Determine the Prevalence of Overweight and Obesity and Effective Factors in Iranian Females: A Population-Based Cross-Sectional Study

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Abstract- The aim of this study was to determine the prevalence of overweight and obesity and their associated factors in the female population of Shiraz, South of Iran. This population-based cross-sectional study is based on a screening program on 11850 women referring to a gynecological clinic between 2004 and 2012. Overweight and obesity were defined as a body mass index (BMI) of 25-29.9 kg/m2 and a BMI ≥30 kg/m2, respectively. The mean age of participants was 41.1±10.6 yrs. Mean BMI were 27 kg/m2 (95% CI: 26.90-27.10). The total prevalence of overweight and obesity was 41.4% (95% CI: 40.5-42.3) and 24.10% (95% CI: 23.3-24.9), respectively. In addition, 50-54-year-old women were more likely to have a BMI ≥25 than Youngers. The high prevalence of obesity and overweight in the present study indicates the need for planning preventive programs for the health system in this population.

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Keywords: Overweight; Obesity; Iran, Prevalence; Female

Introduction

The worldwide epidemic of obesity and overweight is expected to rise significantly in developing countries (1), especially the Middle East region (2). So the Middle Eastern population faces the greatest global burden of Non-Communicable diseases (3). Obesity is a health concern and is related to some chronic diseases, like cardiovascular disease, diabetes, arthritis, gall bladder diseases, and some cancers (4). Body mass index [BMI: weight [kg]/height [m]^2] is a standard to define stages of excess body weight. Women are more prone to be overweight and obese than males, which puts them during childbearing years, at risk of preeclampsia, gestational diabetes, fetal macrosomia, and cesarean delivery (5). As a country in the Persian Gulf region, Iran has a high prevalence of obesity and related disorders, such as metabolic syndrome and diabetes in different age groups (6,7). Therefore, more studies need to be conducted in different regions of Iran. The purpose of this study was to determine the prevalence of overweight and obesity in Shiraz among 20 to 65-yr-Old females.

Materials and Methods

The present study is based on a screening program on 11850 women referring to a gynecological clinic affiliated to Shiraz University of Medical Sciences between 2004 and 2012. The target population was the adult female population of Shiraz, a city located in the south of Iran, which has a total population of 1227000 based on the 2006 census. For all the women who refer to the clinic, a face-to-face interview was performed by trained staff using a structured questionnaire to collect information regarding age, marital status, and education level. Weight measurements were done using digital scales tested. Height measurements were done using a non-stretchable tape, without shoes, while participants held their heads straight up. BMI was calculated using the following formula: weight [in kilograms] divided by height [in meters] squared. Overweight and obesity were

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defined as a BMI of 25-29.9 and BMI≥30, respectively. Obesity was divided into three categories; grade 1 for BMI of 30-34.9, grade 2 for BMI of 35-39.9, and grade 3 for BMI≥40 kg/m^2. In this study, the prevalence of overweight and obesity is given in percentages and their 95% confidence intervals (CI). To assess the relationship between overweight and obesity with potential risk factors, we used simple and multiple logistic regression models.

Results

The mean age of the participants was 41.1±10.6 years. The mean BMI was 27 kg/m2 (95% CI: 26.9-27.1). Another descriptive feature of the Participants was showed in Table 1.

The prevalence of overweight and obesity by age, educational level, and marital status in the studied participants are presented in Table 2. The total prevalence of overweight and obesity was 41.4% (95% CI: 40.5-42.3) and 24.10% (95% CI: 23.3-24.9), respectively. Prevalence of obesity grade 1(BMI of 30-34.9), 2 (BMI of 35-39.9), and 3 (BMI≥40) were 19.1%, 3.1%, and 0.9%, respectively. Also, 80.1% of Obese participants were considered as obesity grade 1 (data did not show in the table). The rates of obesity raised by increasing age. The lowest obesity rates were 16.50 % for age groups of 20-24 years, and the highest rates were 41.9% for the age group of 55-59 years. The elevated rates persisted up to 60 years and then decreased to 28% for older than the 60-year group. The prevalence of overweight was 43.69% among the illiterate, and it reduced to 36.94% with higher levels of education. The prevalence of overweight and obesity in single and married status was 30.5% and 17% and 42.4% and 24.5%, respectively. In Table 3, the estimated OR (with 95% CI) for obesity and for BMI ≥25 are presented. With respect to results derived from the logistic regression model compared with the age group of 20-24 years, the OR has increased to 1.23, 1.51, 1.67,1.91, 2.08, and 2.30 for age groups of 30-34, 35-39, 40-44, 45-49, 50-54, and 55-59 years respectively. There was an inverse relationship between the risk of obesity and the levels of education, particularly at academic levels. After adjusting for age and marital status, the risk of BMI ≥25, compared to Illiterates, significantly decreased with education (OR=0.71 95% CI: (0.58-0.87).

