A Cross Sectional Study of Proportion and Determinants of Overweight and Obesity among Undergraduate Medical Students of a City in Western Gujarat

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Abstract:

Introduction: Obesity is one of the major lifestyle disorders in India and its incidence has rapidly increased during recent decades. Medical students are more prone for obesity, due to, their sedentary lifestyle, lack of exercise, disordered eating habits, increased stress. **Objective:** To find the proportion of overweight/obesity among medical students and identify the contributing/associated factors. **Method:** A cross-sectional study was done among 435 medical students aged 18-23 years. Height and weight were measured. Body Mass Index (BMI) cut off was taken as Asian cut-off. Dietary habits like vegetarian/mix vegetarian, frequency of consumption of fast foods were assessed. Along with-it Physical activity and positive family history of obesity and overweight were also assessed. Approval was taken from the Institutional Ethics Committee. Data was analysed using Microsoft Excel and SPSS. **Results:** Proportion of overweight 14.25% and obesity 8.73% was obtained among medical students. There was statistically not significant association between proportion of generalized obesity noted in males compared to females. There is statistically significant higher chance of being overweight/obese when sedentary time is >2 hours and with increasing junk food frequency. **Conclusion:** Medical students have a high proportion of obesity and are thus more prone for obesity-related risks. The present study will help in enhancing self-awareness among the medical students for practising healthy life style.

Keywords: Body Mass Index, Medical Students, Obesity, Overweight

Introduction:

Worldwide, disease profile is transforming at a rapid pace catching the attention of medical professionals and policy makers alike. This is particularly true in low and middle-income countries that form the major chunk of global population. The emerging epidemics of obesity, cardiovascular disease and diabetes form the crux of this phenomenal change. Among these entities, obesity has become a colossal epidemic causing serious public health concern and contributes to 2.6 million deaths worldwide every year.[1]

India is witnessing a growing burden of non-communicable diseases (NCDs), and the high burden of overweight and obesity among adults poses a daunting challenge to mitigating them.[2] In India the age of onset of obesity is progressively decreasing over the past years and the young individuals are being predisposed to obesity related health problems. About 30-65 % of adult urban Indians are reported to be either overweight or obese.[3]

Proportion varies within the country because of differences in the lifestyle, mainly in the dietary patterns, and physical activity.[4] There is paucity of

studies done on medical students for their lifestyle practices and diseases like overweight and obesity. Hence the present study was undertaken to assess overweight and obesity in undergraduate medical students and identify the determining factors.

Method:

A cross sectional study was carried out among all medical students of the concerned medical college. There is only one medical college in the city. The total intake of medical college is 250 students per year. The study was carried out in between August 2021 to December 2021 with the objectives to determine the proportion of overweight and obesity along with its associated factors in the undergraduate medical students.

The sample size was calculated using the formula $4pq/L^2$ where proportion of 11% with 80% power and 95% Confidence Interval and 5% level of Confidence Interval and absolute precision was 3%. Total sample size calculated was 435, and all 4 years students are included in equal proportion in study. Around 108 students were selected from first year and 109 students from 2nd, 3rd and 4th year batches were selected by simple random sampling using the lottery method by using roll numbers of the students. Verbal consent was taken prior to data collection.

All students aged 18-24 were considered for the study and students who were absent during the study period were not included in the study. The data was collected using a self designed, semi structured questionnaire, which was validated by conducting pilot study among 50 medical students. Height was measured by standard stadiometer in upright position without shoes/footwear and occiput, back (scapula), hips, calf muscles along with back of foot touching the wall. The weight was measured using a standard weighing scale and was round off to nearby 100gms. Other variables like Socio-demographic profile, Physical Activity, Dietary habits and family history of obesity were taken. Physical activity in the form of routine outdoor sports like cricket, football, volleyball was considered and other routine physical activities like walking and bicycling was considered. CDC recommends 75 minutes of sports activity or 150 minutes of routine physical activities. For present study, average of both the type of activity i.e.

120 minutes per week is considered. The BMI was calculated using the formula BMI = Weight (in kg) / Height (in meter^2). BMI cut off were taken as Asian cut-off. Before conducting the study, the approval was taken from the Institutional Ethics Committee. After data collection, a lecture was taken to educate students about healthy life style adoption. Data was analysed using Microsoft Excel and SPSS version 24. Chi- square test was used for analysing the association of variables. Co- relation coefficient used for association of age with over weight and obesity. Data safety and assurance of privacy was given to the participants and access to the data was only with Principal Investigator and Co Principal Investigator.

