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PATTERN AND DETERMINANTS OF OVERWEIGHT AND OBESITY AMONG MEDICAL STUDENTS OF KOLKATA

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ABSTRACT: **Introduction:** Researchers have shown variable prevalence of overweight & obesity among medical students. **Aim:** To assess the prevalence & determinants of overweight/obesity among undergraduate medical students. **Methods:** A cross sectional study was carried out among 278 medical students at Kolkata from March 2015 up to May 2015 by filling a pre designed, pre tested structured questionnaire and doing anthropometric measurements. **Results:** 66% were between 20-21 years ; 58% were males; 54% were day scholars; 78 % were from nuclear family; 49% read in 2nd year; 67% belonged to class I (modified BG Prasad scale March 2015); 9% were obese & 19% were overweight as per WHO scale ; 28% & 20% were obese and overweight respectively as per Indian scale; 1% male & 9% female had a waist circumference of more than 102 cm & 88 cm respectively (WHO scale); 27% male & 30% female had waist circumference of more than 90 cm & 80 cm respectively (Indian scale); 10% male & 21% female had a waist/hip ratio of more than 0.90 & 0.85 respectively. The significant factors were positive family history; large amount of soft drink intake; frequent fast & junk food consumption; fruits taken infrequently; alcohol consumption; longer time spent by means of computer/ watching television; and physical inactivity. **Conclusion:** There is a definite need to inculcate good habits of healthy eating and regular physical exercise.

INTRODUCTION: Obesity and overweight are defined as "abnormal or excessive fat accumulation that may impair health". Once a disease associated with high-income countries, obesity is now also prevalent in low- and middle-income countries particularly in urban settings. ¹ In 2014, more than 1.9 billion adults were overweight and over 600 million were obese; thus the total number of overweight & obesity was 2.1 billion, which was almost one-third of the world's population.

Overall 39% of adults (38% of men and 40% of women) worldwide were overweight in 2014, and 13% were obese (11% of men and 15% of women). In 2014, 11% of men and 15% of women in the world were obese (BMI ≥ 30 kg/m²). Globally at least 2.8 million people each year die as a result of being overweight or obese and 35.8 million (2.3%) of global Disability-adjusted life years (DALYs) are caused by overweight or obesity.

The prevalence of overweight and obesity are highest in the WHO Regions of the Americas and lowest in the WHO Region for South East Asia. Worldwide, 44% of diabetes, 23% of ischemic heart disease and 7–41% of certain cancers are attributable to overweight and obesity. Moreover

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mortality rates increase with increasing degrees of overweight, as measured by body mass index.² In South East Asia Region (SEAR), in 2011, prevalence of overweight & obesity varied between 8% to 30% among males, and 8% to 52% among females and it was higher in females than in males. Annually, 350 000 deaths are attributed to overweight and obesity in this Region.³

According to a study published in the journal 'The Lancet' by Ng M et al, India is the third most obese country in the world, just behind US and China with highest number of obese people. This study used data collected by international bodies and organizations in various countries like India over three decades. The US topped the list with 13% of the obese people globally in 2013, while China and India together accounted for 15% of the global obese population, with 46 million and 30 million obese people respectively. In India, one in every five men and women are either obese or overweight.⁴ The prevalence of overweight increased from 11% to 15% in India and the prevalence of obesity also increased from 2.2% to 3.4% in India in 2011.³

As per NFHS 3, in West Bengal, 6.1% males (15.4% in urban & 2.2% in rural) and 12.5% females (29.1% in urban & 5.7% in rural) were obese.⁵

Researchers have also shown variable prevalence of overweight & obesity among young medical students across different institutions in the country and abroad.

Medical students are the budding doctors of the Nation. So if they are aware of their nutritional status and healthy/unhealthy lifestyles, they can modify their unhealthy lifestyles as well as they can be able to motivate general population.

With this background the present study was carried out to assess the prevalence & determinants of overweight/obesity among undergraduate medical students of IPGME&R/SSKM Hospital.

MATERIALS AND METHODS:

Type of study and study population:

An Institution based observational descriptive study, cross sectional in design, was carried out among undergraduate medical students of IPGME&R, Kolkata from March 2015 up to May 2015.

Inclusion criteria: 1st, 2nd & 3rd year Undergraduate medical students; both sex, not seriously ill; present during days of data collection and gave informed written consent to participate in the study.

