

Do the dietary and lifestyle practices make the private medical students overweight: A cross-sectional study in Bangladesh?

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Abstract:

Introduction:

Increased mechanization and change in the food patterns are leading to physical inactivity and more energy intake globally. That's why, obesity and overweight are no longer confined to the industrialized countries; it has spread to the developing countries as well. In Bangladesh also over-nutrition is increasing alarmingly. As the future doctors, medical students should adopt healthy dietary and lifestyle practices from the very beginning of their youth for contributing more effectively and efficiently to the country's healthcare.

Objectives:

The study assessed the prevalence of overweight, the dietary and lifestyle determinants of overweight among the students of an urban private medical college of Bangladesh.

Methodology:

A cross-sectional study was conducted in Ibrahim Medical College, a private medical college in Dhaka city. Data was collected through self-administered questionnaires and anthropometric measurements. Data Analysis was done by SPSS version 17.0

Results:

The Prevalence of overweight among the medical students was found to be 27.16% (Male 39% and female 22%) . 58% of the respondents had positive family history of overweight/obesity and around 70% of them had positive family history of Type 2 Diabetes and Hypertension. The dietary factors associated with overweight were increased frequency of eating at fast food shops and drinking sweetened tea or coffee. Among the lifestyle factors, liberal family rules regarding food, prolonged gap (≥ 120 minutes) between waking up and having breakfast, taking meal while watching TV or using computer and inadequate sleep (< 7 hours of sleep) were found to be associated with being overweight. Binary logistic regression concludes that positive family history of overweight/obesity; inadequate sleep and a prolonged gap between waking up and having breakfast were significantly contributing to be overweight.

Conclusion:

The prevalence of overweight among the urban private medical college students was found to be higher than the available data of overweight in Bangladesh. Along with dietary habits, lifestyle practices are also becoming more and more important determinants of being overweight. The medical students should be counseled and advised to bring positive attitude towards healthy lifestyle and dietary practices.

Keywords: Non-communicable disease, overweight, obesity, medical students, BMI

1. Introduction

Obesity is a global problem affecting both the developed and developing countries. It is a leading preventable cause of morbidity and mortality associated with non-communicable disease. Obesity and overweight are no longer a disease of industrialized countries, as it has been estimated that around 115 million people from the developing countries are suffering from this disease (WHO, 2011). The reason may be due to the nutritional transition that the developing countries are undergoing. The nutritional transition is caused by rapidly developing economy and market globalization, which in turn is leading to harmful dietary habits and sedentary lifestyles (Lobstein, Baur, and Uauy, 2004). The World Health Organization (WHO) projections show that at least one in three of the world's adult population is overweight and almost one in 10 is obese (WHO, 2006). The trend of increasing overweight and obesity cannot be attributed to the genetic factors only; rather majority of this burden is attributable to the environmental factors, the "Obesogenic environment" (Aranceta, Moreno, Moya, and Anadón, 2009). Being overweight and/or obese is a hazard to public health, as it is linked to a series of non-communicable diseases, namely type 2 diabetes, hypertension, cardiovascular disease, colon cancer, breast cancer and gall-bladder disease. It may even cause dyslipidaemia, osteoarthritis, gout and pulmonary disease like COPD (WHO, 2000)

Overweight and obesity is rapidly increasing in the younger generation of many middle and low income countries, including Bangladesh. An NCD (Non Communicable Disease) risk factor survey done in the year 2010 shows that 17.6% of the adults aged 25 years and above, is overweight (DGHS & MoHFW, 2011). This implies a massive chronic disease burden, resulting in an economic burden in the next 10 to 20 years (Kim & Popkin, 2006), if nothing is done to prevent it. WHO estimates in 2008 shows that in Bangladesh, 7.6% males are overweight and 7.8% females are overweight (WHO, 2011). Bangladesh Demographic and Health Survey (BDHS) data (2007) shows that around 24% of ever married urban females aged 15-49 years are overweight ($BMI \geq 25 \text{ kg/m}^2$)

As mentioned in the dietary guidelines for Americans (2010), the "Social-Ecological Model" depicts how the social and environmental factors around an individual add up, and gives shape to his/her food choices and lifestyle, which determines the total energy intake and energy expenditure (U. S. Department of Agriculture and U. S. Department of Health and Human Services, 2010). The conceptual framework for this study is adapted from this model

