Assessment of Obesity in medical students

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Abstract: Objective: Obesity is one of the root cause of various noncommunicable diseases like hypertension, coronary heart disease and type 2 DM. Obesity in childhood and adolescent is highly associated with increased risk of cardiovascular and metabolic diseases later in adult life. In general population obesity is measured with simple and effective tool, Body mass index (BMI). This study was planned to find out the obesity status of medical students those are health professionals serving the society.

Methods: Study was carried out in I MBBS student after admission in the college at the time of medical check-up, anthropometric measurements such as weight and height were measured with maximum accuracy. BMI was calculated by Quetelet's Index & students were classified into normal (BMI = 18 to 24.99), overweight (BMI =24.99 to 29.99) & obese (BMI 30) groups.

Results: 820 students (334 males and 486 females) were participated in this study. Normal BMI was found in 58.04 % students. 21.95% were found overweight and 10.00% were found obese. 10.00% students were found to be Underweight.

Conclusions: Our data shows that the prevalence of obesity is high amongst medical students who are upcoming doctors..

Keywords: Obesity, Body Mass index, medical students, adolescents

1. Introduction

Obesity is one of the major public health concerns throughout the world. The rate of overweight and obesity is increased alarmingly in last thirty years of all age group population in developed as well as developing country. [1]23% of adults in the world are overweight and 9.8% adults are obese.[2] By 2030, the prevalence of overweight and obese adults in the world is projected to be 38% and 20%, respectively.[3] Based on body mass index (BMI) cut off values, the prevalence of overweight and obesity among Indians is 9.4% and 2.4% respectively.[4]

Country like India is facing a problem of "double burden of malnutrition". Developing countries like India is dealing with communicable diseases and under nutrition as well as also with noncommunicable diseases like overweight and obesity.[5] The World Health Organization (WHO) considered obesity as abnormal or excessive fat accumulation that may impair health.[6] The term obesity is referred to a "chronic condition that develops when energy intake exceeds energy expenditure, resulting in excessive body fat". Obesity is one of the risk factors of Non communicable disease and fifth leading cause of death around the globe.[7] It is well documented that obese child becomes obese adults and increases the risk of hypertension, cardiovascular disease and type II diabetes in feature.[8] Adolescent obesity is also responsible for several disorders like metabolic syndrome, cardiovascular disease and certain types of cancer. It is associated with high morbidity and mortality in the later life.[9] Some studies have shown that overweight and obesity in adolescent is also associated with school absenteeism due to social isolation, depression, poor body image and low self-esteem.[10] Many research literatures mentioned that there is direct relationship between obesity and socioeconomical status, sedentary lifestyle, sleep patterns and parental obesity.[11] It has been also suggested that physical inactivity and excessive dietary fat, salt intake is also responsible for weight gain. Furthermore environmental, behavioural and genetic factor also play important role in overweight and obesity. [12]Therefore, some preventive measures are required to alter the current scenario of obesity.

It is very difficult to compare prevalence of overweight and obesity in adolescent of different countries due to paucity in obesity screenings and research in adolescent as well as lack of standard method of measurement and cut-off points.

Obesity can be considered as excess of adipose tissue which can be measured by a various laboratory method like underwater body densitometry, the dual energy X-ray absorptiometry (DEXA), magnetic resonance imaging (MRI) and computed tomography (CT) which directly measures body fat.[13] These methods are very costly so difficult to implement in epidemiological studies. Several indirect methods are also widely used to measure adiposity using anthropometric measures such as the weight-for-height index(BMI), waist circumference (WC), waist–hip ratio (WHR), and body fat percentage estimated by skinfold thickness (ST).[14] Body Mass Index (BMI)

is most frequently used and simple parameter to measure obesity. BMI is recommended to define overweight and obesity status because it can be obtained easily, and it correlates strongly with body fat percentage. The values are same for both sexes and age dependent. Though not ideal, it has reasonable correlation with adiposity.

Medical students are future doctors, also considered as a very important knowledgeable health promoters and role models to the society for maintaining a healthy lifestyle. Research from many countries stated that obesity among medical students and health personnel is increasing astonishingly due to unhealthy eating habits, stress and lack of exercise. Therefore, this study was planned to assess status of obesity in the medical students using Body Mass Index (BMI), to create awareness of overweight and obesity among them and to recommend preventive measurements.