Exclusion criteria: Medical students suffering from any chronic diseases; students under any medications; non-consenting students.

Study tools were a pre-designed pre-tested structured questionnaire; weighing scale; height measuring machine and measuring tape. The questionnaire was prepared in consultation with three experts of community medicine, pretested on fifty 4th year undergraduate medical students of the same institution other than the those selected for the study, for its suitability and ease of use; modified and validated by another three experienced persons of community medicine.

The questionnaire had three parts. Part I consisted of information on the socio-demographic status; Part II consisted of risk factors of overweight & obesity and Part III consisted of anthropometric measurements of the study population.

Study variables: Age, sex, type of family, day scholar/hostel resident, year of study, per capita monthly income (PCMI), family history of overweight/obesity, smoking status, alcohol consumption, habit of exercise, type of diet, intake of soft drinks, fast food, junk food, fruits, roots & other vegetables, duration of television watching & computer use, weight, height, BMI, waist circumference, hip circumference, waist/hip ratio.

Sample size and sampling technique:

It was decided to collect information from all 400 students studying in 1st, 2nd and 3rd year at this institution but in spite of repeated visit only 278 students were available during the study period. All gave consent for participation in the study. Thus the response rate was cent percent.

Data collection technique: Data collection was done for each semester separately. Before filling the questionnaire, study population were briefed about the purpose and nature of the study; their informed written consent taken where confidentiality and anonymity were assured in all aspects. Then they were instructed to fill out the questionnaire completely and truthfully. Examinations including height, weight, waist and hip circumference were conducted of each participant using standardized height measuring rod, weighing machine and measuring tape by standard techniques. The measurements were taken twice by the investigators. If a designated student could not be contacted or was not cooperative during the three separate visits, the subject was considered as a non-respondent. Overweight/obesity was assessed on the basis of body mass index (BMI) for age using gender specific WHO growth reference BMI-for-age (5-19 years) charts. For aged 20 years and more, a BMI of 30 or more was considered obese, a BMI of 25.0 or more was considered to be overweight as per WHO guidelines.

Statistical Analysis:

Data were entered in Microsoft Office Excel 2010 (Microsoft Corp, Redmond, WA, USA), and analyzed with Statistical Package for the Social Sciences SPSS Inc. Released 2007. SPSS for Windows, Version 16.0. Chicago & Epi-info 6.04d (Centres for Disease Control and Prevention, Atlanta, GA, USA, 2001) using percentages and Chi-square test. P values less than 0.05 were considered statistically significant. To guess association between various factors and BMI, Mantel-Haenszel Crude Odds Ratios (OR) and 95% confidence Intervals (CI) were calculated.

Working definitions:

1. Types of families: ⁶

a) Nuclear family: It consists of a married couple and their dependent children.

b) Joint family: It consists of a number of married couples and their children living together in the same household. All the property is held in

common and all the authority is usually vested in a senior male member of the family.

2. Socio-economic Classification: According to Modified BG Prasad's scale (March) 2015: ⁷

3. Weight and height measurements: ⁸

Weight was measured using digital scale to the nearest of 0.5 Kg with the person standing immobile on the weighing machine with feet 15 cm away from each other and weight evenly distributed on every leg in their light clothing without shoes.

Digital Physician Scale was used for measuring height with an error to the nearest of 0.5 cm in bare feet and with the head in the Frankfurt plane keeping feet together, knees straight and backs of heels, buttocks and shoulder blades were in contact with the erect plane of the scale and height recording was done at the point when the measuring rod was quiescent on head.

4. Body mass index (BMI): is defined as weight in Kilogram divided by the square of the height in meters (kg/m^2).⁹

a) Classification of adults according to BMI(WHO): ⁹

b) BMI limit for Indians: ¹⁰

Underweight : $<18.5 \text{ kg}/\text{m}^2$

Normal BMI: $18.5\text{-}22.9 \text{ kg}/\text{m}^2$

Overweight: $23.0\text{-}24.9 \text{ kg}/\text{m}^2$

Obesity: $\geq 25 \text{ kg}/\text{m}^2$

c) WHO BMI- for- age (5-19 years): Interpretation of cut-offs: ¹¹

Overweight: $>+1\text{SD}$ (equivalent to BMI $25 \text{ kg}/\text{m}^2$ at 19 years)