BMI Classification for Asian Population[5] used in which classified as 1) Severely underweight: < 16.5 kg/m^2 2) Underweight: 16.5 to 18.5 kg/m^2 3) Normal: 18.5 to 23 kg/m^2 4) Overweight/Pre obese: 23 to 24.99 kg/m^2 5) Obesity: >25kg/m^2

Table 1: Comparison of Obesity/Overweight with Gender and Age

Gender	Obese n (%)	Overweight n (%)	Normal n (%)	Total n (%)
Male	19 (9.69)	29 (4.79)	148 (75.51)	196 (45.05)
Female	19 (7.94)	33 (13.80)	187 (78.24)	239 (54.95)
Total	38 (8.73)	62 (14.25)	335 (77.01)	435 (100)

Chi square value = 0.55, p Value = 0.75, Degree of Freedom = 2

Age	Obese n (%)	Overweight n (%)	Normal n (%)	Total n (%)
18	4 (5.71)	7 (10.00)	59 (84.28)	70 (100)
19	5 (7.24)	9 (13.04)	55 (79.7)	69 (100)
20	7 (9.21)	10 (13.15)	59 (77.63)	76 (100)
21	7 (8.64)	13 (13.04)	61 (75.30)	81 (100)
22	8 (10.66)	12 (16.00)	55 (73.33)	75 (100)
23	7 (10.93)	11 (17.18)	46 (71.87)	64 (100)
Total	38 (8.73)	62 (14.25)	335 (77.01)	435 (100)

Chi square value= 4.28, p Value = 0.93; Degree of Freedom= 10

Results:

Out of 435 students 196 (45.05) were male and 239 (54.95) were female. Among total students 9.69% male were obese and 14.79% were overweight as compared to females who were obese (7.94%) and overweight (13.80%). The total proportion of obesity was found to be 8.73% and overweight to be 14.25%. The difference was not significant between sex and obesity. (Table 1)

There is gradual increase in obesity and overweight as age increases. The chi square value calculated to be 4.28 (both obesity and overweight are calculated separately and compared with normal) and p value of 0.93 which signifies that there was no significant association of increasing age with increasing weight from 18 to 23 years.(Table 1)

Figure 1: Pearson Correlation Coefficient between Age and Obesity/Overweight
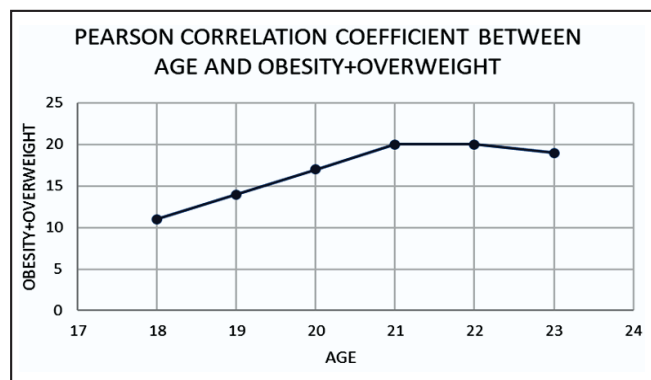

Figure 1 shows correlation between Age and Obesity/overweight. With increasing Age there was an increase in the proportion of Obesity/Overweight, the correlation Coefficient between them was 0.89 which signifies strong correlation between both variables.

The proportion of overweight and obesity was high among those students who have high sedentary time (> 2 hours) as compared to those who were having low sedentary time. There is statistically significant risk of being overweight/obese with increasing junk food frequency. (Table 2)

The proportion of overweight and obesity among mix diet was 19.18% and 13.95% respectively as compared to 11.02% and 5.32% in vegetarian diet which signifies higher chance of being obese/overweight for that consuming mix diet.

Table 2: Comparison of Obesity/Overweight with Sedentary Activity and Junk Food Frequency in a Week

Total Sedentary Time spent for Television/ Mobile/Laptop Daily	Obese n (%)	Overweight n (%)	Normal n (%)	Total n (%)
>2 Hours	16 (13.91)	25 (21.73)	74 (64.34)	115 (100)
≤2 Hours	22 (6.87)	37 (11.56)	261 (81.56)	320 (100)
Total	38 (8.73)	62 (14.25)	335 (77.01)	435 (100)

Chi square value = 14.19, p Value = 0.0008, Degree of Freedom = 2

Junk Food Frequency Per Week	Obese n (%)	Overweight n (%)	Normal n (%)	Total n (%)
>2 Hours	28 (11.96)	45 (19.23)	161 (68.80)	234 (100)
≤2 Hours	10 (4.97)	17 (8.45)	174 (86.56)	201 (100)
Total	38 (8.73)	62 (14.25)	335 (77.01)	435 (100)