Globally, there is increased mechanization and transition of food patterns. This leads to less physical activity and more energy intake (Huneault, Mathieu, & Tremblay, 2011). Bangladesh is a low income country (World Bank, n.d.). In low income countries the people from the high socioeconomic status and urban areas are more likely to be obese (Swinburn, et al., 2011). In this context, the lack of market price regulation of fast foods, the availability of cheap transport to go to nearby places (rickshaw, CNG), lack of recreational space for rapid urbanization, availability of household help at a cheap price, everything leads to more intake of energy dense food and less energy expenditure. In Dhaka, there is rapid urbanization, along with rapidly increasing number of fast food shops. Moreover, in societal context, socializing with friends, peer influence plays a major role in food intake practices. Individually, a person can be influenced by family rules and/or influence and his/her personal preferences for food (Lau, Quadrel, & Hartman, 1990). All these factors together influence the individual's dietary habits and lifestyle. These two, in turn results in the person's BMI (Body Mass Index) status. A study done on young adults to see the association between fast food consumption and change in BMI over a 3 year period also showed that increased fast food consumption was associated with a higher BMI (Duffey, Gordon-Larsen, Jacobs Jr, Williams, & Popkin, 2007, pp. 201-208). Skipping breakfast may cause higher fat storage due to the long period of not eating, and ultimately lead to weight gain (Horikawa, et al., 2011, pp. 260-267). NCD survey done in Bangladesh shows that the mean number of fruit and vegetable consumption are 1.7 and 2.3 servings per day (DGHS & MoHFW, 2011). This shows that there is inadequate consumption of fruits and vegetables, as the minimum daily recommended amount is 5 or more servings per day, in either form. Smoking for short duration reduces appetite and increases energy loss, so smokers tend to have lower body weight than non-smokers. Interestingly, heavy smokers have higher weight as compared to nonsmokers or light smokers. Smoking also increases insulin resistance, so there is central deposition of fat; therefore, smoking increases the chances of being overweight (Chiolero, Faeh, Paccaud, and Cornuz, 2008, pp. 801-809).

A study found out that overweight and obese people have higher prevalence of sedentary activity as compared to those who are not overweight (Kushner & Choi, 2010). Another study showed that less restrictive or "democratic"

parenting style was associated significantly with a higher BMI of the child, as well as higher dietary intakes (Chen & Kennedy, 2004). Even reduced sleep duration may lead to overweight. This might occur as inadequate sleep causes hormonal imbalance which directly leads to weight gain. Also, the person may have reduced energy expenditure in the day due to tiredness (Ayas, 2010). A study done on urban and semi-urban children in India showed that increasing time of watching TV was associated with being overweight (Kuriyan, Bhat, Thomas, Vaz & Kurpad, 2007). The case is the same for adults, as more hours spent on watching TV means more sedentary behavior (Thorp, Owen, Neuhaus, & Dunstan, 2011). An experimental study showed that watching tv while having meal increases the intake of food. Therefore, as there is more energy intake, there are more chances of being overweight (Blass, et al., 2006).

2. Materials and methods

2.1 Study site

This cross-sectional study was conducted in Ibrahim Medical College, Shahbagh, Dhaka, Bangladesh. This particular medical college was selected as it is a private medical college situated in urban area (Dhaka city). The effects of higher socio-economic status, rapid urbanization, mechanization of daily lifestyle, would be well evident in such setting.

2.2 Sampling technique

We did not find the prevalence of overweight among private medical students even after extensive literature review. So we assumed the prevalence to be 50%, the margin of error 10% and the confidence interval to be 95%. Then the estimated sample size would be 76. We have used Epi Info version 3.5.3 to calculate the sample size for our study. Considering the feasibility and a non-response rate of 10%, we decided to take a sample size of 84. Then the respondents were selected by Systematic random sampling.

