Influence of Certain Factors on Overweight and Obesity among Undergraduate Medical Students at Vizianagaram

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Research Article

***Abstract*: Introduction:** In recent years, developing countries like India have been experiencing a nutritional transition in food choices from typically starchy (mainly carbohydrate diets) to fast food pattern and as a result, the dietary habits of young adults like medical students have been affected. Obesity is associated with a large number of debilitating and life-threatening disorders, such as increase in associated cardiovascular, metabolic and other non-communicable diseases. **Aim and Objectives:** To determine the influence of certain dietary habits and life style on body weight of medical students. **Materials and Methods:** Descriptive cross sectional study was conducted in 263 MBBS students. The study questionnaire covered demographic details, eating habits, types of food, exercise and lifestyle. The Body mass index (BMI) was calculated from weight (kg) & square of height (m). Various factors influencing overweight and obesity were analyzed. **Results:** Overweight and obesity was detected in a total of 41 students. Significant difference was observed between mean BMI of normal weight(21.23±1.71kg/m^2) and overweight-obese (27.08±2.51kg/m^2) students. Factors such as irregular diet (OR=2.79), restaurant visits (OR=2.96), family history of diabetes (OR=1.99) and obesity (OR=3.48) were associated with significantly higher risk of overweight and obesity. **Conclusions:** Obesity per se was detected as an uncommon occurrence as compared to overweight or pre-obesity which may turn to obesity in future life. Prevalence of overweight and obesity in young adults similar to national figures is alarming and warrants the need for regular risk factor screening and young adult-based approaches such as changes in life style and health education.

***Keywords*:** Body mass index; medical students; obesity; overweight

Introduction

Overweight and obesity are recognized as an "escalating epidemic" affecting both developed and developing countries [1],[2]. The childhood roots of adult obesity and also cardio vascular diseases are widely recognized and associated with calls for health promotion targeted at youth [3-5].A variety of factors, including diet, genetic predisposition, physical activities, physiological and behavioural factors, are implicated as contributing factors to obesity [6],[7]. Studies on medical students and health personnel in many countries, however, suggest that obesity is a problem among these population groups [8-13]. The present study aimed to determine the influence of certain factors on overweight and obesity among undergraduate medical students. An attempt was made to find out the significance of presence or absence of factors influencing body weight.

Material and Methods:

Subjects: A total of 263 undergraduate medical students (91 male and 172 female) studying in MIMS Medical College, Nellimarla, Vizianagaram of Andhra Pradesh state in India participated in this study. It was a descriptive cross sectional study conducted between April and September, 2012. Underweight students were excluded from further analysis. Finally the study included a total of 209 subjects (74 male and 135 female) with normal weight, overweight and obesity. ***Methods:*** Study participants were given a questionnaire, which consisted of year of study, information regarding factors related to obesity such as age, sex, regular physical activity, type of diet (vegetarian/non-vegetarian), dietary habits (regular/irregular), restaurant visits, eating junk food, and family monthly income (in Indian Rupees (INR) categorized as <30,000 per month INR and ≥30,000 per month INR). Purpose designed questionnaires were administered to ascertain biographical data as well as family history of diabetes and obesity. Height and weight of each subject were recorded. The body weight with an accuracy of ±100 g was recorded. Subjects were weighed without shoes. Standing body height was measured without shoes to the nearest 0.5 cm with the shoulders in relaxed position and arms hanging freely. Body Mass Index (BMI)) was calculated using the formula weight (in kg)/height (in m) 2. BMI of 18.5 to 25 was considered as normal, 25 to 29.9 as overweight and 30 or above as obese.

Statistical analysis: Statistical analysis was performed using the Statistical Package for Social Science (SPSS) version 15.0. Continuous variables (Age in years, body weight, height, BMI, Broca's index) with normal distribution were expressed as mean±standard deviation (SD). The risk associated with various factors in the

causation of overweight and obesity was determined by Odd's ratio (OR). Confidence interval (CI) was determined at 95% and Z test was applied. Significance of factors influencing body weight was done by chi square test. The level of significance was set at p value 0.05.

