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Socio-Demographic Determinants of Overweight and Obesity among Adults in Jabra Area in Khartoum State - Sudan: a Community Based Study

Eltagi Abdalla Mohammed Abdalla[1], Nafeisa Abdulwahab Abdulraheem [2]

[1]Department of Epidemiology, Faculty of Public and Environmental Health, University of Khartoum, Sudan

[2]Department of Epidemiology, Federal Ministry of Health Khartoum, Sudan

Abstract: ***A cross - sectional community based study was conducted in Jabra area in Khartoum State-Sudan, with an aims to estimate the prevalence of overweight and obesity and to identify the socio-demographic characteristics associated with overweight and obesity among adults. Data were collected from 273 participants (36.3% males and 63.7% females) using structured questionnaire and anthropometric measurements of weight and height. The prevalence of overweight and obesity were 33.7% and 25.6% respectively. The results showed there was statistical association between overweight and obesity and sex, age group, marital status, monthly income, education level and family history of obesity the P. values (0.0001, 0.001, 0.0001, 0.022, 0.033 and 0.0001) respectively. Conclusions: In this study the prevalence of overweight and obesity was found to be among adults 33.7% and 25.6% respectively. In analysis; sex, age group, marital status, monthly income, education level and family history were significantly associated with overweight and/or obesity.***

Keywords: Overweight, obesity, BMI, prevalence, Khartoum, Sudan

1. 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 [1-3]. According to a WHO report [4], obesity is defined as a body mass index (BMI) ≥30 kg/m2, and overweight as a BMI of 25–29.9 kg/m2. WHO data show that, globally, there are more than 1 billion adults overweight and 300 million obese people. The problem of obesity is increasing in the developing world with more than 115 million people suffering from obesity related problems. Obesity rates have increased 3-fold or more since 1980 in Middle East, the Pacific Islands, Australasia, and China [5, 6]. Obesity rates in Western Africa are estimated to be 10%. Rates of obesity among women are three times those found in men. In urban West Africa rates of obesity have more than doubled in the last 15 years [7].

Obesity in the Eastern Mediterranean Region is more prevalent in women, urban areas and those of higher socioeconomic status. In general, obesity in this Region was found to be more prevalent in people who were young (30-50 years), better educated, currently married, female or unemployed, and in those who watched television more than 2 hours per day, consumed fresh fruit less than 3 times a week and owned cars [13]. Educational attainment is also found to be inversely correlated with BMI where as income and economic developments tend to be risk factors [14]. Although a review of the modest published literature on this topic may point to a general positive association between socioeconomic status and obesity in both men and women [15, 16]

The prevalence of overweight and obesity in Zambia was 24.7% (21.0% among males and 27.3% among females) [8]. The prevalence of overweight and obesity among adults in Algeria was respectively 32.5% and 30.9% [9].The prevalence of overweight and/or obesity in Ethiopia was found to be (9.4%) [10]. the crude prevalence of overweight and obesity among civil servants in Lagos, Nigeria was 70.7% [19].

Overweight and obesity in Sudan

Several studies have indicated that, the prevalence of overweight and obesity in Sudan with increasing rates. A study conducted by Abu-Aisha et al, reported that the prevalence of overweight and obesity in police forces household in Khartoum was (45.8%) [17]. other study finding the overweight and obesity prevalence among adult Sudanese was 98% [18]. Another study showed the prevalence of overweight and obesity in Sudan was 30% and19.2% respectively [11]. The prevalence of overweight and obesity among Sudanese patients with type 2 diabetes mellitus was found to be 16.8% and 6.9% respectively [12]

2. Materials and Methods

2.1 Study Setting

This study was conducted at Jabra area in Khartoum state - Sudan, it is urban area locate between Al-Sahafa area from East, Al-Shajrah area from West, Railway from South and military zone from North direction. The total population about 6000 person. There are two health centres (AL-Shaheed kalid and Ana-alsudan) and 4 government primary school and 2 Secondary school.

2.2 Data collection Methods

From (273) participant in this study determined using statistical equation (n = Z2×pq/e2). Where n is the sample size, Z2 is the abscissa of the normal curve that cuts off an area α at the tails (1 - α equals the desired confidence level is 95%), e is the desired level of precision, p is the estimated proportion of an attribute that is present in the population,

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and q is 1-p [23]. Relevant data were collection used structured questionnaire to collect socio-demographic characteristics such as (Sex, age group, marital status, monthly income, educational level, and family history of obesity) and anthropometric measurement of weight and height to calculate the BMI.

