There is dearth of knowledge regarding overweight and obesity and its associated factors among medical students of public sector's institutes of Karachi. Medical students are future medical professionals and would be the role model for the general population to be followed [22,23]. Due to their sedentary life style they are more prone to be overweight or obese and ultimately are at greater risk of chronic diseases. So, it would be worthwhile to provide base line information for intervention program to prevent overweight and obesity among future's physicians who would not only take care of sick but would also contribute effectively in field of medicine [31]. Therefore, the objective of the study was to estimate the magnitude of problem and to determine the factors associated with overweight and obesity among medical students of public sector's institutes in Karachi, Pakistan.

Method and Material

A cross sectional analytical study was conducted in two of the public sector institutes of Karachi; Dow Medical College (DMC), and Sindh Medical College (SMC). Data was collected from first year to final year medical students including male and female both. Students having history of fever, typhoid, diarrhoea or any other medical condition in last two months which could have affected their body weight were excluded from the study. Structured self administered questionnaires were distributed to students. They were requested to return filled questionnaires in a week time. They were also asked not to put names or university registration number on questionnaires which could have concealed their identity. There was no potential risk to participants as the study did not involve any intervention. Software Epi data was used for data entry. A sample size of 404 was required based on calculation carried out on software Epi Info, by taking 17.6% prevalence of overweight and obesity in unexposed group [22] with 80% power, to detect an odds ratio of 2 for overweight and obesity, at 5% level of significance.

Weight and height measurements were taken after completion of questionnaires. Weight and height of participants were measured to nearest 0.1 Kg and 0.5 cm respectively by using standard procedures [22]. South Asian cut-off of body mass index was used for defining overweight and obesity (BMI ≥ 23) [32]. The independent variables considered in study were age, sex, marital status, year of study, daily studying hours, family size, family set up, daily pocket money, ethnicity, breakfast habit, tea drinking habit, snacks taking habit, place of breakfast, place of lunch, physical activity and family history of obesity, hypertension, and diabetes.

Software Statistical Package for Social Sciences (SPSS) was used for data analysis. Mean and standard deviation was reported for continuous variables having normal distribution, whereas proportion was reported for categorical variables. Multiple logistic regression technique was used to explore variables independently associated with overweight and obesity in selected population. Adjustment for possible interactions and confounders was done. Odds ratio and 95% confidence intervals were reported in the final model.

Results

A total of 488 students shown interest and picked the questionnaires from research team. The overall response rate was excellent as 428 (87.7%) students returned the completed questionnaires. Prevalence of overweight and obesity among medical students was found to be 14.7%, 12.4% respectively. Among boys it was 47.7% whereas among girls it was 15.9%. The main descriptive characteristics of participants are summarized in table 1.

At multivariable analysis level, the variables which were found to be significant at 5% level of significance are gender (male), place of lunch (college/outside home), snacks taking habits, tea taking habit and family history of obesity. Final model was assessed for biological plausible interactions and confounders but none found to be significant. Table 2 summarized the association of these variables with overweight and obesity in the form of adjusted odd ratio (OR), 95% confidence interval (CI) and p-value.

Discussion

The study determines the factors associated with overweight and obesity among medical students of public sector's institutes in Karachi, Pakistan. Provided information can be used as baseline for future intervention programme especially designed to prevent overweight and obesity among medical students. Response rate (87.7%) was excellent. The overall prevalence of overweight and obesity among medical students was found to be 14.7% and 12.4% respectively. The use of South Asian cut-off point for BMI to categorize individuals on the basis of their weight status was used in this study that ensured the correct

Variables	n (%)
Age (years) (Mean ± SD[1])	20.2 ± 1.7
Gender Boys Girls	 151 (35.3) 277 (64.7)
Participants by studying years 1st Year 2nd Year 3rd Year 4th Year Final Year	 110 (25.7) 45 (10.5) 116 (27.1) 76 (17.8) 81 (18.9)
Daily studying hours (Mean ± SD[1])	6.2 ± 3.1
Ethnicity Urdu speaking Punjabi Sindhi Pushtoon Others	 164 (38.3) 161 (37.6) 63 (14.7) 13 (3.0) 27 (6.3)
Family setup Nuclear[2] Combine[3]	 175 (40.9) 253 (59.1)
Place of breakfast Home College	 349 (90.9) 35 (9.1)
Place of lunch Home College	 288 (67.3) 140 (32.7)
Snacks between breakfast and lunch	323 (75.5)
Tea drinking habit	285 (66.5)
Physical activity (At least 30 minutes/day)	211 (49.3)
Family history of chronic diseases Obesity Hypertension Diabetes	 145 (33.9) 213 (49.8) 187 (43.7)

