

Original Article

OBESITY AND ASSOCIATED FACTORS AMONG STUDENTS OF DIFFERENT MEDICAL COLLEGES IN CUMILLA DURING COVID-19 PANDEMIC

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ABSTRACT

Background: The COVID-19 pandemic has led to special situations and changes to daily life due to the worldwide measures that were brought into effect such as lockdowns. Obesity is a major public health concern among medical students which are undesirable health condition and its frequency is high in this Covid -19 pandemic situation. The aim of the study was to assess the state of obesity and associated factors among students of three medical colleges located in Cumilla district during COVID-19 pandemic situation.

Methods: This study was a cross-sectional study; Purposive sampling technique was used to select 325 students from three different medical colleges of Cumilla. Data were collected from participants through face-to-face interview using a semi-structured questionnaire after taking informed written consent. Data were analyzed by SPSS software.

Results: Among the respondents 52.3% were low, 24.3% were moderate, 24.3%, 12% were high and 11.4% were no physical activity. About 1.8% took one time 12.9% took two times 55.7% took three times 29.5% took their meal more than three times per day. Majority of respondents 54.2% drunk 4 to 6 glasses water daily. Among the 325 participants 12.6% were obese, 21.2% were pre- obesity. Normal BMI was 44.9% and 21.2% was underweight. Obesity was associated with sex; as female medical students were observed to have significantly higher BMI compare to those with male respondents ($P<0.000$). Family type of the students from joint family were observed more obese than nuclear family, ($P<0.05$), Dietary pattern. as the BMI of the respondents increased with the increase of frequency of monthly fast food consumption of the respondents ($P<0.04$). Female medical students were significantly higher biscuits consumption ($P<0.03$) but male respondent inversely significantly higher in cold drink consumption ($P<0.00$).

Conclusion: The study findings may contribute to developing awareness about weight gain and its long term health consequence and devising interventions to prevent COVID-19 related weight gain among medical students.

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INTRODUCTION

Obesity and overweight, also known as the "time bomb", require immediate action in emerging countries. According to the World Health Organization, more than 1.9 billion persons over the age of 18 were overweight in 2016 and 650 million were obese, implying that 39% of adults globally were overweight and 13% obese. The fact that more than half of the world's population is overweight or obese is cause for concern. The rate at which obesity is

increasing is also concerning: Between 1975 and 2016, the global prevalence of obesity nearly tripled.¹ The difficulty of treating obesity is evident in the fact that no country has been able to successfully address the issue and lower obesity rates in recent years. Furthermore, such data are no longer solely a problem for rich countries: A developing country is home to 62% of overweight people. With roughly 1 billion overweight and obese people, Asia and the Pacific (AP) have the highest absolute number of overweight

and obese people, accounting for two out of every five adults.²

Within the continent, Pakistan has the highest obesity rate for adults (14%), and Bhutan has the highest obesity rate for children (6%). In addition, among all regions, South Asia has the smallest gender disparity in adult obesity (4.8 % male, 5.2 % female). Only 4% of the 17% of overweight or obese adults in Bangladesh were obese, and obesity rates are expanding at a slower pace in Bangladesh. Obesity rates in adults increased from 2% to 4% between 1980 and 2013, but rates in children and adolescents maintained at around 1.5%. Obesity is defined by the World Health Organization (WHO) as an abnormal or excessive fat accumulation in the body that may impair a person's health and increase the risk of certain diseases. The body mass index (BMI) is a commonly used and possibly the most straightforward technique of determining overweight and obesity. It is calculated by dividing the weight in kilograms by the square of the height in meters (kg/m²). BMI levels between 18.5 kg/m² and 24.9 kg/m² are considered normal or healthy weight in adults, values between 25 kg/m² and 29.9 kg/m² are considered overweight, and values over 30 kg/m² are considered obese. Morbid obesity is defined as a BMI of 40 kg/m² or more; underweight is defined as a BMI of 18.5 kg/m².²

