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Research Article

Prevalence of Overweight and Obesity among Adult in Selected Areas of Bangladesh

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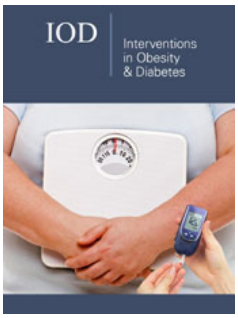

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Abstract

Obesity is becoming the most common health problem of the 21st century, as it will contribute significantly to the high prevalence of cardiovascular disease in developing countries. This study aims to estimate the prevalence of overweight and obesity and determine potential influencing factors among adults in selected areas in Bangladesh. A cross-sectional survey was conducted in4 districts of Bangladesh (Dhaka, Mymensing, Khulna and Sylhet) in 2018. A total of 400 respondents aged 18-93 years from the general population were included using a multistage stratified random cluster sampling design. Data were obtained from face-to-face interview and physical examination. After being weighted according to a complex sampling scheme, the sample was used to estimate the prevalence of overweight (body mass index (BMI) 23-27.49kg/m2) and obesity (BMI ≥27.5kg/m2).The overall prevalence of overweight was 23.25% (male 25.11%; female 20.61%), and the prevalence of obesity was 6.75% (male 6.81%; female 6.67%). The prevalence of both overweight and obesity were higher in men than women ($p<0.001$). The prevalence of overweightwas higher inrespondents aged 36 to50 years than others age group .The prevalence of obesitywas higher inrespondents aged 51 to 65 yearsthan others age group ($p<0.05$). The results of this study will be helpful to policy makers in developing education and publicity to prevent and control the occurrence of overweight and obesity

Keywords: Obesity; Overweight; Body mass index; Diabetes; Bangladesh

Introduction

Overweight and obesity have been shown to be related to multiple chronic conditions, and lead to a heavy economic burden on families and increasing costs to society throughout the world [1]. According to a WHO report, [2] obesity is defined as a body mass index (BMI)≥30 kg/m^2, and overweight as a BMI of 25-29.9kg/m^2. For Asian people, obesity suggests a BMI≥27.5kg/m^2 and overweight indicates a BMI of 23-27.49kg/m^2 [3]. In 2013, in order to make physicians pay more attention to the condition, the American Medical Association classified obesity as a disease [4]. Over the last 33 years, rates of either being overweight or obese doubled among Bangladeshi adults but remained low among children, according to a new, first-of-its-kind analysis of trend data from 188 countries. In 1980, 7% of adults and 3% of children were overweight or obese [5]. According to the Institute for Health Metrics and Evaluation (IHME), of the 17% of overweight or obese adults in Bangladesh, just 4% were obese, and obesity rates in Bangladesh are increasing at a slower pace. From 1980 to 2013 obesity rates in adults grew from 2% to 4%, and rates in children and adolescents remained at about 1.5% [5]. Over the two last decades Bangladesh, a low-income country, has experienced a rapid demographic and epidemiological transition. The population has increased substantially with rapid urbanization and changing pattern of disease, which at least in part, can be explained by nutritional changes. However, the nutritional status of the adult population has not been previously described. Hence, the objective of this study was to estimate the prevalence and explore socio-demographic determinants of overweight and obesity among the Bangladeshi adult population.

Methods

Study setting

The study was conducted in Dhaka, Mymensing, Sylhet and Khulna District in Bangladesh

Study design, period, and sample size

A community-based cross sectional study was conducted from January 01 to March 30, 2018. The source population was individuals aged 18 years and above permanently living there. The sample size was calculated was found to be 400.

Sampling technique

This study was conducted among 400 adults aged 18-93 years who lived in Dhaka, Mymensing, Sylhet and Khulna District for more than six months before the survey. Multistage sampling technique was used; the primary sampling units, four districts were randomly selected from the total of 8 districts. Sample size was equally distributed to each of the selected districts. Finally, systematic random sampling technique was employed to select households to be visited for data collection. From the selected households, eligible adults aged between 18 and 93 were identified, and if there were more than one in a household, then one was randomly selected.

