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Prevalence and Risk Factors of Obesity and Hypertension Among University Students in Rajshahi City, Bangladesh

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Abstract

Obesity has become a new challenge for health care providers in the world, which leads to reduced life expectancy or increased health problems. The aim of the present study was to assess the prevalence and risk factors of obesity and hypertension among the undergraduate and postgraduate students in Rajshahi city. About 675 students were interviewed by standard questionnaires with their verbal consents. In this study, we found that a major portion of the population (13.93% which is about 94 students out of 675) were overweight and 61 students (9.04%) were obese at different stages on the basis of Body Mass Index (BMI) values where 75.41% and 31.15% were male and female students, respectively. About 31.15% of the obese students came from families with monthly income of 31000-40000 taka and 29.50% obese students have at least one obese parent. We also observed that about 32 students (52.46%) out of 61 obese students were pre-hypertensive and 34.43% obese students were stage I hypertensive patient. In this study, we found that the most common risk factors of obesity and hypertension among university students were sedentary life style, physical activity less than 30 min/day, smoking, frequent intake of soft drinks, fast food and food rich in fats (Junk food). This may be the first health survey conducted regarding obesity and hypertension among these university students in Bangladesh, which might be helpful for health workers to raise awareness among the mass people.

Key words: Obesity, Hypertension, University students, Smoking, Bangladesh.

Introduction

Obesity is abnormal or excessive fat deposition with adverse consequences for health, jeopardizing the quality of life and increasing the risk for precocious diseases, incapacity and death. Obesity and problems due to overweight have dramatically increased over the past three decades in the world, which are categorized according to individual body mass index (BMI), which is calculated as weight (kg) divided by height^2 (m^2). The world health organization defined overweight as 30>BMI≥ 25 (kg/m2) and obese as BMI≥30 (kg/m2) (WHO, 2006). Obesity can result in a wide range of serious health consequences, such as diabetes, hypertension, cardiovascular disease, and some forms of cancer (Le Petit and Berthelot, 2006). In addition, excess adiposity can be detrimental to psychological and emotional well-being, lowering an individual's overall quality of life (Kottke *et al.*, 2003). Moreover, obese and overweight individuals tend to face discrimination with respect to employment, education, health care, and wages (Cawley, 2004; Puhl and Brownell, 2001). Finally, at a societal level it is a significant economic burden.

It is reported that consuming food away from home (markedly fast-food) is an important cause of increased obesity risk (Ebbeling *et al.*, 2007; French *et al.*, 2000; Binkley *et al.*, 2000; Pereira *et al.*, 2005). Many conceivable mechanisms such as high glycemic load, large portion size (Ludwig, 2002; Orlet Fisher *et al.*, 2003) and excessive amounts of refined starch and

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added sugars have been proposed to link consumption of fast-food with risk of obesity. Excess caloric intake such as fast food is a well-established determinant for weight gain (Stender, 2007; Prentice *et al.,* 2003; Isganaitis *et al.,* 2005). In a cross-sectional study it was observed that, fast food consumption was positively associated with BMI and higher consumption of fast food at year 7 was associated with a 0.16-unit higher BMI at year 10 (Duffey *et al.,* 2007). Children and adolescents consuming greater quantities of fast food are generally heavier, have greater total energy intakes, and have poorer diet quality. Smoking, hypertension, obesity and diabetes mellitus were common risk factors among patients with acute hypertension (Ahmed *et al.,* 1993; Hakim *et al.,* 1991). High dietary fat intake, smoking and lack of exercise have all been documented as independent risk factors for the development of heart disease and are considered modifiable risk factors as they result from lifestyle behavioral problems (Manson *et al.,* 1992).

The risk factors may vary within and among population groups exposed to different environmental influences (Parsons *et al.,* 1999). This is a public health issue that characterizes the modern times and must be efficiently addressed due to its magnitude and relevance. It is of utter importance to gauge the prevailing risks in each population group so that proper strategies can be drawn and deployed to prevent and treat obesity. This study aims at analyzing the risk factors associated with obesity and hypertension in students from freshmen year to the final year in these universities.

Methodology

Setting and design: The research was conducted among the undergraduate and postgraduate student of Rajshahi city. The students were questioned using pre-determined questionnaire.

Data collection: This cross-sectional health survey was carried out with a self-designed standard questionnaire by directly interviewing the 675 students over three months from January 2015 to March 2015. About 30 Pharmacy students of Varendra University were assigned to conduct the study. The questionnaire contained some basic variables: age, parent's occupation, education level, monthly family income, sleeping time, sedentary lifestyle, physical activity, fast food intake, soft drinks intake, smoking habit and their blood pressure. The questionnaires were self-administered and where necessary, were administered on the students by the research team with the aid of the assistants who had been trained for the study. The questionnaire took about 10 minutes to complete and contained mainly close ended questions.

