Prevalence and Risk Factors Associated with Obesity among Adult Kabul Citizens (Afghanistan), 2012

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Abstract

Objective: The prevalence of obesity is rising in both developed and developing countries. Globally, it is estimated that nearly one billion adults are overweight; at least 300 million of them are clinically obese. In Afghanistan no published data is available regarding non-communicable diseases including obesity. This paper reports the prevalence and associated risk factors of obesity among adult population in Kabul.

Materials and Methods: A cross-sectional study was conducted in Kabul from December 2011-March 2012. A multistage sampling of districts and neighborhoods was used to enroll adults of ≥40 years. Data on socioeconomic status, lifestyle, behavioral factors, blood pressure, and blood sugar were collected and anthropometric measurements were carried out for 1200 inhabitants. Body mass index (BMI) was calculated using measured height and weight; a waist circumference of ≥ 94cm for men and ≥ 80cm for women were considered as central obesity.

Results: The overall prevalence of obesity was 31.2% (BMI≥30kg/m^2)**.** Main risk and protective factors independently associated with obesity were age (adjusted OR=0.55, CI: 0.40-0.78), sex (AOR=1.73, CI: 1.19-2.51), having diabetes (AOR=1.86, CI: 1.16-2.99), blood pressure (AOR=1.46, CI: 1.03-2.08), central obesity (AOR=5.29, CI: 3.68-7.60), and frequency of walking per week (AOR=2.08, CI: 1.50-2.89).

Conclusions: About one-third of the adult population aged 40 and above in Kabul city had obesity. It was strongly associated with risk factors for non-communicable diseases. Modification of lifestyle and promotion of physical activity is recommended. Awareness campaigns on prevention of obesity should be considered.

Keywords: Prevalence, Risk factors, Obesity, Urban, Afghanistan

Introduction

Globally, the burden of non-communicable diseases is rapidly increasing. The most important risk factors are high blood pressure (BP), high concentrations of cholesterol in the blood, inadequate intake of fruit and vegetables, overweight or obesity, physical inactivity and tobacco use (1). By 2008, an estimated 1.46 billion adults globally were overweight (body mass index [BMI]≥25kg/m²) and 500 million

adults were obese (BMI≥30kg/m²) (2). Obesity is a major contributor to global burden of chronic diseases. Coexisting with undernutrition it affects virtually all ages and socioeconomic groups (3). Developing countries are increasingly vulnerable to the worldwide epidemic of obesity (4,5). In low-income countries, obesity mostly affects middle-aged adults (especially women) from wealthy, urban environments; whereas in high income countries it affects both sexes and all ages, but is disproportionately greater in disadvantaged groups (6).

In the Eastern Mediterranean Region (EMR), obesity and overweight has reached an alarming level of 25-82%. Possible determinants of obesity in this region include nutrition transition, inactivity, urbanization, marital status, a shorter duration of breastfeeding, frequent snacking, skipping breakfast, a high intake of sugary beverages, an increase in the incidence of eating outside the home, long periods of time spent viewing television, massive marketing promotion of high fat foods, stunting, perceived body image, cultural elements and food subsidize policy (7,8). In Pakistan, as eastern neighbor of Afghanistan, with the use of Indo-Asian-specific BMI cutoff values, the prevalence of overweight and obesity were 25% and 10.3%, respectively. The factors independently and significantly associated with overweight and obesity included greater age, being female, urban residence, being literate, economic status and intake of meat (9). In another study conducted in Turkey, the prevalence of obesity among adult population of 40 years and above was 43% associated with age, parity, smoking status, alcohol consumption, household income, level of education, and physical activity (10). In a study in Iran, as western neighbor of Afghanistan, it was depicted that the prevalence of overweight and obesity in 7-12 year old school children were 5.8% and 12.3%, respectively. The prevalence was significantly lower in girls compared with boys and higher among private-school compared with public-school (11). But in Iranian adult population, the prevalence of overweight, obesity and pathologic obesity was 40%, 35% and 3% respectively with significant difference by age, gender, education level, economic status, and residence (12).

