

Study of Overweight and Obesity and Associated Factors among Undergraduate Medical Students in North India

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ABSTRACT

Background: Obesity negatively affects one's health or well-being. Due to rising prevalence of obesity and its adverse health effects it is being recognized as a serious public health concern. Medical students are very prone to obesity because of so much stress. Also junk food consumption is very common in medical student which is an important risk factor for obesity.

Aims and objectives: This study was undertaken to find out the prevalence of overweight and obesity its association with different risk factors in undergraduate medical students in a medical college of north India.

Material and method: The cross-sectional study was conducted on 128 undergraduate medical students. A detailed history was taken. Anthropometric measurements including weight, height, body mass index, waist-hip ratio and waist-height ratio were taken according to WHO criteria.

Result & Conclusion: The study showed high prevalence of overweight (30.2%) and obesity (3.9%). Obesity was significantly associated with non-vegetarian diet ($p < 0.01$). Prevalence of overweight and obesity was highest in students with blood group B (12.4%) and least in blood group AB (0%). There was no significant association of obesity with junk food, family history and sleep duration ($p > 0.05$). The importance of healthy eating habits and healthy life style needs to be emphasized. We created awareness for healthy living among medical students during the study.

Keywords: Obesity, medical students, junk food

INTRODUCTION

Obesity is medical condition in which excess body fat accumulates to the extent that it may have a negative effect on health. Overweight and obesity are now dramatically on the rise in low- and middle-income countries, particularly in urban settings. The cause of obesity is complex and multifactorial. Within the context of environmental, social and genetic factors, obesity results from long-term positive energy balance — the

interaction of energy intake and energy expenditure.¹ A variety of factors, including diet, genetic predisposition, physical activities, physiological, and behavioral factors, are implicated as contributing factors to obesity.² The prevalence of obesity is rising in developing countries. In 2014, 13% of adults aged 18 and over in the world were obese.³ The increasing prevalence of overweight and obesity is associated with many diseases including Diabetes mellitus, myocardial infarction, Stroke, Hypertension, and certain cancers. Overweight and obesity are the fifth leading risk factors for global death. At least 2-8 million adults die each year as a result of being overweight or obese. In addition, 44% of the diabetes burden, 23% of the ischemic disease burden and between 7% & 41% of certain cancer burdens are

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attributable to overweight and obesity.⁴ A variety of factors, including diet, genetic predisposition, physical activities, physiological, and behavioral factors, are implicated as contributing factors to obesity.⁵ The great prevalence of this condition, its severe consequences for health makes the prevention of obesity a major public health priority. Studies on medical students and health personnel in many countries suggested that obesity is a problem among these population groups.⁶⁻¹⁰

The aim of this study was to assess the prevalence of overweight and obesity among medical students of North India. We investigated the relationships between obesity and associated risk factors that could be pursued to help medical students more appropriately achieve and maintain a healthy body weight and minimize the risk of associated diseases in future.

MATERIAL AND METHOD

The present study was a cross-sectional study done on 1st year and 2nd year MBBS students of Rama Medical College, Hospital & Research Center Kanpur, UP. Total 129 students participated in the study. A brief introduction on obesity and overweight and its implications were explained and a written consent was obtained for the participation in the study. The general details of the students like name, age, sex, blood group, type of diet (Veg/nonveg), duration of sleep and frequency of exercise were taken. A detailed medical history was taken.

Following anthropometric parameters were measured using standardized techniques¹¹:

Weight was taken by bathroom scale weighing machine (accurate up to 0.5 kg), the marking of the height in cm was made on the wall up to an accuracy of 0.5 cm. waist-hip ratio was significantly higher in male students than that in females ($p < 0.05$).

Height (cm) was measured to the nearest 0.1 cm by asking them to stand barefoot and facing the back in approximation to the wall and keeping a scale straight on the head. A point was marked by the pencil on the wall.

Waist circumference (cm) was measured using non-stretchable measuring tape midway between the lower rib margin and the iliac crest at the end of expiration (accuracy upto 0.1 cm).