In response to COVID-19, variety of steps were implemented by the national authorities, including educational institute closures, lockdown, quarantine and social distancing recommendations, working towards the alleviation of the virus spread as well as a reduction in the pressure on health care systems. As a result, more than 2.6 billion people were put through to home custody. Those circumstances led people to change their lifestyle and eating behaviors, thus an increase in sedentary behavior and screen time, as well as the decrease in physical activity, could also be associated with obesity.³

The increasing frequency of overweight and obesity in youth is a leading public health concern due to its complications are well-documented and include metabolic health risk, chronic diseases, psychosocial problems and an increased risk of cardiovascular diseases in adulthood. 65% of the world's population lives in a country where overweight and obesity kills more people than underweight. Among the behavioral factors, fast food consumption exerted the largest influence on higher levels of obesity. Fast food, usually sold at eating establishments for quick availability or takeout has become popular among young population in recent years. Increases in fast food consumption among young adults may contribute to increasing obesity rates worldwide to

become a global concern, as excessive consumption during the transition to adulthood is associated with increased weight gain from adolescence to adulthood. Most cross-sectional studies that have examined the association between fast food consumption combined with increasing portion sizes and decreased physical activity and measures of obesity in children and adolescents has been implicated as a potential contributing factor in the obesity crisis. Increasing rates of obesity and overweight have been linked to the rising energy density of the diet. Fast food dense with high calorie, high saturated and trans fat and sugar and lacking of fibers can result in excessive weight gain both in students⁴.

Obesity leads to greater susceptibility to cardiovascular diseases, hypertension, type 2 diabetes, respiratory problems, fatty liver, airway disease, depression, and some types of cancer co morbidities which are associated with reduced life expectancy and premature death in addition to their psychosocial and quality-of-life⁵.

Factors associated with overweight or obesity include lower physical activity, dietary behavior, higher sedentary behavior, psychosocial factors, female gender, inaccurate perceptions of the need to diet, poorer self-perceived health status and potential social isolation⁶. Risk factors such as dietary behavior, life style factors (smoking and alcohol use), physical activity for obesity in medical students in our country is not well-known and might differ from those in other countries⁷. Even it was seen the role of obesity in determining the severity of COVID-19 manifestations has been suspected. Very recently, a French study demonstrated a high frequency of obesity among patients admitted in intensive care unit for SARS-CoV-2 related pneumonia, disease severity increasing with body mass index⁸.

In our society, the problem of overweight and obesity goes ignored. Sometimes it is long time or life long process in most person. In many person, it is characterized by slow progression throughout the adult life while in others it is characterized by short term weight loss followed by relapse or weight stability. In Bangladesh, chronic disease epidemiology has just gradually received attention. The government intends to implement an integrated national program for chronic disease prevention and control, as well as multi-sectoral policy interventions and enhanced health system involvement in chronic disease prevention and control initiatives. Although there is clearly strong evidence of genetic component of obesity, lifestyle factors such as proper nutrition, good dietary pattern, decreases of excessive energy intake in diet like carbohydrate and fat which are the main

source of energy, adequate physical activity etc. are important tools in effective treatment of obesity. Just other chronic diseases obesity is managed by life-style modification combined with appropriate other medical modalities like pharmaceutical therapies and in selected patients, surgery. Consulting with experience psychologist and theories of behavior modification related to weight management may helpful in many patients. Actually a team approach combination of various skills and of experts are appropriate for obesity prevention and management⁹.

METHODS

Study design, settings, and period

The descriptive cross-sectional study was designed to find out the state of obesity and associated factors among students of medical colleges of Cumilla including their socio-demographic characteristics. The study was conducted in Cumilla Medical College, Mainamoti Medical College and Central Medical College of Cumilla. Medical colleges were selected purposively. The study was conducted during the period of one year starting from 1st January 2021 to 31st December 2021.

Study subjects, sample size, and sampling

The subjects were all MBBS students of all selected medical colleges. The students were selected using simple random sampling technique from medical colleges.