Obesity: $>+2\text{SD}$ (equivalent to BMI $30 \text{ kg}/\text{m}^2$ at 19 years)

Thinness: $<-2\text{SD}$

Severe thinness: $<-3\text{SD}$

5. Waist Circumference (WC):

Measurement be made at the end of several consecutive breaths, at a level parallel to the floor, in the fasting state, with the subject standing erect and looking straight forward and observer sitting in front of the subject; midpoint between the lower margin of the last palpable rib and the top of the iliac crest in the mid axillary line using non-stretchable flexible tape.^{12, 13}

A) WHO cut-off points of WC for measurements of overweight &/ obesity:¹²

Waist circumference	Cut-off points
Men	>102 cm
Women	>88 cm

b) Waist Circumference Cut-Off points for Indians:¹⁰

Men: 90 cm

Women: 80 cm

6. Hip circumference: Measured around the widest portion of the buttocks, at the level parallel to the floor.¹²

7. Waist-hip ratio (WHR): Ratio of the circumference of the waist to that of the hips; calculated as waist measurement divided by hip measurement (W/H).

WHO cut-off points of waist hip ratio for measurements of abdominal obesity:¹²

Waist-hip ratio	Cut-off points
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Men	>=0.90 cm
Women	>=0.85 cm

8. Current cigarette smoker:

Defined as persons who reported smoking at least 100 cigarettes in their lifetime and who, at the time of survey, smoked either every day or some days.¹³

9. Alcohol consumption:

One who drinks alcohol every day during the study period.

10. Soft drink:

A soft drink is a beverage that typically contains carbonated water, a sweetener and a flavouring.

11. Fast food:

Food that can be prepared and served very quickly. Examples are pizza, burger, rolls, samosa etc.

12. Junk food: Prepared or packaged food that has low nutritional value. Examples are candy, chips etc.

RESULTS: A total of 278 undergraduate medical students were included in the present study whose age ranged between 18 to 23 years; mean age and standard deviation was 20 years and 0.79 years respectively; 66% were between 20-21 years age group; 77% were males; 54% were day scholars; 78 %were from nuclear family; 49% read in 2nd year and 67% belonged to class I as per modified BG Prasad scale March 2015, **Table 1.**

TABLE 1: DISTRIBUTION OF THE STUDY POPULATION AS PER SOCIO DEMOGRAPHIC PROFILES (n=278)

Socio demographic profiles	Number (N)	Percentage (%)
Age (in years)		
18-19	69	24.82
20-21	183	65.83
22-23	26	09.35
Gender		
Male	161	57.91
Female	117	42.09
Residence		
Day Scholar	150	53.96
Hostel resident	128	46.04
Type of family		
Nuclear	218	78.42
Joint	60	21.58
Year of study		
1st	110	39.57
2nd	136	48.92
3rd	32	11.51
PCMI		

Class I (upper): Rs.5,798 and above	187	67.27
Class II (upper middle): Rs.2,899 – 5,797	56	20.14
Class III (lower middle): Rs.1,739 – 2,898	20	07.19
Class IV (upper lower): Rs.870 – 1,738	11	03.96
Class V (lower): Below Rs.870	04	01.44
Total	278	100

Table 2 presented the prevalence of overweight and obesity of the study population as per BMI status. It was seen that 9% of the study population were obese and another 19% were overweight as per WHO scale (Combined overweight & obesity was 28%). The corresponding figures were 28% and 20% respectively as per Indian scale (combined overweight & obesity was 48%).

TABLE 2: DISTRIBUTION OF STUDENTS' NUTRITIONAL STATUS ACCORDING TO BODY MASS INDEX (BMI) (n = 278)

BMI (WHO)	Number (N)	Percentage (%)
<18.50(Underweight)	33	11.87
18.50-24.99(Normal range)	168	60.43
25.00-29.99 (Pre obese/overweight)	53	19.07
30.00-34.99(Obese class I)	12	04.32
35.00-39.99(Obese class II)	11	03.96
>=40.00 (Obese class III)	01	00.35
BMI (Indian)		
<18.50(Underweight)	33	11.87
18.50-22.99(Normal BMI)	113	40.65
23.00-24.99(Overweight)	55	19.78
>=25.00(Obese)	77	27.69
Total	278	100

About 1% of male study population had a waist circumference of more than 102 cm while 9% of female study population had a waist circumference of more than 88 cm (WHO scale). Similarly about 27% of the male study population had waist circumference of more than 90 cm whereas 30% of

the female study population had a waist circumference of more than 80 cm (Indian scale). About 10% of male study population had a waist/hip ratio of more than 0.90 and 21% of the female study population had a waist/hip ratio of more than 0.85, **Table 3**.