2. Material and methods:

Present study was a cross-sectional and institutional type of study. It was conducted in the Department of Physiology, of a local private medical college. Institutional ethical committee approval was obtained for the study. Subjects included in study were 820 healthy I MBBS students ;(Boys-334, Girls-486), between the age group of 18-22years. Students having history of smoking, tobacco chewing and alcohol consumption similarly having any acute or chronic major illness or any physical disability, those who are unwilling to take part in the study were excluded from the study.

A written consent was taken from all the subjects after explaining nature of study to them. Detail medical history was obtained, and a thorough clinical examination was done to rule out presence of any major illness and physical disability in all subjects.

Anthropometric measurements like height and weight were taken by trained paramedical staff in all subjects according to standard procedure to calculate body mass index (BMI). Standing height was measured using stadiometer nearest to 0.1cm accuracy. Weight was recorded using standard digital weighing machine, wearing lightweight cloths and removing heavy items from the pockets with the same degree of accuracy to the nearest of 0.1 kg. BMI was calculated by weight (kilograms) divided by square height (meters).[15]

Based on BMI, subjects were divided into four categories.

For statistical entry SPSS version used. Then data calculate and standard

Category	Range of BMI(Kg/m2)
Underweight	< 18.5
Normal	18.5-24.9
Overweight	25-29.9
Obese	>30

analysis and data 16.0 software was was analysed to percentage, mean deviation.

3. Results:

Number of Subjects	Category as per BMI			
	Underweight	Normal	Overweight	Obese
Boys-334	22(6.5%)	192(57.48%)	80(23.95%)	40(11.97%)
Girls-486	60(12.34%)	284(58.43%)	100(20.57%)	42(8.64%)
Total-820	82(10.00%)	476(58.05%)	180(21.95%)	82(10.00%)

Table 1 shows the percentage of, underweight, normal, overweight and obese students according to BMI.

Table 2 shows mean BMI in all four groups with SD

Number of Subjects	Category as per BMI			
	Underweight	Normal	Overweight	Obese
Boys-334	15.67±1.12	21.89±1.96	27.02±1.30	32.25±2.14
Girls-486	14.52±0.90	21.46±1.94	26.95±1.33	33.38±2.88
P value	0.67	0.04	0.98	0.4

4. Discussion:

The present study was done for the assessment of obesity in medical students. Of the 820 students participated, percentage of obesity was 11.97 % among boys and 8.64% among girls. The percentage of overweight was 23.95 % among boys and 20.57 % among girls. Study shows that the overall percentage of boys and girls having normal BMI were 57.48% and 58.19 % respectively. 6.5 % boys and 12.34% girls were found to be underweight. There was also a higher percentage of overweight and obesity in boys compared with girls, but difference was not significant.

When the present study was compared with other studies in India, it has been observed that the percentage of overweight and obesity are in accordance with the cross-sectional study carried out in Bengaluru India on medical students found that the prevalence of overweight and obesity was 14.6% and 11.3% respectively. Overweight and obesity were more among boys (9.7%, 6.8%) than girls (5%, 4.5%). Central obesity was found in 25.9% girls & 11.1% boys. As per study, the high prevalence of obesity is due to various factors and can be modified by changing routine regimes.[16] Study conducted among medical students by Adhikari et al from Kolkata in 2014 reported the prevalence of overweight and obese was 18% and 2%,[17] while study from Kerala in 2013 by Manojan KK et al showed that prevalence was 24.57% and 25.71%[18] whereas 17.5% and 3.4% overweight and obesity was reported by Gupta et al from west Bengal in 2007 .[19] These all studies were based on WHO Asia-Pacific guidelines. Study done by Chhabra et al. revealed that the prevalence of overweight and obesity was 11.7% and 2% respectively among medical students of Delhi.[20] Study conducted in medical college from Srinagar India, they found that percentage of overall overweight and obesity was 19.4% and 4.4% among medical students .[21]Study conducted in Japanese university from 1979 to1991, was showed that the percentage of obesity is increasing progressively and among the boys of medical school.[22] A study from Greece on 989 third-year medical students showed that the 40% of boys and 23% of girls were obese. Furthermore, 33.4% of boys and 21.7% of girls students in their study had central obesity. They concluded their study stating that BMI can be used as a strong predictor for hypertension.[23] Another study carried in healthcare workers Sicily, Italy, found that 13.3% of males and 13.6% of females were obese.[24] Study from Malaysia reported that overall prevalence of obesity among Malaysian students was 11.7%. The prevalence of Obesity was high among Malaysian females (13.8%) than males (9.6%). The rate of Obesity was 13.6% among the Malays, 13.5% among the Indians and 10.8% among the indigenous group of Sarawak followed by the Chinese 8.5%.[25]