[1]SD: Standard Deviation; [2]Nuclear: Living with parents and siblings; [3]Combine: Living with parents, siblings and grandparents, uncle, aunty, or cousins

Table 1: Descriptive characteristics of the participants (n=428).

Variables	OR	95% C.I	p-value
Gender			
Girls	1	3.02 - 8.15	0.001
Boys	4.96		
Place of lunch			
Home	1	2.44 - 6.61	0.003
College/Out of home	3.67		
Snacks between breakfast & lunch			
No	1	1.03 - 3.68	0.040
Yes	1.95		
Tea taking habit			
No	1	1.38 - 4.54	0.001
Yes	2.50		
Family history of obesity			
No	1	0.98 - 2.73	0.060
Yes	1.63		

Table 2: Adjusted odd ratios (multivariable analysis), 95% confidence interval and p-value for factors associated with overweight and obesity among participants (n=428).

estimation of the magnitude of the problem. The medical students who were found to be at higher risk of being overweight and obese were male students, who had lunch at college cafeteria/out of home, drink tea, have snacks between breakfast and lunch, and have a positive family history for obesity.

Findings of the study in terms of prevalence of overweight and obesity are consistent with findings of the previous studies conducted among medical students which reported 24% overweight or obese [27], 17.4% overweight [33], 17.8% overweight and 9.2% obesity [25]. However, our findings are not consistent with studies conducted in private medical institutes of country who reported a 52.6% and 41.7% prevalence of overweight and obesity among medical students respectively [23,30]. A reason might be in the difference of the social classes of medical students as both of these studies were conducted among medical students of a higher socioeconomic status.

Male gender was found to be associated with overweight and obesity. More male medical students were overweight and obese than their female counterparts. This finding is also consistent with study conducted among earlier career trainee doctors of similar setting [22]. Contrarily, studies conducted in private medical universities (students from high socioeconomic status) of Karachi reported a higher proportion of overweight and obesity among female medical students [23,30]. However, non inferential association reported in those studies did not allowed to make a comparison.

Medical students who were taking their lunch from the college cafeteria or outside their home were more likely to be overweight and obese than medical students taking their lunch at home. A possible reason could be the type of food available in a college cafeteria or outside market. It may be mainly junk food and moreover food available in cafeteria or market may have a higher fat content than home-made food. A similar finding was also suggested in earlier study which reported that trainee doctors who were taking their lunch from outside home were found to be at a greater risk of overweight and obesity as compared to those bringing their lunch from home [22].

Similarly we found an association of snacks taking habit with overweight and obesity. The students who were taking snacks between breakfast and lunch were more likely to be overweight and obese than those who were not taking snacks between their meals. The type of edibles which are usually available for snacks in the college cafeteria or outside include different types of biscuits, French fries, chips, burger and samosas. These edibles in small amounts provide high calories and

possibly can contribute towards overweight and obesity as also reported in earlier studies [22,30].

Another important finding was the association of the tea drinking habit of medical students with their overweight and obese status. The students who were drinking tea at least once a day were found to be at greater risk of being overweight and obese than those who were not taking tea at all. However, earlier studies conducted in France and Log Angeles reported a weight controlling effect of tea on body weight [34,35]. The possible reason of current positive association of tea with weight gain would be the amount of sugar and milk being consumed in it in our setting rather than tea itself. Similarly, frequency of tea consumption and its intake along with other available snacks items e.g. biscuits, fries, chips and samosas (easily available) may be responsible for found association.