In Afghanistan, there is lack of reliable information on burden of non-communicable diseases including obesity, BP, cancer and diabetes due to high priority to infectious diseases; while the country is suffering from double burden of diseases. However a study in Badghis province of Afghanistan in 2002 showed that the prevalence of obesity and overweight in 15-49 year old female group were 1.8% and 11.5% respectively, while the mean BMI was 21.1 Kg/m^2 (13). In a study in 1997 in children aged 3 years, the proportion of overweight was 4% (14); however, according to anecdotal reports of clinicians in Kabul, an increasing pattern in proportion of people with obesity is observed. This study may assist in estimating the burden of obesity and risk factors for adult population in Kabul city by providing evidence in support of strategic decisions and public health interventions to control and decrease the burden of disease. This study aims to determine the prevalence of obesity indicated by BMI and its risk factors in Kabul city.

Materials and Methods

A cross-sectional study was conducted to identify the prevalence of diabetes, hypertension and obesity, and related risk factors in Kabul, Afghanistan. The study covered the adult population aged 40 years and above lived for at least one year or more in 13 districts of Kabul. The study was done in a four-month period from December 2011 to March 2012 on 1200 individuals using a two stage cluster sampling technique. The sample size was calculated considering the prevalence of risk factors for non-communicable diseases such as physical activity, BP, diabetes, dietary behavior, obesity, age, level of education, smoking status, etc. The study clusters were selected from a list of 13 districts in the city.

Data collectors were advised to choose geographical hallmarks such as school and masjid as a station and ask the neighboring residential to come for interview and examination. One member from each household who was 40 years or older was interviewed. Anthropometric measurements such as height and weight, along with BP and blood sugar were measured. Finally, 1169 individuals with complete measurement of height and weight were included in this study. The main outcome of interest was obesity as a dichotomous variable, namely the obese or non-obese. Likewise the main risk factors such as age, sex, ethnicity, family history of disease, educational status, income, residential area, obesity, diabetes mellitus (DM), smoking status, snuff using, physical activity and dietary behavior were assessed and analyzed. Measurements of height and weight were used to calculate body mass index (BMI). A BMI of ≥30kg/m^2 was considered as obese, 25-30kg/m^2 as overweight and 18.5-24.99kg/m2 as normal (15). A waist circumference of ≥ 94cm for men and ≥80cm for women were considered as central obesity (16). Systolic BP≥140mmHg and diastolic BP≥90mmHg were considered as hypertensive (17). Individuals with a random blood sugar of ≥200mg/dl were later assessed by fasting blood sugar (FBS). FBS level≥126mg/dl was considered as diabetic (18). Ethical approval was taken from institutional review board (IRB) in Ministry of Public Health, Afghanistan. Data were analyzed using SPSS 20. Central tendencies, proportions and frequencies were calculated and tabulated. The prevalence of obesity was calculated in all subgroups and different tables were developed including tables of demographic, socio-economic, behavioral and clinical data as a result of descriptive analysis. Later on inferential analysis was used t-test, chi-square and logistic regression to find the association of obesity and risk factors.

Results

Descriptive Univariate Analysis

The socioeconomic and demographic characteristics of the study participants are reflected in table 1. The average age (mean±SD) of subjects was 49.5±10.2 years. Majority of participants (58.5%) were 40-50 years, and 66.5% were female. Overall, 69.3% of subjects were overweight and obese (38.1% overweight and 31.2% obese). These findings