Hip circumference (cm) was measured as the

maximum circumference over the buttocks (accuracy upto 0.1 cm).

Following parameters were calculated:

Body mass index: Body Mass Index (BMI) was calculated using the formula weight (kg)/ height (meters)². The WHO BMI classification was followed, i.e. Underweight < 18.50 , normal range 18.50-24.99, overweight ≥ 25.00 . For adults, WHO defines overweight and obesity as follows:

Overweight is a BMI greater than or equal to 25; and

Obesity is a BMI greater than or equal to 30.¹²

Waist-hip ratio (WHR): Central/abdominal obesity was defined as a WHR ≥ 0.90 for males and 0.85 for females.¹³

Waist-height ratio (WHtR) more than 0.5 will be considered as abnormal.¹⁴

Statistical analysis was done after collection of the data and it was analyzed and interpreted. Percentages and Chi square test were applied to it.

OBSERVATION & RESULT

The present study was conducted on 129 medical students, out of them 65 (50.4%) were males and 64 (49.6%) were females. Out of total students, 85 (65.9%) were normal weight, 39 (30.2%) were overweight and 5 (3.9%) were obese according to BMI. Nobody was underweight in our study group. (Table I).

87 (67.4%) students had normal waist-hip ratio and 42 (32.6%) were obese. Waist-hip ratio was significantly higher in male students than the female students ($p < 0.05$) (table II). 79 (61.2%) students had normal and 50 (38.8%) had abnormally high waist-height ratio. There was no significant difference in waist-height ratio in male and female students ($p > 0.05$) (table II).

We also observed that 45 (34.9%) students were vegetarian and rests (65.1%) were non-vegetarian. Prevalence of obesity was significantly higher in non-vegetarian than vegetarian students ($p < 0.1$). Out of 129 students 35 (27.1%) used to take junk food regularly while 94 (72.9%) were noneaters of junk food or used to take occasionally. There was no significant difference in prevalence of obesity in junk food eaters and non-eaters and exercising and non-exercising students ($P < 0.05$).

33.3% students were exercising regularly while 66.7% were not exercising at all (table III).

History of endocrine disorders were only in 7 (5.4%) students and history of menstrual disorders was present in 6.3% (n= 4) female subjects only. 13.2% students had family history of overweight/obesity while 34.9% had family history of diabetes mellitus. There was no significant difference in the prevalence of obesity/overweight and family history of diabetes/ obesity (Table IV).

76% students had normal sleep duration. 16% students slept for <6 hours while 8.5% slept for >8 hours. There was no significant difference between sleep duration and BMI (P> 0.05). There was no significant difference in the prevalence of obesity and duration of sleep (diagram III)

Prevalence of overweight and obesity was highest in students with blood group B (12.4%) and least in blood group AB (0%). Prevalence of obesity was 1.6% in students with blood group A and B (diagram IV)

Table I Distribution of subjects according to BMI

| Sex | Normal | Overweight | Obese | Total |
|--------|------------|------------|--------|------------|
| Male | 41 | 23 | 1 | 65 (50.4%) |
| Female | 44 | 16 | 4 | 64 (49.6%) |
| Total | 85 (65.9%) | 39 (30.2%) | 53.9%) | 129 (100%) |

Table II Distribution of subjects according to waist/hip ratio and waist/height ratio

| Sex | Waist/hip ratio | | Waist/Height ratio | |
|--------|-----------------|------------|--------------------|-----------|
| | | | | |
| | Normal | Obese | Normal | Obese |
| Male | 37 | 28 | 39 | 24 |
| Female | 50 | 14 | 38 | 27 |
| Total | 87 (67.4%) | 42 (32.1%) | 77 (61.2%) | 51(38.8%) |