The variance in prevalence of overweight and obesity could be due to demographic differences, criteria used to classify obesity status is not uniform and study carried out and compared the different age group of the population. Reason for overweight and obesity in medical population are multifactorial, may be due to burden of academic performance, irregular sleeping time, excessive food intake, eating pre-packaged foods and less fruits and vegetables, and consumption of soft drinks and chocolates are key contributors to weight gain.[26]Consumption of a high glycaemic index food in diet increases frequency of food intake .It also leads to rise in blood glucose level and insulin levels and lowers the fat oxidation by inhibiting lipolysis and favouring lipogenesis in obese adolescent .[27]Obesity is complex condition involving regulation of appetite and energy metabolism, which is responsible for different comorbid conditions. Physiological, biochemical nutritional, social and psychological factors also play role in individual variation in body fat.[28]

The excess body fat can be accumulated through a positive energy balance, that is, when the energy intake exceeds the energy output. About 25percent of daily calories in younger population is contributed by increased consumption of sugar enriched soft drinks, sweets etc. and this relative contribution towards excess energy intake leads to the obesity epidemic. "Positive energy balance was found to be main contributory factor to the obesity epidemic. In overweight and obesity, genetic and biological predisposition plays important role to sudden gain weight when exposed to unhealthy diet and lifestyle.[29]Food intake, Satiety, hunger are most powerful factors for the appetite regulation and ultimately genetic predisposition. Most human obesity is polygenic, and more about 300 genes and gene markers may in some way be responsible for obesity. Although genetic influences are important contributor for adult obesity, there are other factors like adopting western lifestyle, overburdening of

energy dense food and lack of motivation and opportunities towards physical activity helps to sustenance of obesity.

Limitation of the study was that only assessment of obesity was carried out and assessment of each contributing factor to obesity can be done in future studies.

5. Conclusion:

The present study concludes that higher percentage of medical students are overweight and obese. Our study highlights the need of population based educational programs to make people, especially future doctors, aware of dangers of obesity.

6. Recommendations:

Counselling to promote interventional strategies in the form of diet modification, encouraging them to follow lifestyle and regular physical exercises for maintaining weight loss. Awareness of obesity related risk factors for the various noncommunicable diseases are essential for obese individuals during their medical career.

Comprehensive approach towards adopting healthy lifestyle, promoting regular physical exercise by keeping long term vision with gradual weight reduction and proper nutritious food intake, regular sleep pattern is the basic treatment for the management of overweight and obesity.

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References

1. Chopra M, Galbraith S, Darnton-Hill I. A global response to a global problem: the epidemic of over nutrition. Bull World Health Organ 2002; 80: 952-958.
2. Khan ZN, Assir MZK, Shafiq M, Chaudhary A, Jabeen A. High prevalence of preobesity and obesity among medical students of Lahore and its relation with dietary habits and physical activity. Indian J Endocrinol Metabolism. 2016; 20(2):206-10.
3. Global burden of obesity in 2005 and projections to 2030.Kelly T, Yang W, Chen CS, Reynolds K, He J Int J Obes (Lond). 2008 Sep; 32(9):1431-7.
4. Expert WHO. Consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. Lancet. 2004; 363:157–163. doi: 10.1016/S0140-6736(03)15268-3.
5. Mondal N, Bose K, Sen J. 2018. The Paradox of 'Double Burden' of Malnutrition in India. In Malnutrition: A Double Burden. Editors. B.R. Publishing Corporation. 267-278.
6. Haslam DW, James WP. Obesity. Lancet. 2005 Oct 1; 366(9492):1197-209. doi: 10.1016/S0140-6736(05)67483-1.Review. PubMed PMID: 16198769. [PubMed]
7. Tiwari R, Jain V, Rajput AS, Bhagwat AK, Goyal M, Tiwari S. A study to assess prevalence of obesity among medical students of G.R. medical college, Gwalior, M. P., India. Int J Res Med Sci. 2014; 2:1412-6
8. Kamath S, D'Souza J. Prevalence of obesity among the medical students: a cross sectional study in a south Indian medical college. Al Ameen J Med Sci. 2013; 6(1):93-5
9. Centers for Disease Control and Prevention (CDC), Fact sheets. [Accessed on November 22, 2013]. Available from: http://www.cdc.gov/healthyyouth/obesity/facts.htm.
10. Pan L, Sherry B, Park S, Blanck HM. The association of obesity and school absenteeism attributed to illness or injury among adolescents in the United States, 2009. J Adolesc Health 2013; 52:64-9.
11. Flegal KM, Kit BK, Orpana H, Graubard BI. Association of all-cause mortality with overweight and obesity using standard body mass index categories: a systematic review and metaanalysis. JAMA 2013; 309: 71-82.
12. Deotale MK, Ranganathan U, Akarte SV. Prevalence of overweight and obesity among medical students and their knowledge, attitude and practices about obesity. Int J Sci Reports. 2015; 1(1):74-9.
13. Ohe K, Hachiya Y, Takahashi Y, Oda S, Takahara K. The significance of obesity in UOEH medical students-multiple regression analysis of the annual physical checkup data in 1991. J UOEH 1992; 14:279-88.
14. Vazquez G, Duval S, Jacobs DR, Jr, Silventoinen K. Comparison of body mass index, waist circumference, and waist/hip ratio in predicting incident diabetes: A meta-analysis. Epidemiol Rev. 2007; 29:115–28.
15. Ekpanyaskul C, Sithisarankul P, Wattansirichaigoon S. Overweight/Obesity and related factors among Thai medical students. Asia Pac J Public Health 2013; 25: 170–80.