The data collectors went to the universities and interviewed the students with their written consent. The Bengali answers given by some respondents were translated to English by the data collectors. Few questionnaires were excluded during the data analysis because of inadequate information. The study was conducted following the general principles (section 12) of WMA declaration of Helsinki (http://www.wma.net/ en/30publications/ 10policies/b3/). This survey based research is also logistically supported by the Department of Pharmacy of one of the Universities

Statistical analysis: Descriptive statistics were applied to the collected data using Microsoft Excel software-2007. Results are expressed in frequency distribution and percentages.

Results

We conducted a health survey on obesity and hypertension among university students of Rajshahi City in Bangladesh with a self-designed standard structured questionnaire. In this study, we observed that a great portion of study population (13.93% ; which is about 94 students out of 675) were overweight and 61 students (9.04%) were obese at different stages on the basis of Body Mass Index values where 5.19% of students were in the obesity stage I, 3.26% of students were in the obesity stage II and 0.59% of students were in the obesity stage III. We also found that 72.89% of students were normal in weight whereas 4.14% of students were underweight as shown in Table 1.

The most prevalent age group of obese students (45.90%) was between 22-25 years, 34.43% were between 18-21 years and 19.67% were above 25 years. Fathers of about 47.54% of obese students were business men, 45.90% were service holder and 6.56% belonged to other occupations. Mothers of about

63.93% of obese students were service holders and rest were house wife i.e, 34.43%. A great number of obese students (31.15%) came from a high middle class income family of about 31000-40000 BDT monthly, 22.95% had monthly income of 21000-30000 BDT, 16.39% had between 41000-50000 BDT monthly and 14.75% obese students monthly family income was 10000-20000 BDT. A minimum number of obese students (9.84%) monthly family income was over 50000 BDT whereas 4.92% had less than 10000 taka monthly income. About 29.50% obese university students have at least one obese parent and rest of the students have no obese parents. In our study, we also found that 4.92% obese university students were sleeping more than 10 hours per day whereas 3.28% were sleeping less than 5 hours per day. About 39.36% obese students were sleeping between 5-6 hours per day, 34.43% between 7-8 hours per day and 18.03% between 9-10 hours per day as shown in Table 2.

Table 1. Prevalence of obesity among the study population based on BMI (according to WHO).

Category	BMI Range (Kg/m^2)	Frequency X=675	Percentage (%)
Underweight	<18.5	28	4.14
Normal weight	18.5-24.9	492	72.89
Overweight	25-29.9	94	13.93
Obesity I	30-34.9	35	5.19
Obesity II	35-39.9	22	3.26
Obesity III	≥ 40.0	04	0.59

Table 2. Demographic characteristics of the obese students.

Question pattern	Response pattern	Frequency (N=61)	Percentage (%)
Age	18 – 21	21	34.43
	22 – 25	28	45.90
	>25	12	19.67
Sex	Male	46	75.41
	Female	15	24.59
Father's Occupation	Service holder	28	45.90
	Business	29	47.54
	Others	04	6.56
Mother's Occupation	Service holder	39	63.93
	House wife	21	34.43
Family Monthly income (BDT)	<10,000	03	4.92
	10,000-20,000	09	14.75
	21,000-30,000	14	22.95
	31,000-40,000	19	31.15
	41,000-50,000	10	16.39
	>50,000	06	9.84
Having at least one overweight parent	Yes	18	29.50
	No	43	70.50
Sleeping Time/Day (Hours)	<5	02	3.28
	5-6	24	39.36
	7-8	21	34.43
	9-10	11	18.03
	>10	03	4.92

In this health survey, we correlated between obesity and hypertension among university students of Rajshahi city, Bangladesh. We found that a major portion of obese students (52.46%) i.e. about 32 students (52.46%) out of 61 are pre-hypertensive and 34.43% obese students were stage I hypertensive patient. We also observed that 13.11% of obese students have normal blood pressure and none of the obese students belonged to the stage II and III hypertension (Table 3).

Risk factors of obesity and hypertension were also searched and it was found that about 44.26% obese and hypertensive students spent more than 121 min/day for sedentary activities, 36.07% spent 61-120 min/day and 19.67% spent less than 60 min/day for sedentary activities. A great number of obese and hypertensive university students (62.30%) exercised physically less than 30 min/day, 32.79% exercised 31-60 min/day and only 4.92% exercised over 61min/day. About 70.49% of obese and hypertensive university students drank soft drinks daily whereas 29.51% students drank soft drinks at least once a week. A major amount of obese and hypertensive students (81.97%) took fast food daily and 18.03% took fast food at least once a week. About 73.77% obese and hypertensive students took rich food daily and rest of the students (26.23%) took food rich in fats at least once a week. About 39.34% obese and hypertensive university students were current smokers and 49.18% were former smokers, whereas 11.48% of obese and hypertensive university students never smoke in their life (Table 4).