Similarly, we found a positive association of family history of obesity with overweight and obese status of medical students. In our sample population 34% of the students have a family history of obesity. These findings are consistent with previous studies as there is a role of genes in the development of overweight and obesity. Along with that it could be because families are the social role model for individuals who form part of it [22,23,29,30].

There are certain limitations of the study which need to be considered while interpreting results. First of all, cross sectional nature of study design does not claim cause and effect relationship (temporal relationship) between variables in our model and overweight and obese status of students. Secondly, baseline data regarding weight status of medical students at time of their admission was missing which otherwise could have helped us reasonably to conclude whether those students were overweight or obese at the time of admission into medical college or whether they gained weight thereafter. Thirdly, chance of self reporting bias in self administered questionnaires cannot be ruled out. Fourthly, diet is a complex variable in health research and it needs careful measurement which could not have been achieved in this study. Similarly, generalizability of finding is limited to public sector's institutes only as medical students of a private university may have difference of the socioeconomic status. Finally, these results cannot be generalized to students of other speciality e.g. dentists, pharmacy, physiotherapy or nursing. Future researchers can design multi-centred cross sectional study to include sample of medical students from public and private sectors in order to enhance external generalizability of the findings. In the same way, it would be great to explore the problem of overweight and obesity among other science students e.g. dentists, pharmacy, physiotherapy or nursing etc.

Conclusion

The prevalence of overweight and obesity was high among medical students of public sector's institutes in Karachi especially among male having family history of obesity, who had lunch at college, and had tea and snacks taking habits. There is need of a multifaceted intervention involving students, their families and university administration to work in coordination in order to intervene in this problem and to prevent its potential consequences. These efforts would enable medical students to practice a healthy diet and lifestyle and to be role models for the general society, to be followed in terms of a healthy weight. Thereafter we can hope to see medical professionals practicing as well as promoting a healthy diet and lifestyle.

References

1. Ofei F (2005) Obesity - A Preventable Disease. Ghana Med J 39: 98-101.

2. James ML, Donald CY, Joseph AR, Ronald MD (2001) Obesity: Assessment and Management in Primary Care. Am Fam Physician 63: 2185-2197.

3. Nirav RS, Eric RB (2012) Measuring Adiposity in Patients: The Utility of Body Mass Index (BMI), Percent Body Fat, and Leptin. PLoS ONE 7: e33308.

4. Blair SN, Shaten J, Brownell K, Collins G, Lissner L (1993) Body weight change, all-cause mortality, and cause-specific mortality in the Multiple Risk Factors Intervention Trail. Ann Intern Med 119: 749-757.

5. Must A, Strauss RS (1999) Risks and consequences of childhood and adolescent obesity. Int J Obes Relat Metab Disord 23: S2-S11.

6. Kenchaiah S, Evans JC, Levy D, Wilson PW, Benjamin EJ, et al. (2002) Obesity and the risk factors of the heart failure. N Engl J Med 347: 305-313.

7. Malnick SD, Knobler H (2006) The medical complications of obesity. QJM 99: 565–579.

8. Haslam DW, James WP (2005) Obesity. Lancet 366: 1197-1209.

9. Byington R, Keene S, Samples D (2009) An Epidemiological Overview Of Pediatric Obesity: A Global Perspective of a Growing Problem. The Internet Journal of World Health and Societal Politics 6.

10. Cristol H (2002) Trends in global obesity: Developing nations are gaining on U.S. in a weighty matter. The Futurist 36: 10.

11. Flegal KM, Carroll MD, Kuczmarski RJ, Johnson CL (1998) Overweight and obesity in the United States: Prevalence and trends, 1960-1994. Int J Obes Relat Metab Disord 22: 39-47.

12. Cameron AJ, Welborn TA, Zimmet PZ, Dunstan DW, Owen N, et al. (2003) Overweight and obesity in Australia: the 1999-2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab). Med J Aust 178: 427-432.

13. Caprio S, Genel M (2005) Confronting the epidemic of childhood obesity. Pediatrics 115: 494-495.

14. Caballero B (2007) The global epidemic of obesity: An overview. Epidemiol Rev 29: 1-5.

15. Lien N, Henriksen HB, Nymoen LL, Wind M, Klepp KI (2010) Availability of data assessing the prevalence and trends of overweight and obesity among European adolescents. Public Health Nutr 13: 1680-1687.