TABLE 3: WAIST CIRCUMFERENCE & WAIST/HIP RATIO OF THE STUDY POPULATION (n=278)

Waist circumference (WHO)	Number (N)	Percentage (%)
Male(>102)(n=161)	02	01.24
Female(>88)(n=117)	10	08.55
Waist circumference in cm. (Indian)		
Male(>90) (n=161)	43	26.71
Female(>80))(n=117)	35	29.91
Waist/Hip ratio		
Male(>0.90) (n=161)	16	09.94
Female(>0.85))(n=117)	25	21.37

Effects of non modifiable risk factors and their significance were depicted in **Table 4**. Prevalence of overweight & obesity was almost similar in all age groups and this was not statistically significant

($p > 0.05$). Similarly BMI was more or less similar among males and females; again this difference

was not statistically significant ($p > 0.05$). About 25% of the study population had family history of

overweight & obesity and BMI status was significantly more among those who had positive family history (p<0.05).

TABLE 4: DISTRIBUTION OF NON MODIFIABLE FACTORS INFLUENCING BMI AND THEIR SIGNIFICANCE (n=278)

Non modifiable risk factors	BMI (kilograms/metre ²)		Total N(%)	Odds ratio(95% confidence interval)	Chi square; p value
	>=25 N (%)	< 25 N(%)			
Age (in years)					
<=20	42(26.42)	117(73.58)	159	0.86(0.50-1.46)	0.30;0.58
>20	35(29.41)	84(70.59)	119		
Gender					
Male	45(27.95)	116(72.05)	161(57.91)	1.03(0.60-1.75)	0.01;0.91
Female	32(27.35)	85(72.65)	117(42.09)		
Family history					
Present	32(46.38)	37(53.62)	69(24.82)	3.15(1.77 to 5.61)	15.99;<0.0001
Absent	45(21.53)	164(78.47)	209(75.18)		
Total	77(27.70)	201(72.30)	278 (100)		

Regarding dietary risk factors, majority (91%) of the students were not consuming vegetarian foods. More than two fifth of the respondents (40%) took soft drinks in profound amount. About 66% & 48% were having fast foods and junk foods respectively for more than twice per week. Almost all (93%) took fruits regularly in their daily life. About 88% & 97% of the study population consumed roots and other vegetables daily.

BMI was more among those who consumed soft drink of more than 2 liters/week; took fast food and junk food for more than 2 times/week; took root vegetables daily and this difference was statistically significant (p<0.05) whereas type of diet & intake of other vegetables showed no statistical difference (p>0.05). Fruit intake was found to be protective (p<0.05), **Table 5**.

TABLE 5: DISTRIBUTION OF DIETARY FACTORS INFLUENCING BMI AND THEIR SIGNIFICANCE (n=278)

Dietary factors	BMI(kilograms/metre ²)		Total N (%)	Odds ratio (95% CI)	Chi square; p value
	>=23 N (%)	<23 N(%)			
Type of diet					
Vegetarian	09(34.62)	17(65.38)	26(9.35)	1.43(0.60-3.36)	0.68;0.40
Non vegetarian/Mixed	68(26.98)	184(73.02)	252(90.65)		
Soft drink intake(ml/week)					
>2000	40(35.71)	72(64.29)	112(40.29)	1.93(1.13-3.29)	6.01;0.01
<=2000	37(22.29)	129(77.71)	166(59.71)		
Fast food intake					
>2 times/week	69(37.70)	114(62.30)	183(65.83)	06.58(3.00-14.40)	26.77;0.0001
<=2 times/week	08(08.42)	87(91.58)	95(34.17)		
Junk food intake					
>2 times/week	55(41.67)	77(58.33)	132(47.48)	04.02(2.27-7.12)	24.49;0.0001
<=2 times/week	22(15.07)	124(84.93)	146(52.52)		
Fruit intake (daily)					
Yes	68(26.25)	191(73.75)	259(93.17)	0.39(0.15-1.01)	03.94;0.04
No	09(47.37)	10(52.63)	19(06.83)		
Root vegetables (daily)					
Yes	73(29.92)	171(70.08)	244(87.77)	3.20(1.08-9.41)	4.91; 0.02
No	04(11.76)	30(88.24)	34(12.23)		
Other vegetables (daily)					
Yes	128(47.58)	141(52.42)	269(96.76)	1.13(0.29-4.31)	0.34;0.85
No	04(44.44)	05(55.56)	09(03.24)		
Total	77(27.70)	201(72.30)	278 (100)		