2.3 Data collection and analysis

A self-administered questionnaire was given to the respondents to collect information regarding their socio-demographic information, family history of overweight/obesity, type2 diabetes and hypertension, dietary habits and lifestyle practices that could contribute to become overweight. The questionnaire was prepared by adapting questions from WHO STEPwise approach to chronic disease risk factor surveillance- Instrument v2.1 (WHO, n.d.) and Creating a Clinical Screening Questionnaire for Eating Behaviors Associated with Overweight and Obesity (Greenwood, Murtaugh, Omura, Alder, & Stanford, 2008) Anthropometric measurements eg. Weight and height of the respondents were done. Weight was obtained by Bathroom scale and the height was measured by calibrated height meter. BMI was calculated for each students using the formula, $BMI = \text{weight in kg} / (\text{height in meter})^2$

Data was analyzed by SPSS version 17.0 and frequency distribution of all relevant variables was made. We did univariate tests (mean, standard deviation, percentiles, minimum, and maximum), bivariate tests (chi-square, Fisher's Exact test, t-test) and binary logistic regression to analyze the data.

Ethical clearance was obtained and permission from the principal of Ibrahim Medical College was taken to conduct the study. Informed written consent was taken from each respondent after explaining the objectives of the study.

3. Results

Among the 81 participants, there were 58 females (72%), and 23 (28%) males. The mean age of the students was 21.09 ± 1.32 years. The average monthly household expenditure of the students was around 53,000 taka. 27.16% of the students were found to be overweight in the study (Graph 1). Among the male students, 9 out of 23 were overweight (39%), and among the female students, 13 out of 58 were overweight (22%). The students with household monthly expenditure more than 60,000 taka were more likely to be overweight ($\chi^2: 4.32$, p value: 0.038, p value < 0.05). The students with a positive family history of overweight or obesity were more likely to be overweight ($\chi^2: 7.02$, p value: .008, < 0.01) while there was no association found between the family history of diabetes, hypertension and the BMI status.

The students who used to eat at fast food shops 2-3 times per month were more likely to be overweight as compared to the other groups who eat at fast food shops once per month or less (Fisher's exact test value: 8.71, P value: 0.021, p value < 0.05) (Table 1). The students were more likely to be overweight with increasing frequency of taking tea/coffee with sugar ($\chi^2: 10.134$, p value: 0.045, p value < 0.05). No association was found between smoking, skipping breakfast, taking soft drinks and being overweight.

The average time of reclining or sitting down (sedentary activity) was around 8 ± 4 hours; but was not found to be associated with being overweight at a statistically significant level. The students were asked to mention how strict their family rules were regarding food, on a likert scale ranging from very strict to very liberal. There was statistically significant association found between the strictness of the family and the BMI status of students (Table 2). The average gap between waking up and having breakfast/first eating was significantly higher in the overweight students as compared to the student who were not overweight (p value of t-test: 0.032, p value <0.05). Moreover, the students having inadequate sleep were more likely to be overweight (χ^2 : 8.52, p value: 0.004, p value <0.01)

We did binary logistic regression with every variable that were found to be associated with the BMI status. At first the binary logistic regression were done individually (unadjusted model) with the outcome variable (BMI status: being or not being overweight). The predicted outcome was being overweight. Then all the associated independent variables were collectively run through binary logistic regression, with the dependent variable (adjusted model). BMI status was the outcome variable and the predicted outcome was being overweight. We found that having a family history of obesity/overweight, inadequate sleep and long gap between waking up and having breakfast are the factors in this study that contribute to being overweight (Table 3).

4. Discussion

The prevalence of overweight among the students of Ibrahim Medical College (27%) was found to be higher compared to the findings of NCD survey (about 18%) done in Bangladesh recently (DGHS & MoHFW, 2011). The NCD survey was done on a population >25 years old. In our study, the population is younger. The high prevalence could be due to the higher socio-economic class the students come from. The prevalence is lower compared to similar study done in Pakistani private medical students (42%) (Fatima, Nisar, Perveen and Qadri, 2008). There was association between the positive family history of overweight/obesity and being overweight. Similar finding was seen in previous studies as well. A study on Turkish males also showed that positive family history of obesity is a risk factor for being overweight (Şahin, et al., 2011).

Among the dietary habits, only frequency of eating at fast food shops and frequency of drinking sweetened tea/coffee was associated with being overweight. Eating at fast food shops might have increased due to rapid increase of fast food shops in urban areas like Dhaka city. Eating at fast food shops was also found to be associated with gaining weight in other studies (Duffey, et al., 2007). What came out evident from the study is that the students consume vegetables more frequently than the fruits. This may be due to more availability and accessibility of vegetables compared to fruits. It may also be due to cultural influences (WHO/FAO of the United Nations, 2002).