Data collection

All the participants' identities were confirmed by the investigators. During the investigation, each completed questionnaire was examined by two investigators to ensure validity and consistency. After the fieldwork, data were manipulated by parallel double entry, and we also performed three verifications to check for incomplete and inconsistent responses. The questionnaire provided demographics, lifestyle habits and other related information on health. Height and weight were determined using a standardized protocol with the subjects in light indoor clothing without shoes. Height was measured to the nearest 0.1cm, and weight to the nearest 0.1kg.

Data collection and measurement

Data on demographic and behavioral characteristics were collected by trained personnel through a face-to-face interview using a semi structured questionnaire. The field study team was composed of enumerators, laboratory technicians, nurses, and supervisors. The World Health Organization (WHO) stepwise approach (three steps) for noncommunicable disease surveillance was used to collect the data [6].

Step 1: Demographic and behavioral characteristic data

In this step, demographic and behavioral risk factors were collected through face-to-face interviews using an interviewer-administered questionnaire. Each participant was questioned for age, sex, educational status, marital status, occupation type, physical activity, history of raised blood pressure and diabetes, fruit and vegetable intake, alcohol consumption, and smoking habit.

Step 2: Physical measurements

Physical measurements of height and weight needed to calculate body mass index (BMI), waist circumference, and blood pressure were taken in this step. Blood pressure (BP) was taken in a sitting position from the right arm using a digital sphygmomanometer. Two readings were taken 5 minutes apart, and the mean was considered as the final BP result. Prehypertension is defined as systolic BP of 120-139 and diastolic BP 80-89mmHg. Hypertension is defined as systolic BP of ≥140mmHg or diastolic BP of ≥90mmHg. A portable weight and height scale was used to measure the weight of the participant wearing light clothes and height in upright standing position on a flat surface. Then, body mass index (BMI) was calculated by weight in kilograms divided by height in meters squared formula. BMI <18.5 kg/m^2 is considered as underweight, 18.5-22.9kg/m^2 as normal, 23-27.49 kg/m^2 as overweight, and ≥27.50kg/m^2 as obese. Waist circumference (WC) was measured at the approximate midpoint between the lower margin of the last palpable rib and the top of the iliac crest, using a flexible plastic tape. WC values > 94 and >80cm for men and women, respectively, were considered high according to the World Health Organization (WHO) recommendation.

Step 3: Biochemical measurements

The Accu-Chek Active system uses a capillary blood sample which is set to plasma serum standard, showing result in plasma glucose values. This measurement was immediately performed for all participants, and the results were recorded in the questionnaire. Fasting capillary blood samples were collected three times at different occasions (for three consecutive days) from a single study participant, and glucose measurement was carried out within fractions of seconds after sample collection. Then, their average was taken for analysis, and this might have minimized the appearance of abnormal results. The diagnosis of DM was based on the American Diabetes Association diabetes mellitus classification criteria with fasting blood glucose of ≥126mg/dl being considered as positive for DM; impaired fasting glucose, FBG: ≤110mg/dl to <126mg/dl; normoglycemic, FBG: ≤61mg/dl to <110mg/dl), and hypoglycemic, <61mg/dl [7].

Data analysis

The data was entered, cleaned, and analyzed using the SPSS version 23.0 software package. Descriptive statistics were used to summarize the characteristics of study participants.

Consent to participate

Informed verbal consent was gathered from each participant. Any information obtained in each course of the study was kept confidential.

Results

A of total 400 valid observations were included in the analysis. The mean age of participants was 43.43±19.82 years. Two hundred

forty-one (60.25%) of the participants were younger than 50 years old. 58.75% of study participants were male. More than half (56.75%) of adults either attended primary education or did not attend formal education. Two thirds of them (68.5%) were married while 86 (21.5%) were single. Concerning occupation, 140 (35%) adults were farmer whereas 88 (22%) were housewife (Table 1).

Table 1: Sociodemographic characteristics of adults in Bangladesh. Other†: Including students (n=26), Unemployed (n=35), Business (n=18), and daily laborer (n=21).