Data collection:

Data were collected by face-to-face interviews and the students were interviewed once at one point of time. A work schedule was prepared including the entire task in sequence. It started with literature review, protocol development, ethical permission, instrument development and pretesting, data processing, data

analysis, and report writing. Students who were available in that selected medical college sat the time of data collection were enrolled. Afterwards, a sampling frame was made for each medical college. Then Daniel’s random table was used for sampling and data were collected from selected respondents.

Data analysis

After collection, data were first checked in the field immediately after completion of interviews and taking information. Again before data processing, collected data were checked for completeness and internal consistency considering the norms of missing. Followed by, data processing was done, Data were edited and analyzed by IBM Software-Statistical package for Social Science (SPSS) 21 version according to the objectives and variables of the study.

Ethical issues

Ethical approval was obtained from the Institutional Review Board (IRB) of NIPSOM. The participation of the students was. Informed written consent was taken from every student before data collection. Confidentiality, anonymity, and privacy was maintained during data collection. Data were used only for the present study. Interviews were conducted in a calm and quiet place at a convenient time of the students. No physical, emotional, mental, social, financial, or professional harm was associated their participation in the study.

RESULTS

Table 1 shows that most of the respondents (62.5%) were in the age group of 21-23 years followed by 18.8% were in the age group of 24-26 years, 17.2% were in the age group of 18- 20 and 1.5% were in the age group of 27-29 years respectively.



Table-1. Distribution of the respondents by age (n=325)

Age (years)	Frequency	Percentage	Statistics
18-20	56	17.2	Mean=22.11; SD=1.731
21-23	203	62.5	
24-26	61	18.8	
27-29	5	1.5	
Total	325	100.0	

Figure 1 shows the distribution of the respondents by sex. It was found that 39.08% respondents were male

and 60.92% respondents were female.

Figure 1. Distribution of the respondents by their sex (n=325)

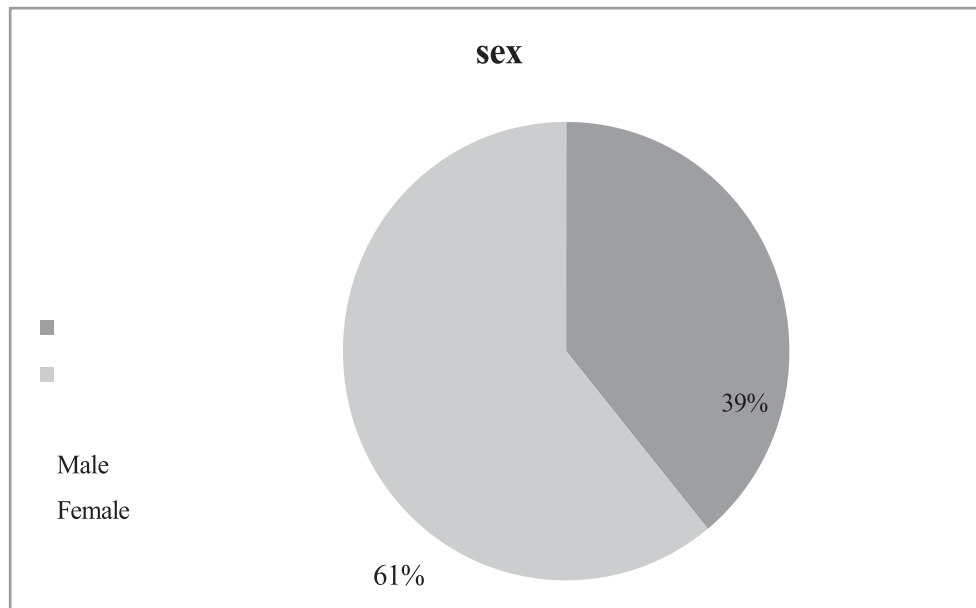


Table 2 shows distribution of BMI classification. 21.2% respondents were under weight, 44.9% were normal BMI. 21.2% were Pre obesity. 8.6% were

obesity Class I. 3.7% were obesity class II and 0.3% were Obesity class III. The mean of their BMI was (\pm SD) 23.41 ± 5.61 .