Non modifiable risk factors influencing BMI and their significance were demonstrated in **Table 6**. Current smoking was reported by 10.79 percent of students, all of them were males. About 11% students were consumers (all were males) of alcohol. For physical activity, only 34% of the study population had habit of regular exercise. A total of 33% subjects used to watch TV and 31%

percent used computer for more than two hours daily.

Correlation was observed between BMI and alcohol consumption, habit of exercise and duration of recreation in the form of watching television and or computer use for more than 2 hours per day ($p < 0.05$). However smoking habit had no significant influence on body weight.

TABLE 6: DISTRIBUTION OF MODIFIABLE FACTORS INFLUENCING BMI AND THEIR SIGNIFICANCE (n=278)

Modifiable risk factors	BMI(kilograms/metre ²)		Total N (%)	Odds ratio (95% CI)	Chi square; p value
	>=23 N (%)	<23 N(%)			
Smoking habit					
Yes	08(26.67)	22(73.33)	30(10.79)	0.94(0.40-2.21)	0.01;0.89
No	69(27.82)	179(72.18)	248(89.21)		
Alcohol consumption					
Yes	25(80.64)	06(19.36)	31(11.15)	15.62(6.09-40.08)	48.84;0.000
No	52(21.05)	195(78.95)	247(88.85)		
Duration of TV watching					
<=2hours/day	25(13.51)	160(86.49)	185(66.65)	0.12(0.06-0.22)	55.55;0.000
>2 hours /day	52(55.91)	41(44.09)	93(33.45)		
Duration of computer use					
<= 2hours/day	40(20.83)	152(79.17)	192(69.06)	0.34(0.20-0.60)	14.60;0.000
>2 hours/day	37(43.02)	49(56.98)	86(30.94)		
Habit of exercise (daily)					
Present	17(18.09)	77(81.91)	94(33.82)	0.50(0.27-0.93)	4.90;0.02
Absent	56(30.43)	128(69.57)	184(66.18)		
Total	77(27.70)	201(72.30)	278 (100)		

DISCUSSION:

Pattern of overweight &/obesity:

In the present study, the proportion of combined overweight &/obesity was 28% (19% & 9% respectively) as per WHO criteria of BMI which was more or less comparable to some previous studies among medical students across different parts of the globe.¹⁴⁻²¹

Study by Gupta et al¹⁴ at Midnapore Medical College demonstrated the prevalence of combined overweight & obesity was 21% (17% and 3% respectively); Abdalla et al¹⁵ at National Ribat University, Khartoum found the pattern of overweight was 18% and obesity 9% (combined prevalence was 27%); Gopalakrishnan et al¹⁶ at AIMST university, Malaysia revealed overweight accounted for 16% & 5% were found to be obese(combined prevalence was 21%); Al-Madani¹⁷ at Arabian Gulf University (AGU), Bahrain showed that combined overweight & obesity was 22.6%; Boo et al¹⁸ at International Medical university, Malaysia found to be 30%; Raza et al¹⁹

at Government Medical college, Karachi revealed that 17% were overweight; Carter et al²⁰ at United Arab Emirates university found that 24% of students were overweight/obese and Basu et al²¹ at two medical colleges of West Bengal revealed a pattern of combined overweight and obesity was 22%(18% overweight & 4% obese respectively).

