OVERWEIGHT AND OBESITY AND ITS DETERMINANTS AMONG MEDICAL STUDENTS IN BANGALORE, INDIA

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ABSTRACT: CONTEXT: Overweight and obesity are becoming major problems in developed as well as developing countries. As there are few studies in India on obesity among medical students the present study was taken up on this group who require early intervention to prevent these diseases among the future doctors. **OBJECTIVES:** To assess the prevalence and determinants of overweight and obesity among clinical students in a tertiary hospital in Bangalore. **SETTINGS & DESIGN:** A cross-sectional study was undertaken among 298, 2nd & 3rd year medical students. **METHODS AND MATERIAL:** Students entered the details in a predesigned, pretested questionnaire. Anthropometry regarding height and weight were measured and Body mass index (BMI) was calculated and they were classified as overweight and obese based on WHO's classification for Asians. BMI of students were compared with their dietary habits, physical activity and perception of body image, television viewing and history of non-communicable diseases among their parents. **RESULTS:** The prevalence of overweight and obesity was 19.1 % and 22.1 % respectively according to WHO's classification for Asians. A statistically significant association was found between overweight/obesity and the variables namely skipping of breakfast ($p < 0.05$), perception of body image among the students ($p < 0.05$) and history of non-communicable diseases among their parents ($p < 0.05$). Multiple logistic regression analysis showed that skipping breakfast and perception of body image was the best predictor variables for overweight and obesity. **CONCLUSION:** Prevalence of overweight and obesity is high among medical students. Early intervention can prevent development of non-communicable diseases among these future doctors.

INTRODUCTION: Overweight and obesity are becoming major problems in developed as well as developing countries. Almost 30-65 % of adult urban Indians are reported to be either overweight or obese or have central obesity. ^[1] Complications associated with obesity comprise of diabetes, hypertension, coronary heart disease, dyslipidemia and certain types of cancer. ^[2] In 2008, of the 57 million global deaths, 36 million (63%) were due to non-communicable diseases. ^[3] The common risk factors contributing to non-communicable diseases, include physical inactivity, unhealthy diet, harmful effects of tobacco and alcohol, and stress which are on the rise. ^[4] As there are few studies in India on obesity among medical students the present study was undertaken with the objectives of assessing prevalence of overweight and obesity among 2nd & 3rd year medical students and finding out the factors associated with it.

METHODS: A cross-sectional study was undertaken amongst 298, 2nd and 3rd year MBBS students (3rd to 7th term) studying at a private medical college in Bangalore, during July to September 2012.

The sample size was estimated by using the formula z^2pq/d^2 where the prevalence of overweight & obesity was taken as 30 %. ^[5] The required precision of the estimate (d) was set at 20

%. Using the above mentioned formula, the sample size was estimated to be 225. However, we included all the 298 students from 3rd to 7th term.

Approval was obtained from the College Ethical Committee. Informed consent was taken from each of the participants before the study. Students were explained about the purpose of the study. Those who were willing to participate and were present during the period of study were included.

A predesigned and pretested questionnaire was administered to all the students (anonymity was assured) comprising of questions related to their dietary habits, physical activity, perception of body image, addictions and history of non-communicable diseases amongst their parents.

Anthropometric measurements were recorded. Weight was measured using a digital weighing scale. Height was measured using a Stadiometer. For measurement of height the students stood straight with heels, buttocks and back touching the vertical limb of the instrument, and stretching upwards to the fullest extent with arms hanging on the side and without any footwear. The head was aligned so that the lower rim of the orbit and the auditory canal were in horizontal plane. Weight was measured without any footwear with minimal clothing. Body mass index was calculated and they were classified as overweight if BMI was more than 23 and obese if BMI was equal to or more than 25 according to WHO's classification for Asians. [2]

STATISTICAL ANALYSIS: Data was recorded on a predesigned proforma and was entered in Microsoft Excel. Statistical analysis was performed using the Statistical Package for Social Sciences (Version 21) software. Percentages and Chi-square were employed wherever applicable. A p value < 0.05 was considered statistically significant. Multivariate analysis was done using logistic regression.