Table 2. Distribution of the respondents by obesity & BMI classification (n=325).

BMI	Frequency(f)	Percentage (%)
Underweight (<18.5)	69	21.2
Normal (18.5-24.9)	146	44.9
Pre obesity (25-29.9)	69	21.2
Obesity Class I (30-34.9)	28	8.6
Obesity class II (35-39.9)	12	3.7
Obesity class III (>40)	1	0.3
Total	325	100

Table 3 shows among 325 respondents, 69.5% were consumed 1-5 times, 3.4% were consumed 6-10 times, 1.5% were consumed 11-20 times, 3.7% were

consumed >20 times and 21.8% were not consumed at all in a typical month. The minimum frequency was 0 and maximum frequency was 30.

Table 3. Distribution of the respondents by monthly fast food consumption (325)

Consumption of fast food	Frequency(f)	Percentage (%)
No consumption	71	21.8
1-5	226	69.5
6-10	11	3.4
11-20	5	1.5
>20	12	3.7
Total	325	100

Table 4 shows among 325 respondents, 52.3% respondents were low physical activity, 24.3% respondents were moderate physical activity, 12%

respondents were high physical activity, 11.4% were no physical activity.

Table 4. Distribution of the respondents according to their physical activity (n=325)

Physical activity	Frequency(f)	Percentage (%)
Low	170	52.3
Moderate	79	24.3
High	39	12
No physical activity	37	11.4
Total	325	100

Table 5 shows among 14 respondents, 3.5% had diabetes, 5.9% had gall stones, 41.2% had

hypertension, 5.9% had osteoarthritis and 17.6% had musculoskeletal problems.

Table 5. Distribution of the respondents by presence of chronic disease (n=14)

Presence of the disease	Frequency(f)	Percentage (%)
Diabetes	4	23.5%
Gall stones	1	5.9%
Hypertension	7	41.2%
Osteoarthritis	1	5.9%
Musculoskeletal problems	3	17.6%

Table 6 shows that the relation between BMI and gender of the respondents. The mean BMI of the respondents was higher in male 25.98kg/m² in relation

to female 20.92kg/m². The difference of mean BMI of the respondents in relation to gender was statistically significant (P<0.000).

Table 6. Comparison of BMI by gender of the respondents (n=325)

Variable	Gender	N	BMI kg/m ²	Standard deviation	P-value
BMI	Male	127	25.98	.09775	p<0.0001
	Female	198	20.92	.08683	

Table 7 shows the distribution medical students according to their obesity. It also shows among male respondents, 52.1% were pre-obesity, 31.5% respondent were obesity class I, 15.1% were obesity class II, 0.9% were obesity class III. On the other hand, among female respondents the corresponding figures were 83.3%, 13.9%, 2.8% and 0% respectively. Fisher

exact test was conducted as chi-square test demonstrated the violation assumption where all cell should have expected count greater or equal to 5. From Fisher's exact test (p<0.009). There was significant (p<0.05) association between obesity and gender of the participants.

Table 7. Comparison of obesity by gender of the respondents (n=109)

Pre-obesity and obesity (BMI)	Gender		Statistics
	Male f (%)	Female f (%)	
Pre obesity	38(52.1%)	30(83.3%)	Fisher exact test P<0 .009
Obesity class I	23(31.5%)	5(13.9%)	
Obesity class II	11(15.1%)	1(2.8%)	
Obesity class III	1(0.9%)	0(0%)	
Total	73	36	

Table 8 shows mean difference of frequency of monthly different food items consumption between male and female. The food items were fast food like pizza, burgers, puffs etc. ice-cream, chocolates, fried chips and cakes/pastries/jam. The table also shows the

mean consumption of biscuit were higher in female and but mean consumption of cold drinks were higher in male. Cold drink and biscuit consumption with obesity is significant.