Table 1. descriptive characteristics of participants in this study

Variables		n	%
Age group	**20-24**	673	5.68
	25-29	1188	10.03
	30-34	1535	12.95
	35-39	1867	15.76
	40-44	2060	17.38
	45-49	1886	15.92
	50-54	1361	11.49
	55-59	745	6.29
	>60	535	4.51
Educational level	**Illiterate**	650	5.49
	Primary	4191	35.37
	High school	4803	40.53
	College	2171	18.32
	Unknown	35	0.30
Marital status	**Single**	916	7.73
	Married	10014	84.51
	Widowed	638	5.38
	Divorced	249	2.10
	Unknown	33	0.28
	Total	11580	100.00

Table 2. Mean body mass index and prevalence of obesity and overweight in the studied population by age, educational level, and marital status

Variables		n	BMI (kg/m^2)	Overweight: BMI=25-29.9	Obese: BMI≥30
			Mean (95%CI)	% (95%CI)	% [95%CI]
Age group	20-24	673	25.10 [24.7 – 25.4]	30.80 [27.0-34.0]	16.50 [13.8-19.5]
	25-29	1188	25.70 [25.4-25.9]	35.00 [32.30-37.80]	17.40[15.3-19.7]
	30-34	1535	26.40[26.1-26.6]	39.90 [37.4-42.4]	19.50[17.6-21.6]
	35-39	1867	27.00 [26.8-27.2]	43.15 [40.8-45.3]	22.90[21.0-24.8]
	40-44	2060	27.30 [27-27.20]	44.60 [42.6-46.9]	24.80[23.0-26.8]
	45-49	1886	27.60 [27.4-27.8]	43.80 [41.5-46.2]	27.40[25.4-29.5]
	50-54	1361	27.70 [27.4-27.9]	63.60 [41-46.3]	29.20[26.8-31.7]
	55-59	745	27.70 [27.3-28.0]	40.80 [37.2-44.4]	31.30[27.8-34.6]
	>60	535	27.40 [27.0-27.7]	40.90 [36.7-45.2]	28.00[24.3-32.1]
Educational level	Illiterate	650	27.74 [27.38 -28.09]	43.69 [39.88- - 47.50]	29.23 [25.73-32.73]
	Primary	4191	27.42 [27.28 -27.55]	41.83 [40.34-43.32]	27.65 [26.30-29.00]
	High school	4803	26.93[26.80 -27.06]	42.91 [41.51 -44.31]	22.63 [21.45-23.81]
	College	2171	26.13 [25.93 -26.33]	36.94 [34.91 -38.97]	19.16 [17.50 -20.82]
Marital status	Single	916	25.35 [28.8 -55.9]	30.50 [27.52-33.48]	17.00 [14.57-19.43]
	Married	10014	27.12 [27.04 -27.21]	42.4 [41.43-43.37]	24.5 [23.66-25.34]
	Widowed	638	27.68[27.34 -28.01]	43.90[40.05-47.75]	28.80 [25.29-32.31]
	Divorced	249	26.51 [24.99 -25.65]	36.90 [30.91-42.89]	23.70 [18.42-28.98]
	Total	11850	27.00[26.90 – 27.10]	41.40[40.5-42.30]	24.10[23.3-24.9]

Table 3. Crude and adjusted OR derived from logistic regression analysis for obesity

