Overweight and Obesity and Associated Risk Factors among the Iranian Middle-Aged Women

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Abstract

Background: Overweight and obesity is considered to be a worldwide epidemic that its incidence is increasing and has become a global public health. Overweight and obesity has significant contributing factor in the development of various chronic diseases such as cardiovascular disease, hypertension, diabetes mellitus, stroke, osteoarthritis, and certain cancers**.**

Objectives: To assess the prevalence of overweight and obesity in a group of Iranian middle-aged women and the association with some socio-demographic factors.

Methods: The study was undertaken among women aged 40–60 years in Semnan, Iran. The Body Mass Index (BMI) was calculated by measuring height and weight. Socio-demographic variables collected were age, marital status, household income, employment, educational level, residential area, number of children, life satisfaction and menopausal status.

Results: A total of 749 women were included. The prevalence of overweight/obesity was high (80.8%). Educational level and menopausal status were strongly associated with obesity. Other socio-demographic variables were not significantly associated with overweight/obesity. Comparison with two previous studies in this region showed that the prevalence of overweight is increasing in women.

Conclusions: This study showed high prevalence of overweight and obesity in middle-aged women. Overweight and obesity have had no significant association with most socio-demographic variables.

Key words: Overweight, Obesity, Middle-aged women, Socio-demographic characteristics

Introduction

Obesity is considered to be a worldwide epidemic that its incidence is increasing. It has become a global public health and more than one billion adults estimated to be overweight and over 400 million of them are obese.[1] According to the WHO estimate, there will be about 2.3 billion overweight people aged 15 years and above, and over 700 million obese people worldwide in 2015.[2]

Obesity has significant contributing factor in the development of various chronic diseases such as cardiovascular disease, hypertension, diabetes mellitus, stroke, osteoarthritis, and certain cancers.[3] According to the previous data, there are wide variations in the prevalence of obesity throughout the world, ranging from India, where 1% or less of the population is obese, to the Pacific Islands, where the prevalence of obesity can reach up to 80% in some regions.[4]

Although obesity was initially most visible in developed countries, recent global figures indicate that it is increasing in the developing world. As developing countries have become wealthier, marked change in lifestyles cause obesity development.[5] So that WHO emphasizes the importance of monitoring the prevalence and secular trends for overweight and obesity in each country.[6]

The prevalence of obesity among men and women varies greatly within and between countries. Women, in particular, have a higher prevalence of obesity that increases with age.[7] These gender disparities are exacerbated among women in developing countries, particularly in the Middle East and North Africa.[8] Some studies suggest that not only the global differences in the prevalence of obesity vary by sex, but also that the social determinants of obesity vary by gender.[9,10]

Iran is a middle-income developing country undergoing economic, environmental, and cultural changes. Lifestyle and diet have significantly changed in recent years. These changes negatively affected both energy intake and expenditure.[11]

In middle-aged women, the biological factor and hormonal changes affects fat distribution that may increase risk or exacerbate negative effects of obesity on health. These biological and related socio-cultural differences warrant specific study on women. Understanding how regional body mass indexes are changing in women, and the relative

speed at which this is occurring, is important for health planning policy and intervention.[12]

Few studies have explored this topic in middle-aged women. Identifying the important determinants of overweight/obesity may help to define target groups for prevention. So that this study designed to evaluate obesity in a group of middle-aged Iranian women and comparing the result with two previous study that conducted in this region. We also examined the associations of overweight and obesity with demographic and socioeconomic characteristics. This article is the first nationwide obesity prevalence study among women aged 40-60 in Iran.

Methods

This cross-sectional study was conducted during 2012 in Semnan city that is situated in center of Iran. This city consists of seven districts. Each district is covered by a Primary Health Care center (PHC). The target population in this study was women of middle age (40-60years) in all seven regions.

A multistage stratified cluster random sampling technique was used to select study population. In the first stage, clusters (households) were chosen randomly using systematic sampling technique based on family health number in PHC centers. In the second stage, we randomly selected subjects in each cluster. Once a household was selected, all residents were identified by age and sex, and one women aged between 40-60 years was randomly selected. If there was not a woman with above age, the next household selected, until calculated sample attained. The study was approved by the Research and Ethics Committee of the Semnan University of Medical Sciences and informed consent was obtained from all subjects.

Data was collected face-to-face by trained interviewers using a structured questionnaire comprising data on social, demographic and personal history. Weight was determined using a digital electronic weighing scale with accuracy to 0.1 kg and wearing lightweight clothing. Height was measured to the nearest centimeter by using a tape measure and women standing upright without shoes. Body mass index (BMI), defined as the weight in kilograms divided by the height in meters squared (kg/m^2). Overweight defined as having a BMI between 25.0 and 29.9 kg/m^2; and obesity as having a BMI equal or greater than 30.0 kg/m^2.[6]

The small number of underweight participants in this study made accurate inference about this group impossible. Therefore, this category was removed from analysis. Data about socio-demographic details including age, marital status, household income, employment, education, residential area, number of children, life satisfaction and menopausal status were registered. The menopausal status was defined based on WHO criteria.[13] Household income and life satisfaction was based on self-reported information.