Table 8. Comparison of consumption of different fast food items by gender

Food item frequency of monthly consumption	Male (M±SD)	Female (M±SD)	P value
Cold drinks	8.24±12.42	3.65±6.744	<0.0001
Biscuits	9.97±14.780	13.64±14.25	0.028
Fast food (pizza, burger, puffs etc.)	3.48±6.953	2.61±4.828	0.217
Ice-cream	3.62±9.617	2.69±5.507	0.269
Chocolates	6.72±11.963	5.51±8.839	0.295
Fried chips	6.32±8.942	5.78±8.987	0.597
Cakes/pastries/jam	5.44±8.454	4.45±8.211	0.295

DISCUSSION

A total of 325 medical students from three medical colleges were included in the study. The purpose of the study was to determine the state of obesity and associated factors among students of medical colleges of Cumilla district in pandemic situation. This study explored the socio-demographic, anthropometric, dietary pattern lifestyle, and associated factors. The main findings of the study were influenced by anthropometric variables. The frequency of pre-obesity and obesity among 325 respondents were 21.2% and 12.6%. There proportion of normal BMI of the respondents was 44.9%. Moreover, 21.2% was underweight. Pre-obesity or overweight was 52.1%, obesity class I was 31.5%, obesity class II was 15.1% and obesity class III was 0.9% found in male as compare to the corresponding figures were 83.3%, 13.9%, 2.8% and 0% respectively in female. More to points, female respondents were observed to have significantly high mean BMI (1.3206±0.08683) compare to those (1.4148±0.09775) with male respondents which was not similar findings in the study conducted by Banna et al⁶. If we look at dietary

pattern, the study showed, 0.9% were vegetarian, 99.1% were non-vegetarian. Again table showed the percentage of non-vegetarian female respondents was higher than male. This finding contradicts the results found by Silliman et al¹⁰. Again frequency of meal taken more than three times was higher in weakened as compare to class day. The findings clearly reported the frequency of monthly consumption of bakery items, fast food/junk food, ice-cream, chocolate, fried chips and soft drinks/cold drinks. A study was conducted West et al reported that energy dense food like fast food, sugar sweetened beverage consumption had been contributing factors to the increasing obesity among young adults in developing countries. The findings also showed protein like egg and milk consumption were higher in female but energy dense food consumption were higher in male¹¹. In the study, respondents consumed different types of cooking oil like sunflower oil, mustard oil, palm oil, coconut oil, olive oil and other type oil in food which was similar findings conducted by Hashan et al¹². In this study, statistically significant correlation (P=0.04) between frequency of monthly fast food consumption and BMI of the respondents were established. Positive weak

correlation between the frequency of fast food consumption and BMI was established which similar finding to the study was conducted by Goon et al⁴. Results from our study highlight that physical activity and sleeping hours. Here Physical activity was categorized by low, moderate, high and no physical activity according to IPAQ-short questionnaires. A study was conducted by Banna et al had been reported “no physical activity” were more likely to be overweight or obese⁶. Out of 325 respondents, 4.3% respondents had chronic disease. Among 14 respondents, 3.5% had diabetes, 5.9% had gall stones, 41.2% had hypertension, 5.9% had osteoarthritis, 5.9% had dyslipidemia and 17.6% had musculoskeletal problems. A qualitative study was conducted by Rippe et al shows weight gain was associated with hypertension, type 2 diabetes, dyslipidemia, gall stone, osteoarthritis etc⁹. The study explored different types Socio-demographic characteristics including age, gender, class, residential location and types, monthly family income, family type, etc. The age distribution among the respondents was 18-29 years. MBBS class were divided into 1st year, 2nd year, 3rd year, 4th year and 5th year and there was almost similar finding showed in the study of Gupta et al¹³. There were no significant differences in obesity prevalence among residential location and types. Medical students living on hostel had the highest rate (76.9%), followed by those living in with family members, mess, and relative’s home and other place. Similar findings was found in the study conducted by Heish et al¹⁴. Again high mean BMI (1.3775 ± 0.09485) was significantly higher in joint family than that of (1.3509 ± 0.10363) in nuclear family. The similar findings found in the study conducted by Gamit et al¹⁵.