Results: Out of 263 students, 91 were male and 172 were female. The study participants constituted 99 students from 1st year MBBS, 62 from 2nd year, 54 from 3rd year and 48 from 4th year. 54 participants who were underweight were excluded from further analysis. Thus the study included a total of 209 students of which 74 were male and 135 were female. Male: Female ratio was 1:1.8.

Table 1. Distribution of study population and prevalence of overweight and obesity

	BMI			
MBBS Year	18·5-24.9	25.0-29.9	>30.0	Total
1st year	48 (28.57%)	26 (68.42%)	0	74 (35.41%)
2nd year	44 (26.19%)	4(10.53%)	2 (66.67%)	50 (23.92%)
3rd year	41 (24.41%)	5 (13.16%)	1 (33.33%)	47 (22.49%)
4th year	35 (20.83%)	3 (7.88%)	0	38 (18.18%)
Total	168 (80.38%)	38 (18.18%)	3 (1.44%)	209

Table 1 shows distribution of study population according to the academic year and prevalence of overweight and obesity among them. An overall prevalence of overweight and obesity was 19.62%. Normal BMI of 18.5-24.9 was found in 168 (80.38%) study participants, 38 (18.18%) were observed to be overweight with a BMI of 25.0-29.9 and remaining 3 (1.44%) were obese having BMI >30.0.

Table 2. Frequency distribution of students according to World Health Organization (WHO) body mass index (BMI) cut-offs for international classification of body weight and Asian population

BMI in kg/m^2 (BMI category)	WHO international classification, Number (%)		
	Male (n=74)	Female (n=135)	Total (n=209)
18·5-24.9 (Normal)	56 (75.68%)	112 (82.96%)	168 (80.38%)
25.0-29.9 (Overweight)	17 (22.97%)	21 (15.56%)	38 (18.18%)
≥30 (Obese)	1 (1.35%)	2 (1.48%)	3 (1.44%)
Total	74 (35.41%)	135 (64.59%)	209
	WHO body weight classification for Asian population, Number (%)		
	Male (n=74)	Female (n=135)	Total (n=209)
18·5-22.9 (Normal)	42 (56.76%)	91 (67.41%)	133 (63.64%)
23.0-27.4 (Overweight)	29 (39.19%)	36 (26.67%)	65 (31.10%)
≥27.5 (Obese)	3 (4.05%)	8 (5.92%)	11 (5.26%)
Total	74 (35.41%)	135 (64.59%)	209

Based on the WHO international classification of body weight, out of 74 male students 56 (75.68%) were having weight in the normal range, 17 (22.07%) were overweight and 1 (1.35%) was obese whereas out of 135 female students, 112 (82.96%) were normal weight, 21 (15.56%) were found to be overweight and 2 (1.48%) were obese. Based on the WHO standards for Asian population, 133 (63.64%) were normal weight, 65 (31.10%) were overweight and 11 (5.26%) were obese.

Table 3. Comparison of demographic and anthropometric data between normal weight and overweight & obese students

Demographic and anthropometric data	Overweight & obese students (n=41)	Normal weight students (n=209)	95% CI of mean difference	Z value	p value
Mean age±SD (years)	18.85±1.75	20.2±1.85	0.76,-1.94	4.47	<0.0001
Mean body weight ±SD (kg)	74.24±13.17	57.6±7.71	20.81,12.48	7.83	<0.0001
Mean body height ±SD (cm)	165.29±10.94	164.2±8.2	4.62,-2.43	0.61	0.545
Mean BMI±SD (kg/m^2)	27.08±2.51	21.23±1.71	6.67, 5.07	14.40	<0.0001
Mean Broca's index±SD	114.34±13.14	89.63±7.44	28.85, 20.55	11.68	<0.0001

For 209 study participants, the mean BMI was 22.38 ± 2.99 kg/m^2 and the mean Broca's index was 94.48±13.04. Broca's index of >105 which is considered as overweight and obese was observed in a total of 42 students.