Variables		Obesity		BMI≥25 [Overweight + obesity]	
		Simple	Multiple	Simple	Multiple
		OR(95%CI)	OR(95%CI)	OR(95%CI)	OR(95%CI)
Age	20-24	1	1	1	1
	25-29	1.07[0.83 -1.38]	0.99[0.76 -1.29]	1.23[1.02 -1.49]	1.06 [0.87 -1.29]
	30-34	1.23[0.97 -1.56]	1.09[0.85 -1.40]	1.64[1.36 -1.97]	1.33 [1.09 -1.61]
	35-39	1.51[1.99 -1.90]	1.28[1.02 -1.63]	2.19[1.83 -2.62]	1.69 [1.39 -2.05]
	40-44	1.67[1.33 -2.10]	1.40[1.10 -1.79]	2.55[2.13 -3.04]	1.93 [1.52 -2.34]
	45-49	1.91[1.52 -2.39]	1.61[1.26 -2.05]	2.75[2.30 -3.30]	2.09 [1.27 -2.54]
	50-54	2.08[1.65 -2.64]	1.74[1.35 -2.40]	2.99[2.47 -3.63]	2.25 [1.83 -2.76]
	55-59	2.30[1.78 -2.97]	1.90[1.45 -2.50]	2.87[2.30 -3.58]	2.13 [1.68 -2.69]
	>60	1.97[1.50 -2.61]	1.60[1.18 -2.16]	2.50[1.97 -3.17]	1.79 [1.38 -2.32]
Marital status	Single	1	1	1	1
	Married	1.58 [1.32 -1.89]	1.16 [0.95 -1.41]	2.24 [1.95 -2.56]	1.66 [0.78 -3.54]
	Widow	1.51 [0.07 -2.12]	1.18 [0.90 -1.54]	1.70 [1.28 -2.26]	1.64 [1.29 -2.09]
	Divorced	1.97 [1.54 -2.51]	1.07 [0.75 -1.52]	2.94 [2.37 -3.66]	1.10 [0.82 -1.49]
Educational level	Illiterate	1	1	1	1
	Primary school	0.99 [0.77 -1.11]	1.16 [0.95 -1.41]	0.84 [0.70 -1.01]	0.95 [0.85 -1.14]
	High school	0.70 [0.59 -0.85]	1.18 [0.90 -1.54]	0.70 [0.58 -0.84]	0.87 [0.72 -1.09]
	College	0.57 [0.47 -0.70]	1.07 [0.75 -1.52]	0.47 [0.39 -0.57]	0.71 [0.58 -0.87]

Discussion

Our study was a large population-based study with 11850 participants. The mean BMI among Iranians female adults was reported 27.0 kg/m2 (26.4-27.7) by WHO (8). Considering the results of this study, the mean BMI was 27 kg/m2, which is the same as this report.

According to the results of the current study, the prevalence rates of overweight and obesity were 41.4% and 24.1%, respectively. The results of this study, in accordance with the previously published studies, confirm an epidemic of obesity and overweight in developing countries (5,9-12). Our findings also suggest

that our female population can expect to experience a very high rate of cardiovascular diseases and diabetes in the near future. Our data was in accordance with a former study in Shiraz carried out in 2010 that showed the prevalence of obesity equal to 22.5% among women (4). Several studies have been conducted about the prevalence of overweight and obesity in the general population in Iran. In a study, the prevalence of overweight and obesity among the Iranian Female general population has been reported 32.4% and 24.5%, respectively (13). Bahrami *et al.,* (14) estimated the prevalence of overweight and obesity 34.2% and 28%, respectively. In another study, the prevalence of overweight and obesity among Iranian women was reported 33.3% and 26.7%, respectively (15). Nikooyeh *et al*., showed that the prevalence of overweight and obesity in women is 34.8% and 40.0 %, respectively (16).

Age, education level, marital status, socio-economic status, menopause, age at menarche, and abortion history are likely some factors that influence BMI among women (14,17-20).

In studies in China (21), Portugal (22), Italy (23), in the same age group as ours, the prevalence of overweight and obesity was less than in our study. A national study in Lebanon reported that the prevalence of overweight and obesity in women was 49.4% and 18.8%, respectively (24). The differences observed between these findings may have several causes. Economic status, educational level, ethnicity, and lifestyle are important factors that may partly explain such variety. In terms of age groups, similar to the results of most studies (15,25-28), there was a positive relationship between age and obesity. The results of this study also revealed a lower prevalence of obesity among those with higher education levels, as seen in other studies (15,26-32), which may relate to their ability to understand the risk factors of obesity and overweight related diseases. The findings of this study demonstrated that obesity and overweight are among the most important health issues in Iranian female population, and control measures are strongly recommended.

Our study has some limitations. Diet quality and quantity, Physical activity status, and socio-economic status were not considered. Though, the large sample size was a strength of the present study. Also, variables were measured by trained staff using standard procedures.

The results of the current study showed that obesity and overweight have a high prevalence in the female Iranian population. Consid52ering the complications of obesity and overweight, especially in women, we would suggest that Iranian health policy-makers plan appropriate intervention programs, with a focus on diet, physical activity, and lifestyle modification, to decline the incidence of obesity and overweight.

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