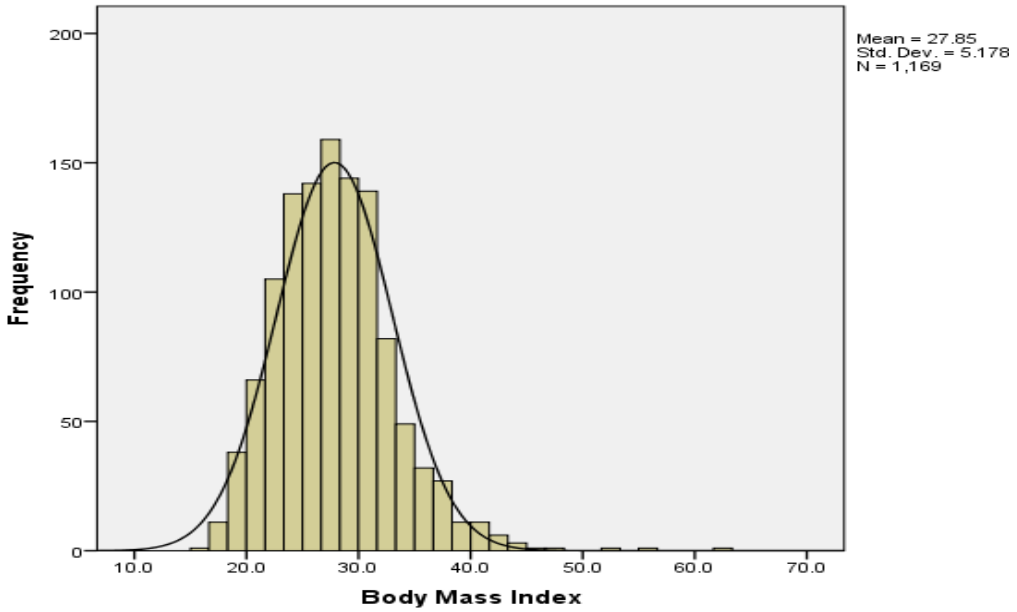

Figure 1. Frequency distribution of body mass index among Kabul urban citizens

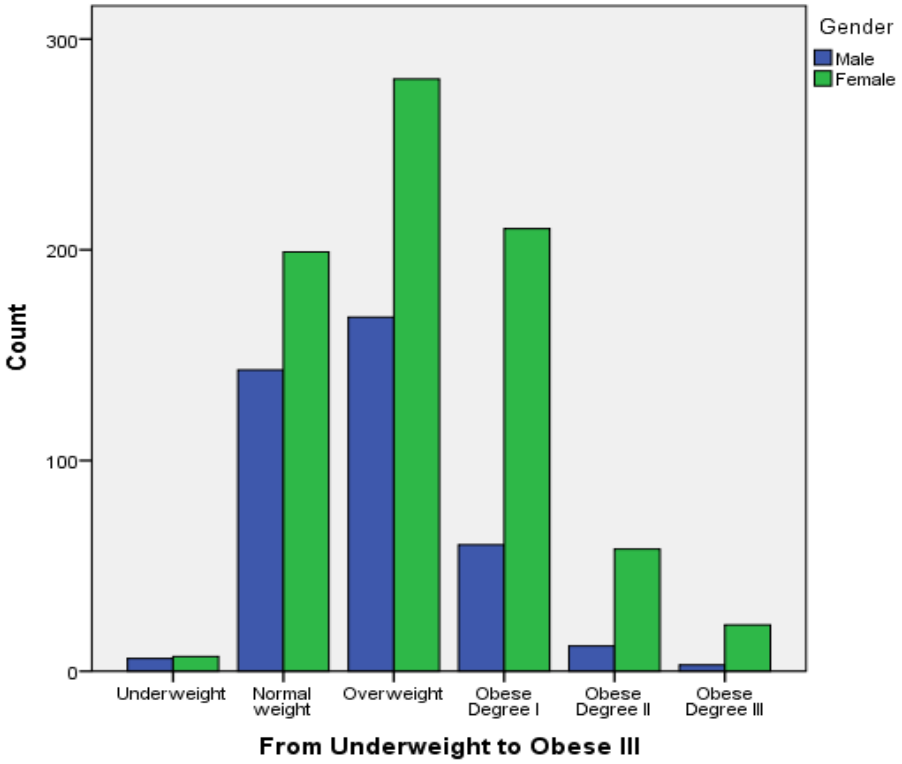

Figure 2. Six categories of BMI by sex group

are in agreement with a study in Turkey in which with same measurement, the overweight and obese were 36.1% and 27.3% despite of being in age group of 18-65 years (8,11). Furthermore, 58.5% were centrally obese using waist circumference. The average BMI was 27.85±5.17 Kg/m^2 (mean±SD) and ranged from 15.2 to 62.2Kg/m^2. In the meantime, 33%, 48.5% and 18.5% were hypertensive, pre-hypertensive and normotensive respectively.

As seen in table 1, almost 57% of the participants were illiterate who are less cautious about their health. Half of the participants had income of less than 10000 (equal to 200$). Their employment status shows high degree of unemployment (40%) and 25% are housewives. Prevalence of tobacco use in the form of cigarette smoking and mouth snuff is 5% and 9%, respectively.

Diet, physical activity and prevalence of hypertension and obesity are described in table 2. Around 70% of study participants were using solid fat in their kitchen for cooking which is almost double of liquid oil (28%). Monthly red meat consumption was one and half times more than poultry use as lunch or dinner. Also, on average, they were taking almost three times fruits, rice and vegetables per week which is very low.

Physical activity is calculated by different proxies. They had good practice of walking to their jobs (63.2%) compared to less than 5% who were using bicycle, motorcycle or cars.