Table III Distribution of subjects according to food habits & exercise

| BMI | Veg/nonveg | | Junk food | | Frequency of exercise | |
|------------|------------|------------|------------|------------|-----------------------|------------------------|
| | Veg (%) | Nonveg (%) | Eater | Non Eater | Regular exercise | Occasional/no exercise |
| Normal | 28 | 57 | 20 | 65 | 28 | 57 |
| Overweight | 16 | 23 | 13 | 26 | 14 | 25 |
| Obese | 1 | 4 | 2 | 3 | 1 | 4 |
| Total | 45 (34.9%) | 84 (65.1%) | 35 (27.1%) | 94 (72.9%) | 43(33.3%) | 86 (66.7%) |

Table IV: Distribution of subjects according to family history & h/o endocrine disorder & menstrual disorder

| BMI | F H/obesity | | FH/DM | | H/o endocrine disorder | | H/o menstrual disorder | |
|--------------|-------------|-------------|------------|------------|------------------------|-------------|------------------------|----------|
| | yes | no | yes | No | Yes | No | Yes | No |
| Normal | 11 | 74 | 32 | 53 | 5 | 80 | 3 | 40 |
| Overweight | 4 | 35 | 11 | 28 | 1 | 38 | 1 | 16 |
| Obese | 2 | 3 | 2 | 3 | 1 | 4 | 0 | 4 |
| Total | 17 (13.2%) | 112 (86.8%) | 45 (34.9%) | 84 (65.1%) | 7 (5.4%) | 122 (94.6%) | 4(6.2%) | 60 (10%) |

Diagram I sleep duration and obesity

Diagram II blood group & obesity

DISCUSSION

According to WHO, body mass index is the most useful indicator of obesity in a population study. In our study, 30.2% students had BMI > 25 Kg/m² and 3.9% students had BMI > 30 Kg/m². These results were similar those of the study done by Jayaraj et al in a medical college of south India where they found 31.3 % students with BMI > 25 kg/m² 6.3% students with BMI > 30 kg/m².¹⁵ They also found 4.5% students with BMI < 18.5% (underweight). In our study no students was underweight. In a study done on medical students of Gwalior, MP, India the prevalence of overweight and obesity was very low (9.93% were overweight and 1.53% were obese).¹⁶ similar study was done in Delhi and reported a prevalence of 11.7% overweight and 2% obesity among medical students.¹⁷ WHR has been found to be a more efficient predictor of obesity¹⁸ If obesity is redefined using WHR instead of BMI, the proportion of people categorized as at risk of heart attack worldwide increases threefold.¹⁹ in our study central obesity was significantly higher in male students than females similar results were found in a study done in Lahore²⁰. Waist-height ratio is also a better indicator of obesity than BMI²¹. In our study there was no significant difference in waist-height ratio in male and female students.

We also found a significant relationship between non-vegetarian diet and obesity. Tiwari R et al did not find significant relationship between obesity and veg/nonveg diet although obesity was more prevalent in nonvegetarians¹⁶. Our study did not show any significant relationship between obesity and junk food while other studies showed that obese students had a higher

caloric intake from butter and zinger burger. Fast food consumption may be associated with weight gain and its complications as indicated in CARDIA study, a population based prospective study of cardiovascular disease risk factor development in young adults followed for the subsequent 15 years. This study was limited by the lack of information on portion size and caloric density of the food consumed.²²

We also did not any significant relationship between obesity and family history .this may be because changes in the genetic makeup of population occurs too slow to be responsible for obesity. But other studies could establish a positive correlation between family history and obesity.^{15, 16}

CONCLUSION

This study revealed that prevalence of overweight and obesity is very high in medical students of North India and it is comparable to the findings of earlier studies in other states of India as well as other countries. No student in our study was underweight. Physical activity is used to be very low in medical students. First year medical students undergo very high stress of studies and new hostel life. This stress may be an important factor in developing obesity in these students. There are no parents to check their eating habits in the hostel. Students' fast food consumption increases in hostel. All these factors may be important in the pathogenesis of obesity in these students. Also their physical activity becomes very low. Students find no time to care for their health. This may lead to the development of several serious diseases. So this is a high time to consider this issue and encourage healthy life style and healthy food habits so that the danger of risk of developing chronic diseases in our future doctors can be prevented.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: The study was approved by institutional Ethics Committee.

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