CONCLUSION

Most of medical student were with normal BMI. But obesity is increasing among those who are using unhealthy dietary pattern including fast food, cold drinks and biscuits consumption. The risk of obesity was much higher in female than male. In addition, the frequency of pre-obesity was high and they were at potential risk because pre-obesity subjects are the most probable candidates for obesity. This study reinforces the need to encourage healthy lifestyle and healthy food habits. A goal should be established for securing balanced nutrition by lowering consumption of fast food, ice-cream, cold drinks, bakery items and increasing physical activity for the medical students.

REFERENCES

1. World Health Organization. Obesity and overweight. [online] World Health Organization 2021. Available at: <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>.
2. Helble M and Sato A. Wealthy but Unhealthy Overweight and Obesity in Asia and the Pacific: Trends, Costs, and Policies for Better Health 2018. Available at: <https://think-asia.org/handle/11540/8454>.
3. Stavridou A, Kapsali E, Panagouli E, Thirios A, Polychronis K, Bacopoulou F Et al. Obesity in Children and Adolescents during COVID-19 Pandemic 2019; 8(2): 135.
4. Goon S, Bipasha MS and Islam MS. Fast food consumption and obesity risk among university students of Bangladesh. *European Journal of Preventive Medicine* 2014; 2(6): 99-104.
5. Alberca RW, Oliveira LDM, Branco ACCC, Pereira NZ and Sato MN. Obesity as a risk factor for COVID-19: an overview. *Critical Reviews in Food Science and Nutrition* 2021; 61(13): 2262-2276.
6. Banna MHA, Brazendale K, Hasan M, et al. Factors associated with overweight and obesity among Bangladeshi university students: a case-control study. *Journal of American College* 2022; 70(8):2327-2333.
7. Erem C, Arslan C, Hacıhasanoglu A, Deger O, Topbas M, Ukinc K et al. Prevalence of obesity and associated risk factors in a Turkish population 2004;12(7):1117-27.
8. Busetto L, Bettini S, Fabris R, Serra R, Dal Pra C, Maffei P et al. Obesity and COVID-19: An Italian Snapshot. *Obesity (Silver Spring)* 2020; 28(9):1600-1605.
9. Rippe JM, Crossley S, Ringer R. Obesity as a chronic disease: modern medical and lifestyle management. *J Am Diet Association* 1998; 98(10 Suppl 2):S9-15.
10. Silliman K, Fortier KR. and Neyman M. Survey of dietary and exercise habits and perceived barriers to following a healthy lifestyle in a college population. *Californian journal of health promotion* 2004; 2(2): 10-19.
11. West DS, Bursac Z, Quimby D, Prewitt TE, Spatz T, Nash C, Mays G, Eddings K. Self-reported sugar-sweetened beverage intake among college students. *Obesity (Silver Spring)* 2006; 14(10):1825-31.

12. Hashan MR, Rabbi MF, Haider SS, Das Gupta R. Prevalence and associated factors of underweight, overweight and obesity among women of reproductive age group in the Maldives: Evidence from a nationally representative study. *PLoS One* 2020; 15(10):e0241621.
13. Hsieh K, Rimmer JH, Heller T. Obesity and associated factors in adults with intellectual disability. *J Intellect Disabil Res.* 2014; 58(9):851-63.
14. Gupta S, Ray TG and Saha I. Overweight, obesity and influence of stress on body weight among undergraduate medical students. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine* 2009; 34(3): 255.
15. Gamit, SS, Moitra M and Verma MR. Prevalence of obesity and overweight in school going adolescents of Surat city, Gujarat, India. *International Journal of Medical Science and Public Health* 2015; 4(1): 42-47.