Table 3. Prevalence of hypertension among obese university students in Rajshahi city.

Category	BP range (mm Hg)		Frequency N=61	Percentage (%)
	Systole	Diastole		
Normal	90-119	60-79	08	13.11
Pre-hypertension	120-139	80-89	32	52.46
HTS I	140-159	90-99	21	34.43
HTS II	160-179	100-109	00	00
HTS III	≥180	≥110	00	00

Table 4. Risk factors for obesity and hypertension among the study population.

Risk Factors	Response pattern	Frequency (N=61)	Percentage (%)
Sedentary lifestyle (Min/Day)	<60	12	19.67
	61-120	22	36.07
	>121	27	44.26
Physical activity (Min/Day)	<30	38	62.30
	31-60	20	32.79
	>61	03	4.92
Frequency of soft drinks intake	Daily	43	70.49
	Weekly	18	29.51
Frequency of fast food intake	Daily	50	81.97
	Weekly	11	18.03
Frequency of intake of food rich in fats	Daily	45	73.77
	Weekly	16	26.23
Smoking	Current smoker	24	39.34
	Former smoker	30	49.18
	Never	07	11.48

Discussion

The purpose of this study was to determine the prevalence and risk factors of obesity and hypertension among Bangladeshi university students. The results of this study are very alarming with an epidemic of obesity and hypertension in these university students. Around 94 students (13.93%), were identified as

overweight whereas around 61 students (9.04%), were recorded as obese at different stages of obesity. Beth Anderson and his colleagues showed the overall prevalence of fast food consumption with a result of 28% studying on Michigan adults (Anderson *et al.,* 2011). Another cross sectional study among northeast Ohio residents showed a 42% prevalence of fast food consumption (Butt *et al.,* 2007), whereas this study showed an increased prevalence in Bangladesh which was (81.97%) for daily fast food intake. In another survey, it was reported that, approximately 63% respondents took fast food at least once in a week (Moore *et al.,* 2009), whereas this present data showed 11 out of 61 (81.03%) obese students took fast foods atleast once a week. Study conducted by Islam & Ullah (2010) identified brand reputation, accessibility, taste, cost, quality, food hygiene, and fat and cholesterol level as the factors related to fast food preferences by the university students in Bangladesh. In this study, factors like convenience, easy accessibility, taste, and cost are also reported. In another study, by Rydell *et al.,* 2008, data from a convenient sample of adolescents and adults in the Minneapolis/St. Paul, Minnesota, metropolitan area; limited time, good taste, eating with friends and family, and cost were the most prevalent reasons among a sample of college students from a large Midwestern university (Morse *et al.,* 2009).

The present study revealed that more than 62% of the students did not do sufficient amount of physical exercise (less than 30min/day). Al Refaee and Al-Hazza, 2001 showed that over 53% of Saudi males were totally physically inactive, and 27.5% were irregularly active in Riyadh, KSA. In contrast, Taha, 2005 reported that 91% of male school students were practicing physical exercise. However, in our study we found among Bangladeshi university students, 44.26% of the obese students maintained a sedentary life style, they took soft drinks and fatty foods much more frequently, and most of them were current smoker (39.34%) and former smoker (49.18%). This kind of life style certainly made an effect on their body physiology as evident in Table 4. We also noticed that about 52.46% of these obese students are pre-hypertensive and 34.43% are already suffering from stage-1 hypertension.

Regular exercise/physical activity provides considerable benefits in reducing morbidity and mortality from several chronic diseases in adults, especially from CVD and its risk factors (Haapanen *et al*., 1997). Scientific evidence shows an association between regular physical exercise and the lowering of blood lipid levels, resting blood pressure among persons with borderline hypertension, overweight, glucose intolerance and insulin sensitivity (Wannamethee *et al.,* 2000).

Our study has some limitations, the data were self-reported and the study is cross-sectional which does not infer causal relationships. Furthermore, we took samples from only three universities and therefore caution should be taken to generalize the data for other institutions.

Conclusion

The study reveals the relation between obesity and hypertension with their risk factors. Proper measure should be taken to raise awareness among the students. Keeping the obesity and hypertension under control is always much safer than cure. Learning life-long habits that incorporate exercise and healthy eating are mandatory and research is emerging regarding the various methods of educating youth with a view of controlling the epidemic.

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