Almost 86% were performing some physical activities lasting 10 minutes per day. Majority were spending their time just as sedentary life style sitting on chairs or laying down.

Bivariate analysis

Relationship of risk factors with obesity was analyzed using chi-square and logistic regressions for categorical variables and student t-test for continuous variables (table 3). According to table 3, odds of being obese were consistently lower as the age increased.

Table 1- Frequency distribution of the socioeconomic and biodemographic characteristics of study participants (N=1169)

Variables	Categories	Number (%)
Age (years)	40-49	684 (58.5)
	50-59	237 (20.3)
	60-69	158 (13.7)
	70 and over	73 (6.3)
Sex	Males	392 (33.5)
	Females	777 (66.5)
Weight (in kilogram)	≤ 50	128 (10.9)
	50-60	232 (19.8)
	60-70	335 (28.7)
	> 70	474 (40.5)
Basic Mass index (in kg/m square)	Underweight	13 (1.1)
	Normal weight	346 (29.6)
	Overweight	445 (38.1)
	Obese	365 (31.2)
Level of education	Illiterate	669 (57.2)
	Primary/Unofficial Education	17 (10)
	Secondary School	212 (18.2)
	High school and more	171 (14.6)
Monthly income (Afghanis)	≤ 10000	518 (52.4)
	10000-20000	291 (29.5)
	20000-30000	79 (8)
	≥ 30000	100 (10.1)
Work	Government Employee	257 (22)
	Business	59 (5)
	Farmer/worker	61 (5.2)
	Jobless	467 (39.9)
	Unable to work	39 (3.3)
	Housewife	286 (24.5)
Smoking	Current Smoker	59 (5.1)
	Ever Smoker	95 (08.2)
	Never Smoker	1006(86.7)
Mouth Snuff Use	Current User	105 (9)
	Ever User	25 (2.2)
	Never User	1029(88.8)

Likewise there was significant difference between mean age of obese and non-obese subjects. Females were 2.5 times more obese compared to males (OR=2.51, 95%CI: 1.88-3.66) which shows sex variation in obesity.