However, this pattern rate was elevated than some other studies done among medical students.²²⁻²⁶ Study by Fernandez et al²² at Shrimati Kashibai Navale Medical College, Pune revealed overall prevalence of overweight/obesity was 13%; by Aslam et al²³ at Aga Khan University, Karachi it was 9%; by Chhabra et al²⁴ at University College of Medical Sciences, Delhi it was 14%(12% & 2% respectively for overweight & obesity).; Nojomi et al²⁵ at Iran University of Medical Sciences found as 12%; and Sinhababu et al²⁶ at Nursing Training School, Bankura demonstrated as 5%. On the contrary, the findings of this study were much lower compared with another group of studies conducted among comparable groups.²⁷⁻³⁵ Gore et

al at Bangalore revealed the combined prevalence was 41.27% (19.1 % were overweight and 22.1% were obese respectively)²⁷; Selvaraj et al²⁸ at Meenakshi Medical College & Hospital, Kanchipuram reported as 33% (24% & 9% respectively for overweight & obesity); Bakr et al at Egypt²⁹ demonstrated as 49% (37% & 12% respectively) Bertisias et al³⁰ at University of Crete, Greece showed 40% among men and 23% among women; Hingorjo et al³¹ at dental college of Karachi found 61% in females and 44% in males; Nisar et al³² at Baqai Medical University, Karachi reported the combined prevalence was 42%; Mahmood et al³³ at Civil Hospital of Karachi demonstrated it was 60% (32% & 28% for overweight & obesity respectively); and Allam et al at Saudi Arab showed that the combined prevalence was 44.8% (34.5% of the students were overweight, and 10.3% were obese).³⁴

Determinants:

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.^{14, 15, 17, 19, 22, 24, 30, 33} on the contrary, reverse findings were also noted in other studies.^{26, 31}

Age: is another biological non-modifiable factor which influences individual's susceptibility to weight gain and the development of obesity. This study showed no statistical association with age and BMI which was comparable with Karachi study by Nisar et al.³² However some previous studies conducted among medical students revealed that obesity among students aged less than 20 years were less in comparison with the upper age group which was statistically significant.^{15, 22, 26}

Positive family history: of obesity was also observed to be related with BMI status in the present study which was consistent with prior studies by Basu et al²¹, Fernandez et al²², Selvaraj et al²⁸, Gore et al²⁷, Bakr et al²⁹, Mahmood et al³³ and Chhya et al.³⁴

Lifestyle issues: Physical inactivity was significantly associated with overweight and

obesity which was also in accordance with previous studies.^{14, 22, 22, 28, 31, 32, 33}. Compulsory physical activity in the form of jogging, gymnasium, aerobics should be promoted through institution climate and modes of encouragement should be modified from audio-visual choices to game play and other forms of physical activities. One important finding of our study was the significant statistical association of watching television/using computer for long time with high BMI; which was in agreement with several other studies.^{16, 21, 28, 29, 31} However overweight/obesity was not associated significantly with watching TV/using computer in Midnapore study¹⁴ and Pune study.²²

Though alcohol consumption was inversely associated with obesity found in Midnapore study¹⁴ and Pune study²²; our study and West Bengal study²¹ demonstrated positive relationship with alcohol consumption and high BMI. In the present study, smoking was associated with low BMI which was corroborative to some other studies.^{14, 18, 21}

Dietary habits:

There was no significant role of type of diet in our study and some previous studies like studies at Midnapore¹⁴, West Bengal²¹, Pune²² and Gujarat.³⁴

The significant role of soft drinks as found out by Abdalla et al¹⁵, Boo et al¹⁸, Basu et al²¹, Fernandez et al²², and Nisar et al³² showed strong evidence for weight gain which was in agreement with our study. Consumption of sugar-sweetened beverages (SSBs) may be a key contributor to the epidemic of overweight/obesity, by virtue of these beverages' high added sugar content, low satiety, and incomplete compensation for total energy.

It was 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.^{15, 21, 26, 31, 32}

It was found that as the frequency of taking fruits increased, the proportion of overweight subjects decreased. These observations were statistically significant in our study and West Bengal study.²¹

CONCLUSION: The problem of obesity/overweight was high in our study. The main factors responsible for obesity were found longer time spent by means of computer/ watching television, large amount of soft drink intake, frequent fast and junk food consumption, fruits taken infrequently, physical inactivity and alcohol consumption. Also positive family history played a role for obesity development. Thus there is a definite need to inculcate good habits of healthy eating and regular physical exercise.

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