Chi square value = 19.28, p Value = 0.00006, Degree of Freedom= 2

Table 3: Comparison of Obesity/Overweight with Diet Pattern, Total Sports Activity per Week and History of Obesity in Either Parent

Type of Diet	Obese n (%)	Overweight n (%)	Normal n (%)	Total n (%)
Vegetarian	14 (5.32)	29 (11.02)	220 (83.65)	263 (100)
Mix	24 (13.95)	33 (19.18)	115 (66.86)	172 (100)
Total	38 (8.73)	62 (14.25)	335 (77.01)	435 (100)

Chi square value= 17.53, p Value = 0.00015, Degree of Freedom= 2

Total Sports Activity Time Per Week	Obese n (%)	Overweight n (%)	Normal n (%)	Total n (%)
≤2 Hours	7 (7.21)	13 (13.54)	80 (83.33)	96 (100)
>2 Hours	15 (4.42)	49 (14.45)	275 (81.12)	339 (100)
Total	38 (8.73)	62 (14.25)	335 (77.01)	435 (100)

Chi square value= 1.14, p Value = 0.56, Degree of Freedom= 2

There was no statistical association between less physical activity and being overweight. Students were also inquired about the obesity among their parents. Total 19.51% obese student gave positive history of obesity in either of the parents whereas 24.39% overweight students had positive history of obesity in either parents. On applying chi square test , significant association was found between history of parents being obese and students being overweight/obese. (Table 3)

Discussion:

Both primordial prevention and primary prevention plays an important role in prevention of NCDs emergence. Being in Medical profession, medicos are considered to have higher knowledge regarding the matter and they should practice what they are preaching, however in most of the research studies[6-8] it had been found that among all the risk factors persist in medical students, there is a significant proportion of overweight and obesity among them. It was found in the current study that, the total combined proportion of overweight (14.25%) and obesity (8.73%) was 22.98%. Similar result was found in the study by Gupta et al[6] who demonstrated the proportion of combined overweight & obesity was 21% (17% and 3% respectively); Study done by Gopalakrishnan et al[7] revealed combined proportion of the same as 21% and study by Basu et al[8] revealed a pattern of combined overweight and obesity as 22% (18% overweight & 4% obese respectively).

On the contrary, the findings of this study were much lower compared with another group of studies [9-12] conducted among comparable groups. Bakr et al at Egypt[9] demonstrated as 49% (37% & 12% respectively); Gore et al[12] at Bangalore revealed the combined proportion was 41.27%;Selvaraj et al[10] at reported as 33%;Abdalla et al[11] found the pattern of overweight was 18% and obesity 9% (combined proportion was 27%); while Some studies shows lower proportion than present study; Raza et al[13] at Government Medical college, Karachi revealed that 17% were overweight and Study by Fernandez et al[14] at Pune revealed overall proportion of overweight/obesity was 13%; Chhabra et al[15] at University College of Medical Sciences, Delhi it was 14% (12% & 2% respectively)

In present study, Proportion of over weight and obesity in male was 24.48% and female was 21.74% which differed from other studies [16,19] Gender is one of the biological factors affecting the weight status. Our study demonstrated that BMI was not affected by gender. However, several studies among medical students showed a significantly higher rate of overweight and obesity among males in comparison with females [6,11,13-18] on the contrary, reverse findings were also noted in other studies [19-20]

Positive family history of obesity was also observed to be related with BMI status in the present study which was consistent with prior studies [8-10,12,17,18] In present study there was no significant association between less physical activity and being overweight. While some studies, physical inactivity was significantly associated with overweight and obesity in [6,10,14,17,19,21]

Present study showed higher chance of being obese/overweight for those consuming mix diet. But this result differs from some previous studies like studies at Midnapore[6], West Bengal[8], Pune[14] and Gujarat[18] which showed no significant role of type of diet in proportion of being over weight and obese.

Present study noted that proportion of overweight& obesity was more among those who were consuming junk and fast food more frequently and the difference was statistically significant; which was in line with studies by various investigators [8,11,19-21]

Conclusion:

This study concludes that the proportion of overweight/obesity was significant among medical students. This proportion of overweight/obesity was highly associated with sedentary lifestyle though the physical activity was not statistically associated with overweight or obesity. High consumption of junk food, positive family history and who had high sedentary time showed the high proportion of overweight and obesity. Increasing age showed positive correlation for combined overweight and obesity, while gender distribution showed no association with obesity and overweight among medical students.

Declaration:

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Conflict of Interest: Nil

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