2.2.1 Anthropometric measures

Weight and height, measurements were taken. Heights of the subjects were measured with an inelastic measure tape, with the subject standing on bare feet. For weight measurements, the subjects were required to stand on electronic scale with bare feet as well. Then BMI was calculated as BMI = Weight (Kg) / [Height (m)2]. According to the WHO classification of BMI. Less than 18.5 consider underweight, 18.5 – 24.9 normal weight, 25 – 29.9 overweigh and ≥30 obese.

The consent was obtained from each participant in this study and he/she was informed about the purpose of the study at first.

2.4 Data Analysis

Data were analyzed used SPSS (Statistical Package for Social Science) version 20. The p.value less than 0.05 considered statistically significant.

3. Results

Two hundred and seventy three (273) participants were enrolled in this study, 36.3% (99/273) of them were males while 63.7% (174/273) were females (figure1). The results showed the prevalence of underweight, light, overweight and obesity according BMI were 7.7%, 33.7% and 25.6% respectively, (figure2). The prevalence of overweight and obesity among females greater than males 32.2%, 33.3% and 26.3%, 12.2%) respectively. The prevalence of overweight was high among married 39.2% while the high rate of obesity among divorced 66.6% (table1). The prevalence of obesity was 52.9% and 34.6% among age group (46-60 and 31-45) respectively, while 18% among age group 18-30, statistically significant p = 0.001. Regarding to the family history the obesity 45.5% among those have history of obesity, compare to 19.3% among non have history, statistically s significant P= 0.0001 (Table2). There was statistical association between obesity and level of education, the obesity was higher among illiterate, primary and secondary education (25%, 47.9% and 25.9%), while was (23.8% and 12.5%) among graduate and postgraduate respectively P = 0.033 (Table 3). The overweight and obesity associated with increasing in monthly income P = 0.022 (Table 4).

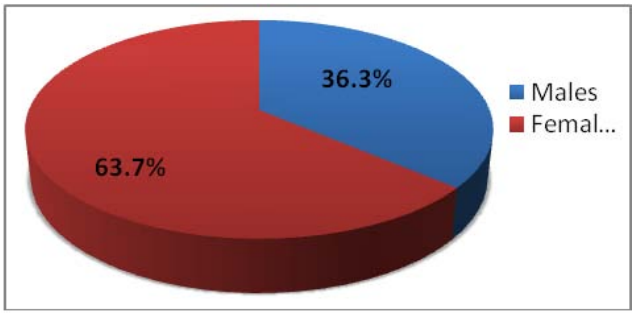

Figure 1: Distribution of participants according to sex (n=273)

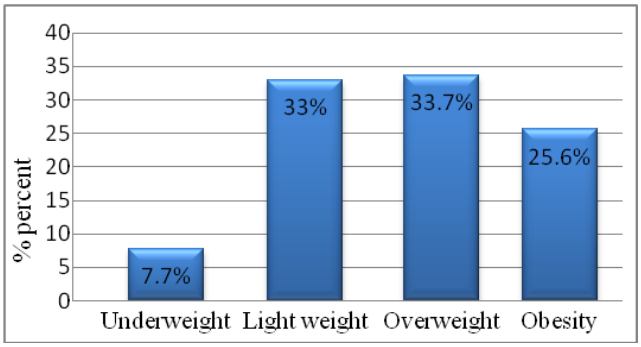

Figure 2: Distribution of participants according to BMI (n=273)

Table 1: Relationship between BMI and sex &marital status among participants - (n=273)

Variable	BMI								Total		P. value
	Under weight		Normal		Overweight		Obesity				
	No	%	No	%	No	%	No	%	No	%	
Sex											
Male	8	8.2	43	43.4	26	26.3	12	12.1	99	36.3	0.001
Female	13	7.5	47	27	56	32.2	58	33.3	174	63.7	
Marital status											
Single	15	11.7	63	49.2	37	28.9	13	10.2	128	46.9	0.0001
Married	5	3.9	26	20	51	39.2	48	36.9	130	47.6	
Divorced	0	00	1	16.7	1	16.7	4	66.6	06	02.2	
Widow	1	11.1	0	00	3	33.3	5	55.6	09	03.3	

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Table 2: Relationship between BMI and age groups &family history of obesity among participants (n=273)

Variable	BMI								Total		P. value
	Under weight		Normal		Overweight		Obesity				
	No	%	No	%	No	%	No	%	No	%	
Age group											
18-35	18	10.5	75	43.6	48	27.9	31	18	172	63	0.001
36-45	1	1.8	7	12.7	28	50.9	19	34.6	55	20.1	
46-60	1	2.9	4	11.8	11	32.4	18	52.9	34	12.5	
> 60 years	1	8.3	4	33.3	5	41.7	2	16.7	12	04.4	
Family history											
Yes	4	06	13	19.7	19	28.8	30	45.5	66	24.2	0.0001
No	17	8.2	77	37.2	73	35.3	40	19.3	207	75.8	