Statistical analysis

Data were analyzed by Chi Square test (for univariate analysis) and logistic regression analysis using SPSS Version 16.00(SPSS, Inc., Chicago, IL). P-value less than 0.05 were considered statistically significant. We used logistic regression analysis to estimate adjusted odds ratio (OR) of obesity for different levels of risk factors.

Results

The study enrolled 749 middle age women. Mean age (±SD) of participant was 50.7 ±4.5. Most participants were married (94%), minority of women (8%) have had high level of education (>12 years) and 661(83.3%) were non-employed. The main characteristics of subjects are presented in Table 1.

Mean BMI (±SD) of women was 28.6±4.3 using the WHO criteria. 19.2 % of women were normal weight, 45.4% overweight and 35.4% obese. The combined prevalence of both overweight and obesity was 80.8%. Table 2 displays relationships between socio-demographic variables and the likelihood to be classified as overweight or obese. Overweight and obesity were not significantly associated with age, marital status, education level, number of children, place of residency, employment, life satisfaction, household income and menopausal status.

The associations between the risk of obesity and the socio-demographic factors in multivariate models showed that education level and menopausal status was associated with increased chance of obesity. The risk of obesity was more common by approximately 1.52 fold in women with<12 year of education (OR=1.52, 95% CI: 1.09-2.10, p=0.01). In addition, the risk of obesity was 1.58 time more common in pre-menopause women when compared with menopausal women (OR=1.58, 95% CI: 1.06-2.36, p=0.026) (Table 3).

Discussion

Obesity is caused by a complex interaction between the environment, genetic predisposition, and human behavior. Environmental factors are likely to be major contributors to the obesity epidemic.[4] Recent estimates show the prevalence of overweight and obesity to be increasing at alarming rates, in both developed and developing countries.[14]

This study found that the prevalence of overweight and obesity among middle-aged women was high. In a systematic-review and meta-analysis, obesity was reported in 13.7% of Iranian adult males and 27.3% of females.[15] This shows that prevalence of obesity in this group is significantly higher than general adult female.

The prevalence of overweight/ obesity in this study (80.8%) was higher than the value reported in women of China, Swiss, Portuguese, Italia, Malaysia, Ghana, Tunisia.[16-22] A similar prevalence of obesity among women in Turkey (35%) was reported.[23] Most of these studies were conducted on all adult women not in middle-aged group. In a study in Shiraz, southern Iran that conducted on 25-55 adult the prevalence of overweight/obesity was 63.9% in women. The prevalence of obesity was 22.5% in women.[24]

Compared with our study, Dijkshoon reported higher prevalence of obesity among Turkish and Moroccan immigrant women (89%) in The Netherlands.[25] Mbochi and co-worker from Kenya reported a higher BMI in women aged 40-60 compared with our finding.[26]

Our finding for overweight and obesity was compared with two previous studies conducted in Semnan during 1996-97 and 2006.[27.28] In the 1996-97 study 75.3% of middle-aged women have had overweight/obesity. The study revealed overweight in 37% and obesity in 38.5% of women. In 2006 study prevalence of overweight/obesity was 78.2%. Prevalence of overweight and obesity was 43.5% and 34.7% respectively. Figure 1 shows an increase in overweight during a sixteen -year period between the three studies. On the other hand, findings show a slight decrease in trend of obesity during this period.

In Tehran Lipid and Glucose Study conducted on adult above twenty years old between 1998 and 2002 the prevalence of overweight slightly decreased from 40 to 39.5% in women. Whereas, obesity have risen from 43/8% to 49.9% in women.[29] Such increase in the prevalence of overweight/obesity may be due to change in lifestyle and nutrition shift in Iran. The increasing economic status in recent years has resulted in a higher consumption of sugar, salt, red meat and saturated fatty acids among Iranian people and therefore increased the possibility of becoming obese.[30]

Most other studies from developing and developed countries have documented similar increase. Balarajan et al examined trends in the prevalence of overweight/obesity and underweight among women of reproductive age in 3 South Asian countries. The prevalence of overweight/obesity increased substantially in all countries.[31] In study on adult Swiss population between 1992-3 and 2007, the prevalence of overweight/ obesity increased from 22.3% to 31.3% in women, while the prevalence of obesity increased from 4.9% to 8.5% in women.[17] Similar increase was reported from some other studies.[32-34]