Characteristics	Frequency	Percent
Sex		
Male	235	58.75
Female	165	41.25
Age		
18-35	115	28.75
36-50	126	31.5
51-65	74	18.5
66-93	85	21.25
Education		
HSC and above	101	13.5
SSC	119	29.75
Primary	154	38.5
No education	73	18.25
Marital Status		
Married	274	68.5
Single	86	21.5
Divorced	23	5.75
Widowed	17	4.25
Districts		
Dhaka	100	25
Mymensing	100	25
Sylhet	100	25
Khulna	100	25
Occupation		
Housewife	88	22
Farmer	140	35
Private Job	72	18
Other†	100	25

Distribution of adults' behavioral characteristics

From total of participants responding, 173 (43.25%) were smokers. Only Ten (2.5%) participants consumed alcohol over the last 30 days preceding the time of data collection. Three hundred six (76.5%) participants ate fruits two or fewer days a week. Forty-seven (11.75%) participants ate vegetables for two or fewer days during regular weekdays. One hundred thirty seven (34.25%) adults were not involved in adequate physical activity or physical inactivity (Table 2).

Table 2: Distribution of adults behavioral characteristics. Other†: Including students (n=26), Unemployed (n=35), Business (n=18), and daily laborer (n=21).

Tobacco Status	Frequency	Percentage
Ever Smoking Cigarette		
Yes	173	43.25
No	227	56.75
Current Alcohol Consumption		
Yes	10	2.5
No	390	97.5
Fruits Consumption per Week		
Two or fewer	306	76.5
Three to four	73	18.25
Five or more	21	5.25
Vegetables Consumption per Week		
Two or fewer	47	11.75
Three to four	82	20.5
Five or more	271	67.75
Total Physical Activities		
Active	263	65.75
Inactive	137	34.25

Physical and biochemical measurements

Table 3: Physical and biochemical measurement characteristics of study population.

Variables	Frequency	Percentage
Hypertension		
Yes	159	39.75
No	241	60.25
Waist Circumference		
Normal	216	54
High	184	46
Body Mass Index		
Underweight	46	11.5
Normal	234	58.5
Overweight	93	23.25
Obese	27	6.75
Fasting Blood Glucose		
Diabetic	39	9.75
Prediabetic	46	11.5
Normoglycemic	305	76.25
Hypoglycemic	10	2.5

Prevalence of overweight and obesity

The overall prevalence of overweight was 23.25% (male 25.11%; female 20.61%), and the prevalence of obesity was 6.75% (male 6.81%; female 6.67%). The prevalence of both overweight and obesity were higher in men than women (p<0.001) (Figure 1). The overall prevalence of overweight was 23.25% (18-35 years old 20.87%; 36-50 years old 26.19%; 51-65 years old 22.97% and 66-93 years old 22.35%), and the prevalence of obesity was 6.75 (18-35 years old 5.22%;36-50 years old 7.94%; 51-65 years old 8.11% and 66-93 years old 5.88%) (Figure 2). The prevalence of overweight was higher in respondents aged 36 to50 years than others age group. The prevalence of obesity was higher in respondents aged 51 to 65 years than others age group (p<0.05) (Tables 4 & 5).

Table 4: Prevalence of overweight and obesity according to gender (sex).

	Male (n=235)		Female (n=165)		Total (N=400)		χ-square Test	P-value
Overweight	25.11%	59	20.61%	34	23.25%	93	18.53	0.0001
Obese	6.81%	16	6.67%	11	6.75%	27		

Table 5: Prevalence of overweight and obesity according to age group.

	Overweight		Obese		Total (N=100)	χ-square Test	P-value
18-35 Yrs	20.87%	24	5.22%	6	115	13.97	0.043
36-50 Yrs	26.19%	33	7.94%	10	126		
51-65 Yrs	22.97%	17	8.11%	6	74		
66-93 Yrs	22.35%	19	5.88%	5	85		
Total	23.25%	93	6.75%	27	400		