Table 4. Distribution of subjects based on factors influencing body weight

Study factors		Normal weight	overweight and obese	χ^2 value	p value*	Odds ratio	CI
Gender	Female	112	23	1.61	0.209	0.65	0.30-1.36
	Male	56	18				
Income in INR	>30,000	114	27	0.19	0.659	0.85	0.39-1.84
	<30,000	54	14				
Non-Vegetarian diet	Yes	142	36	0.28	0.596	1.32	0.44-4.22
	No	26	5				

Irregular Diet	Yes	24	13	6.87	0.009*	2.79	1.18-6.55
	No	144	28				
Physical exercise	No	56	23	8.84	0.003*	0.27	0.10-0.72
	Yes	112	18				
Restaurant visits	Yes	58	25	9.63	0.002*	2.96	1.39-6.36
	No	130	16				
Junk food	Yes	60	16	0.16	0.693	1.15	0.54-2.43
	No	108	25				
Family H/o diabetes	Present	58	21	3.91	0.048*	1.99	0.95-4.20
	Absent	110	20				
Family H/o obesity	Present	16	11	8.78	0.003*	3.48	1.35-8.94
	Absent	152	30				

* Indicates significant p values

The role of various risk factors such as female gender, family income per month >30,000 INR, type of diet, family history of obesity and diabetes etc. in the causation of overweight and obesity were studied. The factors such as irregular diet (OR=2.79), restaurant visits (OR=2.96), family history of diabetes (OR=1.99) and obesity (OR=3.48) were associated with a significantly higher risk of overweight and obesity. Participation in outdoor sports was present in 125 students (59.81% of 209) out of which 107 (85.60%) were of normal weight and 18 (14.40%) were overweight & obese. Out of 84 students who did not participate in sports, 61 (72.62%) were of normal weight and remaining 23 (27.38%) were overweight & obese. Increased risk of overweight and obesity was associated with non-participation in outdoor sports (OR=2.24).

In addition to the aforementioned factors, awareness regarding morbidities arising as a result of obesity and risk factors for obesity viz unhealthy dietary habits, genetic factors, racial factors, physical inactivity was noted. The students were also asked to mention the type of obesity (whether abdominal or generalized) which is more dangerous. These findings are depicted in Illustration 1.

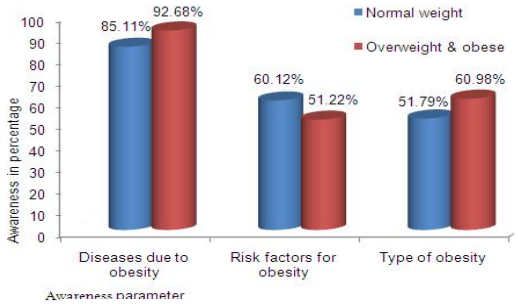

Illustration 1. *Awareness regarding obesity*

Discussion

The prevalence of overweight and obesity among the medical students in the present study was in coherence with that of the general population in India. The findings regarding prevalence are in accordance with another study among medical students in Kolkata (20.9%) [14]. However another study in North India by Chhabra et al [15] reported a prevalence of 13.7% among medical students of Delhi.

For comparison of overweight and obesity among medical students with previous studies as well as to understand the extent of the problem in relation to the Asian standards, the prevalence was calculated using WHO cut-offs for both the international and Asian population. According to the cut-off limits for Asian population, prevalence of overweight and obesity was observed to be 36.36%. Similar prevalence of 30% has been reported by other study also [16]. The presen study showed that approximately one-fourth of males and one-fifth of females were overweight and obese. This finding is consistent with Gupta S [14] et al study wherein 21.43% of males and 20.45% of females were overweight and obese.

When compared with the anthropometric data of normal weight students, overweight and obese students were taller and significantly heavier ($p<0.0001$). Mean of Broca's index was significantly more in overweight and obese students ($p<0.0001$). Mean of BMI in overweight and obese was on a higher side as compared to that in normal weight students and this was found to be statistically highly significant ($p<0.0001$). BMI is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. Considering this fact, only BMI was used for further analysis regarding influence of various factors on body weight.