16. Seidell JC (1997) Time trends in obesity: an epidemiological perspective. Horm Metab Res 29: 155-158.

17. Du S, Lu B, Zhai F, Popkin BM (2002) A new stage of the nutrition transition in China. Public Health Nutr 5: 169-174.

18. Al-Isa AN (1995) Prevalence of obesity among adult Kuwaitis: A cross-sectional study. Int J Obes Relat Metab Disord 19: 431-433.

19. Al-Nuaim A, Al-Rubeaan K, Al-Mazrou Y, Khoja T, Al-Attas O, et al. (1996) Prevalence of diabetes mellitus, obesity and hypercholesterolemia in Saudi Arabia. In: Diet Related Non-communicable Diseases in the Arab Countries of the Gulf, (eds.). AO Musaiger & SS Miladi 73-81.

20. Rashidy-Pour A, Malek M, Eskandarian R, Ghorbani R (2009) Obesity in the Iranian population. Obes Rev 10: 2-6.

21. Zafar SH, Haque I, Butt AR, Mirza HG, Shafiq F (2007) Relationship of body mass index and waist to hip ratio measurement with hypertension in young adult medical students. Pak J Med Sci 23: 574-579.

22. Mahmood S, Najjad MK, Ali N, Yousuf N, Hamid Y (2010) Predictors of obesity among post graduate trainee doctors working in tertiary care hospital of public sector in Karachi, Pakistan. J Pak Med Assoc 60: 758-761.

23. Nisar N, Quadri MH, Fatima K, Perveen S (2009) Dietary habits and life style among the students of a private medical university karachi. J Pak Med Assoc 59: 98-101.

24. Bertsias G, Mammas I, Linardakis M, Kafatos A (2003) Overweight and obesity in relation to cardiovascular disease risk factors among medical students in Crete, Greece. BMC Public Health 3: 3.

25. Sawsan MA, Elsadig YM (2010) Obesity among medical students of the National Ribat University, Khartoum 2008. SJPH 2: 16-19.

26. Mohtasham AZ, Maddah M (2006) Prevalence of overweight and obesity among female medical students in Guilan-2003. Iranian Journal of Endocrinology and Metabolism 8: 157-162.

27. Carter AO, Elzubeir M, Abdulrazzaq YM, Revel AD, Townsend A (2003) Health and lifestyle needs assessment of medical students in the United Arab Emirates. Med Teach 25: 492-496.

28. NY, Chia GJ, Wong LC, Chew RM, Chong W, et al. (2010) The prevalence of obesity among clinical students in a Malaysian medical school. Singapore Med J 51: 126-132.

29. Tazeen HJ, Nish C, Gregory P (2006) Prevalence of overweight and obesity and their association with hypertension and diabetes mellitus in Indo-Asian population. CMAJ 175: 1071-1077.

30. Hingorjo MR, Syed S, Qureshi MA (2009) Overweight and obesity in students of a Dental College of Karachi: lifestyle influence and measurement by an appropriate anthropometric index. J Pak Med Assoc 59: 528-532.

31. Dyrbye LN, Thomas MR, Shanafelt TD (2006) Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. Acad Med 81: 354-373.

32. Snehalatha C, Viswanathan V, Ramachandran A (2003) Cutoff Values for Normal Anthropometric Variables in Asian Indian Adults. Diabetes Care 26: 1380-1384.

33. Raza S, Sheikh MA, Hussain MF, Siddiqui SE, Muhammad R, et al. (2010) 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 60: 970-974.

34. Dulloo AG, Duret C, Rohrer D, Girardier L, Mensi N, et al. (1999) Efficacy of a green tea extract rich in catechin polyphenols and caffeine in increasing 24-h energy expenditure and fat oxidation in humans. Am J Clin Nutr 70: 1040-1050.

35. Roberts AT, de Jonge-Levitan L, Parker CC, Greenway F (2005) The effect of an herbal supplement containing black tea and caffeine on metabolic parameters in humans. Altern Med Rev 10: 321-325.