Literates were less likely to be obese compared to illiterate (OR=0.64, 95%CI: 0.50-0.82). We found significant association between income and obesity showing that subjects with income of more than 200$ per month were 1.29 times (95%CI: 1.00-1.66)

Table 2. Frequency distribution of the Behavior factors evaluated, (N=1169)

VARIABLES	Categories	Number (%)
Type of kitchen oil	Solid Oil	811 (69.4)
	Liquid Oil	335(28.7)
	Other	019 (01.9)
Taking food, fruits and vegetables [mean (SD)]	Poultry/month	3.43 (3.96)
	Red Meat/month	5.06 (4.68)
	Fruits/week	3.37 (2.30)
	Rice/week	3.20 (3.18)
	Vegetables/week	2.96 (2.36)
Frequency of eating meat per month	3	303 (26.1)
	3-6	582 (50.1)
	6-9	160 (13.8)
Frequency of eating rice per month	3	532 (49.2)
	3-6	426 (39.4)
	>6	1263 (11.4)
Frequency of taking vegetables per week	Once	236 (20.2)
	Twice	289 (24.7)
	Thrice	163 (13.9)
	More than 3 times	481 (41.1)
Frequency of taking fruits per week	Once	176 (15.1)
	Twice	265 (22.7)
	Thrice	231 (19.8)
	More than 3 times	497 (42.5)
Way of going to work	Walking by foot	738 (63.2)
	Using Bicycle	025 (02.1)
	Using Motorcycle	015 (01.3)
	Using Car	069 (05.9)
	By Public Transport	059 (05.0)
Frequency of physical activity (minutes per day)	10	1010 (86.4)
	10-20	131 (11.2)
	>30	28 (02.4)
Frequency of sedentary lifestyle (hours per week)	10	235 (20.1)
	10-30	803 (68.7)
	>30	129 (11)
Frequency of walking (hours per week)	10	371 (31.9)
	10-30	620 (53.4
	>30	171 (14.7)

more likely to be obese compared to lesser income. In addition, there was statistically significant association between job status such as being jobless (OR=2.74, 95%CI: 1.29-5.80), and housewives (OR=3.22, 95%CI: 1.22-8.51) and obesity. There was a significant association between obesity and smoking (OR=2.31; 95%CI: 1.15-4.62), as well as snuff use (OR=3.20; 95%CI: 1.79-5.70).

According to table 4, we could not find significant association between obesity and type of kitchen oil as well as mode of

Table 3. Bivariate analysis of bio-demographic and socio-economic factors and obesity

Variables		BMI≥30	BMI<30	OR	CI 95%
Age (years)	40-49	233 (34.1)	451 (65.9)	1	Reference
	50-59	76 (32.1)	161 (67.9)	0.53	0.37-0.76
	60 and more	50 (21.6)	181 (78.4)	0.58	0.38-0.88
Sex	Males	75 (19.1)	317 (80.9)	1	Reference
	Females	290 (37.3)	487 (62.7)	2.51	1.88-3.66
Level of education	Illiterate	236 (35.3)	433 (64.7)	1	Reference
	Literate	129 (25.8)	371 (74.2)	0.64	0.50-0.82
Monthly income (Afghani)	≤ 10000 (200$)	2146 (28.2)	372 (71.8)	1	Reference
	> 10000 (200$)	219 (33.6)	432 (66.4)	1.29	1.00-1.66
Job Categories	Governmental Employees	64 (24.9)	193 (75.1)	1	Reference
	Business	15 (25.4)	44 (74.6)	1.43	0.98-2.08
	Farmer/worker	09 (14.8)	52 (85.2)	1.39	0.73-2.63
	Jobless	180 (35.8)	287 (61.5)	2.74	1.29-5.80
	Housewife	92 (32.2)	194 (67.8)	3.22	1.22-8.51
	Unable to work	5 (12.8)	34 (87.2)	0.75	0.55-1.03
Knowledge about DM	Yes	67 (34.5)	127 (65.5)	1	Reference
	No	293 (30.2)	676 (69.8)	0.82	0.59-1.13
Knowledge about BP	Yes	63 (32.5)	131 (67.5)	1	Reference
	No	302 (31)	673 (69)	1.07	0.77-1.49
Smoking	Yes	10 (16.9)	49 (83.1)	1	Reference
	No	353 (32.1)	748 (67.9)	2.31	1.15-4.62
Mouth Snuff	Yes	14 (13.3)	91 (86.7)	1	Reference
	No	348 (33)	706 (67)	3.2	1.79-5.70