In the present study, overweight and obesity was observed to be higher amongst female as compared to male students though statistically not significant ($p=0.209$). This is in contrast to other studies [14],[16] which have observed that occurrence of overweight and obesity was more among male students. This contrast could be because total female students were proportionately higher than male students in the present study. More number of overweight and obese students belonged to high income group and consumed non-vegetarian diet. However, this was statistically not significant. Similar findings were reported by Gupta S et al [14]. Richer people have better access to meat and other energy-dense foods (which are much more

expensive than other foods such as vegetables) than the poor. While middle socio-economic status groups usually consume more vegetables and fruits, which are less energy dense, than high socio-economic status groups [17].

The present study revealed that irregular diet pattern was associated with a significantly greater risk for overweight and obesity (p=0.009). A higher percentage of the students not participating in outdoor sports were overweight and obese which was found to be statistically significant (p=0.021). No physical exercise was also associated with a greater risk and a statistically significant occurrence (p=0.003) of overweight and obesity. This finding is in agreement with that of another study [14]. Boo NY et al [16] in their study observed that physical exercise and outdoor sports did not have a significant influence on body weight which is in contrast with the present study. Researchers have reported that addition of exercise to dietary restriction can promote greater reduction in weight than change in diet alone [18]. Baker et al [19] reported that the most important life style factors responsible for obesity were long time spent using computer, eating more during time of stress and snacking between meals. Sedentary behavior and physical activity may be predictive of body mass in later life. The impact of various dietary habits such as junk food (bakery items, pizza, burger etc), chocolate eating and frequency of restaurant visit more than once a week, on analysis revealed positive correlation with overweight and obesity. Statistically highly significant risk was observed with increased frequency of restaurant visits (p=0.002) whereas junk food (p=0.693) and chocolate eating (p=0.236) did not increase the risk significantly. Junk food contains more amount of fat than carbohydrate and protein [20],[21]. Fat is less satiating than carbohydrate and dietary fat is stored more efficiently than carbohydrate or protein which finally results in obesity or overweight [22]. Similarly irregular food intake deleteriously affects nutritional health, reduces energy levels and promotes the consumption of high caloric food later in the day [23]. Results of the present study correlate with previous reports which suggest that junk food and chocolate intake tends to be more common among overweight and obese [24-26].

Positive family history of diabetes (p=0.048) and obesity (p=0.003) was more common in overweight and obese students. This was also observed to be statistically significant. Result from a previous study done in Pakistan provided evidence that obesity was common with family history of diabetes [26].

More than three-fourth of the students from normal as well as overweight and obese category were aware regarding diseases such as congestive cardiac failure, diabetes, stroke, Polycystic ovarian syndrome etc arising due to obesity. The correct awareness about the risk factors for obesity and that abdominal obesity is more dangerous was present in more than half of the students. They had substantial knowledge regarding risk factors and measures required to reduce them but little effort is made by them to modify their lifestyle as evident from lack of implementation of healthy diet modification and low physical activity level. Regardless of predisposing factors, diet and lifestyle have a great influence on overweight and obesity. Due to the cumulative effect of adverse factors throughout life of an individual, it is particularly important to adopt a healthy diet and lifestyle practice from young adult life. This study revealed the unhealthy dietary habits and life style of medical students, who represent a significant community of future health practitioners.

Conclusions

It can be concluded from the present study that, although obesity per se was detected as an uncommon occurrence, overweight or pre-obesity which may turn to obesity in future life was much common among medical students. The mean body weight and BMI of overweight and obese students was higher than normal weight students. Factors such as physical exercise and participation in outdoor sports had a protective effect against overweight and obesity. Irregular diet, restaurant visits more than once a week and a family history of diabetes or obesity increased the risk of overweight and obesity.

Based on this, it is recommended that healthy lifestyles should be adopted from young adulthood itself. A regular screening regarding determination of young pre-obese individuals who have a predilection for obesity in their adult life is another valuable approach in obesity prevention.

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