RESULTS: This study included 298 medical students from 2nd and 3rd year (3rd term to 7th term). 79 (26 %) students were from 3rd term, 27 (9.1%) from 4th term, 78 (26.2 %) from 5th term, 24 (8.1 %) from 6th term and 90 (30.2%) from 7th term. Ages of the students ranged from 18-24 yrs. 109 (36.6%) were males and 189 (63.4 %) were females. More than half (58.7%) were normal, 19.1 % were overweight and 22.1% were obese.

84.2 % of the students had up to 3 times meals per day and 85.2 % had up to 2 times snacks per day. However 55.7% skipped breakfast and statistically significant association (P<0.05) was found between skipping breakfast and overweight/obesity among medical students as shown in Table 1.

Table-1: Breakfast pattern and its relationship to Overweight and Obesity

Breakfast pattern	Normal		Overweight/obese		Total		P value
	No.	%	No.	%	No.	%	
Skip	90	51.4	76	61.8	166	55.7	0.049
Never skip	85	48.6	47	38.2	132	44.3	
Total	175	100	123	100	298	100	

Only 14.1 % had at least 5 servings of fruits and vegetables per day, which is expected for a healthy life. Majority of the students, i.e., 88.9% had soft drinks regularly. 98.3% had fast food regularly. 96.6 % had bakery items regularly.

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79.5 % watched TV for less than 2 hrs.71.1 % performed physical activity.76.8 % perceived their body image as normal or lean and only 23.2 % perceived it as overweight. A statistically significant association was found between perception of body image and overweight/obesity as shown in Table 2.

Table-2: Perception of body image associated with Overweight and Obesity

BMI classification	Perception of body image				Total		P value
	Lean/Normal		Overweight				
	No.	%	No.	%	No.	%	0.000
Normal	166	72.5	9	13	175	59	
Overweight/Obese	63	27.5	60	87	123	41	
Total	229	100	69	100	298	100	

History of non-communicable diseases namely obesity, hypertension, diabetes mellitus or coronary heart disease in their parents was present in 59.4 % of the students. A statistically significant association was found between the family history of non-communicable diseases amongst their parents and overweight/obesity among students as shown in Table 3.

Table-3: Non-communicable diseases among parents and Overweight/Obesity among students

Non Communicable diseases among parents	Normal		Overweight/obese		Total		P value
	No.	%	No.	%	No.	%	
No	83	47.5	38	30.9	121	40.6	0.003
Yes	92	52.6	85	69.1	177	59.4	
Total	175	100	123	100	298	100	

Only 2.7 % students gave history of smoking and 7.4 % gave history of alcoholism. Multiple logistic regression model (forward: LR method) was used to predict the probability of obesity for an individual using 11 independent variables (predictor variables) as shown in Table 4.

Table-4: Multiple logistic regression

Variables	B value	Odds ratio	p value	Confidence Interval	
> 3 times meals per day	-0.155	.857	0.699	0.392	1.874
> 2 times snacks per day	0.242	1.274	0.567	0.556	2.915
< 5 servings of fruits & vegetables	0.228	1.256	0.585	0.555	2.842
Skipping breakfast	0.624	1.867	0.036	1.042	3.343
Have soft drinks	0.154	1.167	0.740	0.468	2.909
Have fast food	0.415	1.514	0.668	0.227	10.098
Have bakery items	0.386	1.472	0.606	0.339	6.387
Watch TV for > 2 hrs.	0.398	1.481	0.264	0.740	2.994
Physical activity everyday	-0.297	.743	0.344	0.401	1.375
Perception of body image as overweight	-2.833	.059	0.000	0.027	0.130
Non communicable diseases present among mother/father	-0.303	.738	0.290	0.421	1.295

Employing a 0.05 criterion of statistical significance, skipping breakfast and perception of body image had significant partial effects. The regression model with perception of body image and skipping of breakfast was the best-fit model.