transportations. Those who were obese had 1.49 (95%CI: 1.05-2.12) and 6.87 (95%CI: 4.96-9.51) times more odds of being diabetic and centrally fatty as compared to non-obese. Finally, we did not find significant relationship between frequency of using meat, poultry, rice and obesity. In addition, our study found significant relationship between obesity and physical activity in terms of sedentary life style with more duration of times or walking times. Physical activity has been a protective factor for obesity in other studies as well (19, 20).

Multivariate Analysis

In order to find independent association of risk factors and obesity, we conducted multiple logistic regressions. We used the biological as well as statistical significance of factors as criteria for inclusion in the regression model. Table 5 shows the results of multivariate analysis with adjusted OR (AOR) and Confidence Intervals (CI). After controlling for other variables, age (AOR=0.55, 95%CI: 0.40-0.78), sex (AOR=1.73, 95%CI: 1.19-2.51), having diabetes (AOR=1.86, 95%CI: 1.16-2.99), BP (AOR=1.46, 95%CI: 1.03-2.08), central obesity (OR=5.29, 95%CI: 3.68-7.60), frequency of walking (AOR=2.08, 95%CI: 1.50-2.89), and using poultry as a meal for lunch or dinner (AOR=1.49, 95%CI: 1.10-2.01) were independently associated with obesity. As the data were collected for risk factors and obesity at the same time we just say that there was association of obesity and above factors independent of other factors.

Discussion

Approximately two-third of the adult (≥40 years old) urban citizens of Kabul, the capital

Table 4. Bivariate analysis of behavioral risk factors associated with obesity

VARIABLES		BMI≥30	BMI<30	OR	CI 95%
Using Solid fats in kitchen	No	106 (29.6)	252 (70.4)	1	Reference
	Yes	259 (31.9)	552 (68.1)	1.11	0.85-1.46
Using Liquid Oil in kitchen	No	263 (31.5)	571 (68.5)	1	Reference
	Yes	102 (30.4)	233 (69.6)	0.95	0.72-1.25
Walking by foot to work station	No	137 (31.9)	292 (68.1)	1	Reference
	Yes	228 (30.9)	510 (69.1)	0.95	0.73-1.21
Going by car to work	No	346 (31.5)	753 (68.5)	1	Reference
	Yes	19 (27.5)	50 (72.5)	0.82	0.48-1.42
Going by Public Transport to work	No	350 (31.5)	760 (68.5)	1	Reference
	Yes	15 (25.4)	44 (74.6)	0.74	0.40-1.34
DM	No	304 (30)	709 (70)	1	Reference
	Yes	61 (39.1)	95 (60.9)	1.49	1.05-2.12
Central Obesity	No	52 (10.9)	427 (89.1)	1	Reference
	Yes	308 (45.6)	368 (54.4)	6.87	4.96-9.51
Frequency of eating red meat in a month	3 times	99 (32.7)	204(67.3)	1	Reference
	3-6 times	186 (32)	396 (68)	0.24	0.46-1.21
	6-9 times	47 (29.4)	113 (70.6)	0.77	0.49-1.21
	>9 times	31 (31.3)	85 (73.3)	0.87	0.51-1.49
Frequency of eating chicken in a month	3 times	148 (28.6)	370 (71.4)	1	Reference
	3-6 times	149 (34.9)	278 (65.1)	1.14	0.73-1.76
	>6 times	36 (31.3)	79 (68.7)	0.85	0.54-1.32
Frequency of eating rice in a month	<6 times	301 (31.4)	657 (68.6)	1	Reference
	>6 times	34 (27.6)	89 (72.4)	0.89	0.70-1.16
Frequency of sedentary lifestyle per week in hours	10 hours	67 (28.5)	168 (71.5)	1	Reference
	10-30 hours	264(32.9)	539 (67.1)	0.89	0.55-1.45
	>30 hours	34 (26.4)	95 (73.6)	0.73	0.48-1.11
Frequency of walking per week in hours	10 hours	126 (34)	245 (66)	1	Reference
	10-30 hours	202 (32.6)	418(67.4)	0.53	0.35-0.81
	>30 hours	37 (21.6)	134 (78.4)	0.57	0.38-0.85