Table 3: Relationship between BMI and education level of adults - Jabra area – Khartoum (n=273)

Variable	BMI								Total		P. value
	Under weight		Normal		Overweight		Obesity				
	No	%	No	%	No	%	No	%	No	%	
Education level											
Illiterate	0	00	1	25	2	50	1	25	4	1.5	0.033
Primary	2	9.5	4	19.1	5	23.8	10	47.6	21	7.7	
Secondary	6	7.1	20	23.5	37	43.5	22	25.9	85	31.1	
Graduate	12	8.2	62	42.1	38	25.9	35	23.8	147	53.8	
Post-graduate	1	6.3	3	18.7	10	62.5	2	12.5	16	5.9	

Table 4: Relationship between BMI and Monthly income by SDG (n=273)

Variable	BMI								Total		P. value
	Under weight		Normal		Overweight		Obesity				
	No	%	No	%	No	%	No	%	No	%	
Income SDG											
< 500	11	14.9	27	36.5	18	24.3	18	24.3	74	27.1	0.022
500 - 1000	5	5.2	36	37.5	33	34.4	22	22.9	96	35.2	
1000 - 2000	4	6.9	13	22.4	24	41.4	17	29.3	58	21.2	
> 2000	1	2.9	7	20	16	45.7	11	31.4	35	12.8	
Non-respondent	0	00	7	70	1	10	2	20	10	03.7	

4. Discussion

Obesity as an epidemic of 21st century is a major public health problem worldwide which its prevalence is dramatically increasing in both developed and developing Countries, Overweight are the sixth most important risk factor causative to the total worldwide disease. Some studies found that obesity increases the risk of some chronic and life threatening disorders such as type 2 diabetes, Cardiovascular disease, hypertension, hyperlipidemia, sleep apnea, and followed by, it has been estimated to reduce life expectancy around 7 years [19].

The study showed that, the prevalence of overweight and obesity among adults was 33.7% and 25.6% respectively. This result was lower compared with the prevalence of overweight and obesity which was found 45.8% in Sudan [17], 70.7% in Nigeria [19]. Our result was higher than that found in Sudan 30% and19.2% respectively [11]. Also this result higher than that found among Sudanese patients with type 2 diabetes mellitus 16.8% and 6.9% respectively [12].

The prevalence of obesity among adults in this study was (25.6%), higher than that found in Spanish (17%) [20]. in Ethiopia (9.4%) [10].

The study showed there was a consistent difference between men and women in the prevalence of these weight disorders. Females show higher frequencies of overweight and obesity than males (32.2%, 33.3% and 26.3%, 12.2%) respectively. This results in line with that found in the Middle East and North Africa, overweight and obesity higher among females than males [21].in Zambia 24.7% (21.0% among males and 27.3% among females) [8]. In Turkey 18.8% of the adult population was obese (28.5% among women and 9% among men) [22].

Regarding to the age group, the result showed, greater age appear to be independently associated with overweight and obesity (P=0.001). This finding similar with that found in Sudan [12]. Our results showed, there was statistical association between obesity and marital status (p = 0.0001), this finding agree with that found in Turkey, obesity is associated positively with marital status (married and widowed) [22].

In relation to the age the study show the overweight and obesity increase with age until 60 years the decline, statistically significant (p=0.001). This finding consists with that found among Sudanese, the obesity prevalence rate increases with age [12]. Among Turkish adults, obesity is associated positively with age (the highest prevalence in the 50–69 age groups) [22]. In Brazil, there was significant association between BMI and age [23].

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The findings of this study showed that, overweight and obesity associated with increasing in monthly income (P=0.022). This result agrees with that found in Ethiopia, overweight and/or obesity significantly associated with high income [10].

The study showed the obesity increase while the level of education decrease, the obesity was higher among illiterate, primary and secondary education (25%, 47.9% and 25.9%), while was (23.8% and 12.5%) among graduate and postgraduate respectively. The results illustrated statistical association between lower education level and overweight or obesity (P=0.033). This result in line with that found among adults in Algeria, obesity was higher among illiterate people than among those with a higher [9]. Our results inverses with that found in Zambia, there was association between higher education level and overweight or obesity [8].

Regarding to the family history the results showed there was statistical relationship between obesity and family history (p=0.001). the results similar with that found among adults Turkish, obesity is associated positively with family history of obesity[22]. In India Family History was found to be insignificant factor for overweight / obesity [24].

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