Using the Odds prediction equation it was predicted that those who perceived themselves as normal and had breakfast regularly were 8.71 times more likely to become obese. However, it was interesting to see that students who perceived themselves as overweight and skipped breakfast had 32 times higher chance of becoming obese compared to those who perceived themselves as normal and had breakfast regularly.

DISCUSSION: In this study 19.1 % were overweight and 22.1 % were obese. In the Lebanese study prevalence of overweight was 24 % and obesity 7.2 %. Obesity was more common among males, i.e., 12.5 % than females 3.2 %. [6] In a Malaysian study 30.1 % of the students were overweight or obese (BMI equal to or greater than 23). [5] In another Malaysian study 14.8 % were found to be overweight. [7] In a study conducted in Egypt 36.9 % were overweight and 12.5 % were obese. [8] In the study conducted in Pakistan 41.7 % were overweight. [9] In a study in Saudi Arabia the prevalence rate of obesity by body mass index was found to be 30.6 % with more girls falling in the Grade I (26.1 %) than the Grade II (4.5 %) category. [10] In another study done in Saudi Arabia 34.5 % of the students were overweight and 10.3 % were obese. [11] In a study done on freshman students in Turkey out of 2259 subjects included in the analyses, 322(14.3%) were overweight or obese. [12]

Dietary assessment of medical students revealed that majority of students (85.9 %) had less than five servings of fruits and vegetables per day. Studies have shown that University students usually do not follow healthy eating habits. The typical university student's diet is high in fat and low in fruits and vegetables. [13] In this study 44.3 % students had breakfast daily and 84.2 % had less than three meals per day. In the Lebanese study 53.3 % female students reported eating breakfast

daily or 3-4 times per week compared to 52.1 % male students. ^[6] In a Malaysian study more than half of the students had regular meals and breakfast (57.6 % and 56.1 % respectively). However 73.5 % consumed fruits less than 3 times per week. ^[14]

In this study history of non-communicable disease amongst either parent was positive in 59.4 % students. In the Pakistani study 33 % had history of Diabetes mellitus amongst their parents. ^[9] The present study showed that there was significant association between positive history of non-communicable diseases among parents and overweight and obesity among students. This shows that there is a genetic predisposition in these students for developing non-communicable diseases in future therefore early detection and treatment of overweight and obesity may help to postpone development of these chronic diseases.

This study revealed that 20.5 % students watched TV for more than 2 hrs. However overweight or obesity was not significantly associated with duration of TV watching. In a study done in Karachi it was observed that the obese students watched TV more and were physically less active than their non-obese counterparts. ^[15]

In this study only 23.2 % perceived their body image as overweight. In a study done in Mangalore 23.8 % of the students felt they were lean, 64.6 % felt they were normal and 11.6 % felt they were overweight. ^[16]

It was heartening to note in the present study that 71.1 % students participated in physical activity and the practice was more amongst boys. In a study done by Chythra R Rao et al. 62 % students performed physical activity and the practice was more among boys in that study also. ^[17]

Logistic regression in the current study showed that students who skipped breakfast had 32 times higher risk of becoming obese. This may be because of the tendency to eat more during the next meal. The dietary pattern of these students needs to be studied in depth in further studies.

Students who perceived themselves as normal/lean though overweight/obese and consumed breakfast regularly tended to have 8.71 times higher risk of obesity. This may be due to the type of food they had and there is a need to perform studies to find out breakfast pattern in these students and modify it to a low calorie diet.

This study has some limitations namely information was collected on self-reported questionnaire and hence response was dependent on recall of the students. Also qualitative data was collected though actual quantity of food consumed, type of snacks consumed, amount of soft drinks consumed and details about physical activity were not taken.

The conclusion drawn from this study is that prevalence of overweight and obesity is high among the 2nd & 3rd year medical students. Majority of students who are overweight or obese give family history of non-communicable diseases therefore it is of utmost importance to have early intervention programmes to prevent non-communicable diseases among these future doctors.

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