of Afghanistan, are overweight and obese with near one-third of them are just obese. This is the first study in Afghanistan which intended to determine the level of obesity and its associated risk factors in the capital of the country. The proportion we found is not far from other countries in which the prevalence of obesity is near 30% (9,19). In addition, more than half of adult population had central obesity. At the same time, 46% and 13% of this of population at productive age group were hypertensive and diabetic, respectively. It means that the country is already entered in epidemic of non-communicable diseases which requires strengthening efforts for its control and prevention. Increasing age is affecting negatively the level of obesity at bivariate as well as multivariate analyses. Likewise, gender as a non-modifying factor had relationships at both levels of analysis. Females were more likely to be obese compared to males. These findings are supported by Pakistani as well as Turkish, Bahrain, Saudi Arabia and Lebanese studies (8,9,19-23). At bivariate analysis, socioeconomic factors such as education,

Table 5. Multivariate analysis risk factors associated with obesity

VARIABLES		ADJUSTED OR	CI 95%	P VALUE
Age group (P value=0.001)	<50	1	Reference	-
	>50	0.55	0.40 – 0.78	<0.01
Sex (P value: 0.004)	Male	1	References	-
	Female	1.73	1.19 – 2.51	<0.01
Having Diabetic Problem (P value=0.010)	No	1	References	-
	Yes	1.86	1.16 – 2.99	<0.05
BP (P value=0.033)	No	1	References	-
	Yes	1.46	1.03 – 2.08	<0.05
Central Obesity (P value=0.000)	No	1	References	-
	Yes	5.29	3.68 – 7.60	<0.001
Walking habit per week (P value=0.022)	<30 hours	1	References	-
	>30 hours	2.08	1.50 – 2.89	<0.05
Using Chicken as meal (P value=0.009)	<3 times per month	1	References	-
	>3 times per month	1.49	1.10 – 2.01	<0.01

income and job categories had significant relationships with obesity; but it was not confirmed at multivariate analysis. Furthermore, there were independent significant associations of obesity and BP as well as diabetes which is supported by other studies as well (9). It means that there is close relationship between BP, diabetes and obesity; while this cross-sectional study could not describe which one is exposure or outcome. The health education campaigns should be tailored to cover all of them. Walking as a proxy for physical activity is a protective factor against obesity. This statement was proved by this study at bivariate and multivariate analyses. The association between physical activity and obesity has been shown in other countries (24-26). Although this study could not show significant association of diet and obesity, it has been proved by studies elsewhere. Preventive measures should promote physical activity along with healthy diet.

The technique used for recruiting the study participants could encourage participation of those with chronic diseases and leading to possible overestimated prevalence of chronic diseases including obesity. It may be concluded from this study that along with communicable diseases, the adult urban citizens in Afghanistan are also suffering from non-communicable diseases such as diabetes, high blood pressure and obesity. Obesity is a major public health problem that requires concerted interventions to be prevented. The findings obtained from this study can contribute in formulation of more advanced and national studies to have a generalized picture of non-communicable disease and their risk factors in the country. It also will assist policy makers to develop a strategy for appropriate control and prevention of non-communicable diseases in Afghan urban population.

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