16. Gudegowda KS, Vengatesan S, Sobagiah RT. Prevalence of overweight and obesity among medical college students, Bengaluru. Int J Community Med Public Health 2018; 5:1881-6. https://doi.org/10. 18203/ 2394-6040. ijcmph20181692

17. Adhikari A, Dey I, Mandal NK. A Study on Overweight & Obesity and its Risk Factors among Undergraduate Students of a Medical College in Kolkata. J Comprehensive Health. 2015; 3(2):42-51.

18. Manojan KK, Benny PV, Bindu A. Prevalence of obesity and overweight among medical students based on new Asia Pacific BMI guideline. Int J Prev Ther Med 2014; 2:15-7.

19. Gupta S, Ray TG, Saha I. Overweight, obesity and influence of stress on body weight among undergraduate medical students. Indian J Community Med 2009; 34:255-7.

20. Chhabra P, Grover VL, Aggarwal K, Kannan AT. Nutritional status and blood pressure of medical students in Delhi. Indian J Community Med 2006; 31:248-51

21. Reqaya Hameed, Anjali Nadir Bhat, Nida Nowreen, Prevalence of Overweight and Obesity among Medical Students and its Correlation with Sleep Pattern and Duration. International Journal of Contemporary Medical Research, Volume 6 | Issue 6 | June 2019.

22. Ohe K, Hachiya Y, Takahashi Y, Oda S, Takahara K.The significance of obesity in UOEH medical students–multiple regression analysis of the annual physical checkup data in 1991 . J UOEH 1992; 14:279-88

23. Tokmakidis Savvas P, Kasambalis Athanasios and coworkers. Fitness levels of Greek primary school children in relationship to overweight and obesity. 2006; 165: 867–874.

24. Abbate C, Giorgianni C, Munaò F, Beninato G, D'Arrigo G, D'Arrigo P, Brecciaroli R. Evaluation of obesity in healthcare workers. Med Lav. 2006 Jan-Feb; 97(1):13-9.

25. GR Lekhraj Rampal and co-workers. Prevalence of Overweight among Secondary School Students in Klang District, Selangor.Malasiya Journal of Nutritrion.2007; 13(1): 1-8.

26. Fernandez K, Singru SA, Kshirsagar M, Pathan Y. Study regarding overweight/obesity among medical students of a teaching hospital in Pune, India. Med J Dr. D.Y. Patil University. 2014; 7(3):279-83.

27. Febbraio MA, Keenan J, Angus D. Pre-exercise carbohydrate ingestion, glucose kinetics, and muscle glycogen use: effect of the glycemic index. J Appl Physiol. 2000; 89:1845-51.

28. Wilborn C, Beckham J, Campbell B, Harvey T, Galbreath M, La Bounty P, et al. Obesity: Prevalence, theories, medical consequences, management, and research directions. J Int Soc Sports Nutr. 2005; 2:4–31.

29. Isabelle Romieu,Laure Dossus, Simón Barquera,Hervé M. Blottière,Paul W. Franks, Marc Gunter, et al. Energy balance and obesity: what are the main drivers? Cancer Causes Control. 2017; 28(3): 247–258