The factors among lifestyle that were found to be associated with being overweight are the liberal family rules regarding food, long gap between waking up in the morning and having breakfast/first eating, inadequate sleep, and increased frequency of having snacks while watching TV/video/using computer. The possible reason may be that strict families give away less pocket money to the students, or discourage eating outside, so they eat outside readymade foods less. Moreover, strict families have meals as a family more often, so it reduces outside food consumption and skipping meals. Thus the students may have healthier food habits to prevent them from being overweight. The gap between waking up in the morning and having breakfast/first eating was significantly higher in the overweight students compared to that of the non-overweight students, and association was found between prolonged gap (≥ 120 mins) between waking up and having breakfast/first eating and being overweight. This may be explained metabolically. The more the gap between waking up and having breakfast/first eating or the more prolonged time a person stays fasting, the more it might lead to obesity. This is because prolonged fasting state may lead to reduced satiety effect, and cause the person to eat more when he/she first eats (Horikawa, et al., 2011, pp. 260-267). Again, those who had inadequate sleep (sleep less than 7 hours per day) were significantly associated with being overweight (p value <0.01). The possible explanation behind short sleep duration and predisposition to overweight was given by Patel and Hu (2008). Sleep deprivation may predispose to obesity in mainly two ways: Increased caloric intake and decreased energy expenditure. Due to short sleep duration, when the person stays awake, there are more chances of food intake. Serum leptin reduces and serum ghrelin increases due to short sleeping time, leading to an abnormally increased appetite for, and excessive consumption of food. Again, due to less sleep, the individual feels tired, and thus he/she does less physical activity, rests more, which may be associated with watching TV or other sedentary activities (Patel and Hu, 2008). Thus, inadequate sleep increases the risk of being overweight.

According to WHO (2011), it is recommended for adults aged 18-64 years to do vigorous intensity activity for at

least 75 minutes or moderate intensity activity for at least 150 minutes per week, or do the equivalent combination of moderate and vigorous intensity activity throughout the whole week. Majority of the participants did not do any vigorous or moderate intensity activity throughout the whole week. This may be due to lack of awareness, which is unlikely in this group of people, as they are medical students. It most probably may be due to lack of free time and space to do such activity. A study done on the prevalence of unhealthy lifestyle among overweight and obese adults found that lack of physical activity is associated with being overweight (Kushner & Choi, 2010).

After doing binary logistic regression with all the variables that were associated with BMI status, the factors that were found to contribute to being overweight were: Having a family history of obesity/overweight, inadequate sleep (sleep <7 hours), and having a long gap (≥ 120 minutes) between waking up and having breakfast/first eating. Family history is once again found to be contributing to overweight as found in previous studies (Şahin, et al., 2011). From the findings, we can emphasize that regardless of the importance dietary habits have as a determinant of overweight, lifestyle determinants are becoming more and more important factors in predicting overweight. The possible reason why lifestyle stood out among all the factors may be due to the fact that physical activity and dietary pattern are more influenced by environmental factors, whereas sleep, gap between waking up in the morning and having breakfast are more individual choices. That might be the reason why in this group of people coming from almost similar backgrounds and similar life patterns, the lifestyle factors became the ones to mark the difference. However, that does not imply that the other risk factors do not contribute to being overweight and should be overlooked. Those risk factors should also be kept in mind and precautions should be taken.

5. Conclusion

The prevalence of overweight among the urban private medical college students was found to be higher than the available data of overweight in Bangladesh. But as there was no similar published study found in Bangladesh, the data was not exactly comparable with the other surveys done in Bangladesh. However, the prevalence was found to be less than the prevalence found in a similar study done in Pakistan (Fatima, et al., 2008). Nevertheless, this study could make an important contribution by depicting the situation of the prevalence of overweight among this specific group. From the findings, we can emphasize that regardless of the importance socio-economic status and dietary habits have as a determinant of overweight, lifestyle determinants are becoming more and more important factors in predicting overweight. Nevertheless, our study once again drew attention to the fact that having a family history of overweight/obesity should be considered as a warning sign for any one, and that he/she should be taking care of his/her diet and lifestyle beforehand, to avoid being overweight and eventually facing the health consequences.