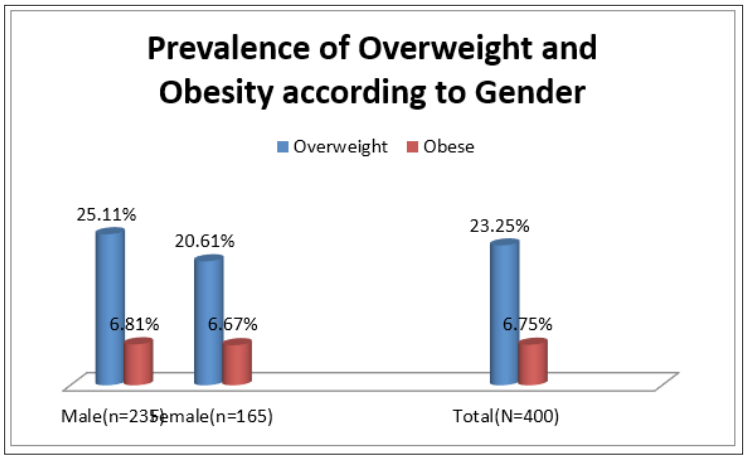

Figure 1: Prevalence of overweight and obesity according to gender (sex).

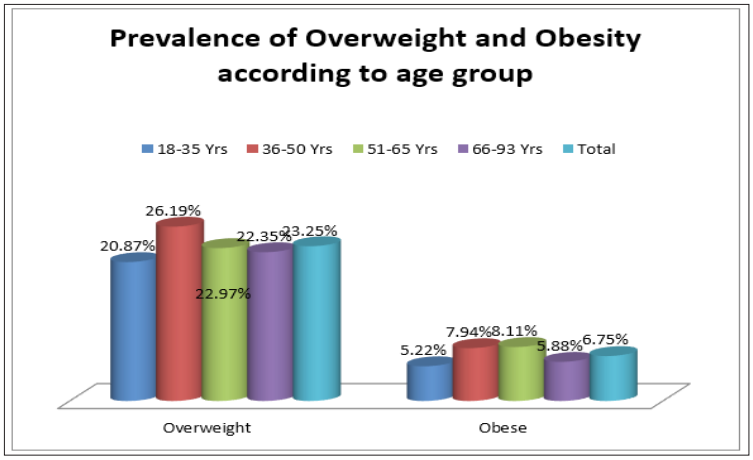

Figure 2: Prevalence of overweight and obesity according to age group

Discussion

A report by WHO in 2014, confirmed that globally the prevalence of overweight and obesity affected more than 1.9 billion adults aged 18 years or older, where 39% of adults were overweight and 13% were obese [8]. Bangladesh's economic transitioning will expose the population to Westernized lifestyles, including processed foods, increased mechanization of tasks and population shifts from rural areas to cities [9]. Over the last 33 years, rates of either being overweight or obese doubled among Bangladeshi adults but remained low among children, according to a new, first-of-its-kind analysis of trend data from 188 countries. In 1980, 7% of adults and 3% of children were overweight or obese. In 2013, those rates had climbed to 17% for adults but only 4.5% for children [10]. Of the 17% of overweight or obese adults in Bangladesh, just 4% were obese, and obesity rates in Bangladesh are increasing at a slower pace. From 1980 to 2013 obesity rates in adults grew from 2% to 4%, and rates in children and adolescents remained at about 1.5% [10]. In our study, total of 400 respondents aged 18-93 years from the general population were included using a multistage stratified random cluster sampling design. Data were obtained from face-to-face interview and physical examination. After being weighted according to a complex sampling scheme, the sample was used to estimate the prevalence of overweight (body mass index (BMI) 23-27.49kg/m^2) and obesity (BMI ≥27.5kg/m^2).The overall prevalence of overweight was 23.25% (male 25.11%; female 20.61%), and the prevalence of obesity was 6.75% (male 6.81%; female 6.67%). The prevalence of both overweight and obesity were higher in men than women ($p<0.001$). The prevalence of overweight was higher in respondents aged 36 to50 years than others age group .The prevalence of obesity was higher in respondents aged 51 to 65 years than others age group ($p<0.05$).

Conclusion

In conclusion, our study showed high prevalence of overweight and obesity which should be considered as a public health concern and should be followed by specific interventions at the community level, especially targeting the low income citizens, with multidisciplinary activities, starting from childhood as a primordial prevention program.

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