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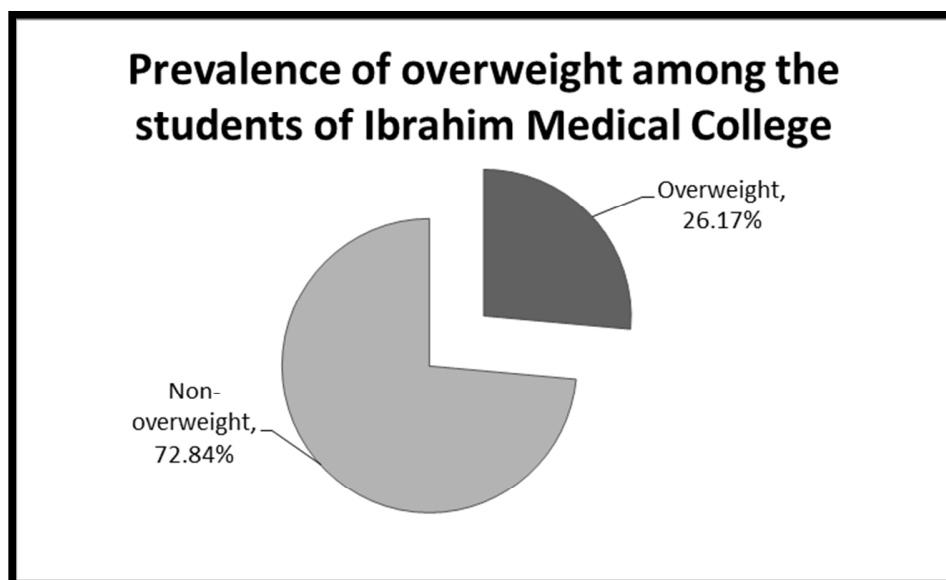
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Graph 1: Prevalence of overweight among the students of Ibrahim Medical College

Variable		BMI Status		Fisher's exact test value	p value
		Non-overweight Number of students (%)	Overweight Number of students (%)		
Frequency of eating at fast food shops	Once per month or less	30(51%)	8(36%)	8.71	0.021*
	2-3 times per month	18(30%)	13(59%)		
	1-2 times per week	10(17%)	0(0%)		
	5 or more times per week	1(2%)	1(5%)		

* p value is statistically significant at a 0.05 level

Table 1: Association between frequency of eating at fast food shops and being overweight

Variable		BMI Status		Chi-square value	p value
		Non-overweight Number of students(%)	Overweight Number of students(%)		
Strictness of family rules regarding food	Very liberal	10(17%)	4(18%)	12.74 ^a	0.009**
	Liberal	3(5%)	8(36%)		
	Neither strict, nor liberal	16(27%)	5(23%)		
	Strict	20(34%)	3(14%)		
	Very strict	10(17%)	2(9%)		

^aFisher's Exact test value

** p value is statistically significant at a 0.01 level

Table 2: Association between the strictness of family rules regarding food and BMI status

Adjusted Model			Unadjusted Model		
Variable	Odds Ratio (CI)	p value	Variable	Odds Ratio (CI)	p value
Positive family history of Overweight ^a	15.04 (1.22-184.69)	0.034*	Positive family history of Overweight ^a	4.66 (1.41-15.42)	.012*
Inadequate sleep ^b (sleep<7 hours)	12.55 (1.92-28.40)	0.027*	Inadequate sleep ^b (sleep<7 hours)	4.51 (1.58-12.90)	.005**
Long gap between waking up and having breakfast/first eating ^c (≥120mins)	8.91 (1.19-66.90)	0.034*	Long gap between waking up and having breakfast/first eating ^c (≥120mins)	5.88 (1.10-17.32)	.001**

* p value statistically significant at 0.05 level, ** p value statistically significant at 0.01 level

a:Reference category: no family history of overweight/obesity, b:Reference category: having adequate sleep (≥7 hours), c:Reference category: normal gap (<120 minutes)

Table 3: Adjusted and unadjusted model's values of variables contributing to overweight

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