In contrast Al-Lawati and Jousilahti in their study reported decrease in overweight and obesity between 1991 and 2000 among Omani adult women.[35] A similar decrease was reported among adult women from Spain. This decline was greatest in women aged 60–69 years.[36]

Education is well known to be beneficial to health and may protect against obesity through cognitive advantages that result in healthier lifestyles and better behaviors related to determinants of obesity. In agreement with this, in our study it was observed that obesity tends to be more prevalent among people who are less educated. This finding on

negative relationship between education and obesity is consistent with the results from other previous studies. For example in observations made among Brazilian women, the prevalence of obesity markedly decreased with the increase level of education.[10] Some other studies confirmed this association.[37-42]

Contrary to these studies, other studies found an inverse association, subjects with a low level of education presented with lower values of overweight and obesity than those with a higher level of education.[31,32,43,44] Two study in Ghana and Kenya on adult women showed that education appears to have no association with a woman's weight status.[21,26]

Multivariate analysis showed that the risk of obesity was more common in pre-menopause women. The years surrounding the menopause are associated with weight gain, increased central adiposity, and decreased physical activity. This weight change may be due to hormonal changes occurring during the menopausal transition.[45] Sternfeld B et al study did not show relationship between menopausal status and weight gain in midlife women.[46]

The different living environments (urban versus rural) displayed markedly different prevalence rates of overweight and obesity in previous studies. In most studies overweight/obesity was positively related to urban residency.[16,31,32,35]

In contrast L. Beltaïfa1et al in their study from adult Tunisian women reported that people living in rural areas were more obese than those living in the urban area.[22] Our study did not show significant association between place of residency and Overweight/obesity. Similarly in a study conducted in Italian adult people no particular pattern in prevalence for different levels of BMI was found based on area of residency.[19]

Other socio-demographic variable including marital status, number of children, employment and household income was not significantly associated with overweight and obesity in our study. Our results confirm the findings from some previous survey. Martinez et al reported no significant differences in terms of overweight and obesity in relation to marital status.[47] In another study, marital status, parity, income level and cultural orientation were not associated with overweight/obesity.[25] In contrast, most other studies showed that the prevalence of obesity was significantly associated with occupation,[18] marital status,[20,39] number of children[21,26] and household income.[22,38]

This study has a number of limitations that warrant mention. First this study was cross-sectional that limits the causal interpretation of the associations described. Second, women included in this study cannot be thought of as a random sample of all Iranian women and results cannot be totally extrapolated to the general female. Third, family income and life satisfaction was self reported.

Conclusion

In conclusion, the findings of this study indicate 45.4% of middle- aged women are overweight and 35.4% are obese that is higher than value reported from most other

countries. This finding highlights the problem of overweight and obesity in this group of women. Also, comparison with two previous studies in this region showed that the prevalence of overweight is increasing in women during two recent decades despite mild reduction in obesity. Socio-demographic variables except education level and menopausal status were not significantly associated with obesity and overweight. It is crucial to design preventing health policies targeting specifically middle-aged women in order to educate them on lifestyle modifications.

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Table 1: Socio-demographic variables of the study population

Characteristic	N	%
Age(year)		
40-45	86	11.5
46-50	331	44.2
51-55	211	28.2
56-60	121	16.2
Marital Status		
Married	704	94.0
Single	45	6.0
Educational Level		
Illiterate	62	8.3
Primary	254	33.9
Intermediate	178	23.8
Secondary	195	26.0
Higher	60	8.0
Residential Area		
Urban		93.6
Rural	701	6.4
	48	
Number of Children		
0	99	13.2
1	198	26.4
2	247	33.0
3	139	18.6
4≥	66	8.8
Employment		
Yes	88	11.7
No	661	88.3
Menopausal status		
Pre-menopause	148	19.8
Peri-menopause	268	35.8
Post- menopause	333	44.5
Family income		
High	163	21.8
Medium	528	70.5
low	58	7.7
Life satisfaction		
Very satisfied	276	36.8
Satisfied	396	52.9
Not satisfied	77	10.3

Table 2: Prevalence (%) of Obesity, Overweight according to study group Socio-demographic variables

Characteristic		BMI(Kg/m^2)			p-value
		Normal (<25)	Overweight (25-29.9)	Obes (≥30)	
Age(year)					
	40-45	16.3	44.2	39.5	
	46-50	18.4	45.0	36.6	**0.910**
	51-55	20.4	46.0	33.6	
	56-60	21.5	46.3	32.2	
Marital Status					
	Married	18.8	46.2	35.1	**0.202**
	Single	26.7	33.3	40.0	
Educational Level					
	Illiterate	21.0	38.7	40.3	
	Primary	18.9	44.5	36.6	**0.464**
	Intermediate	17.4	42.7	39.9	
	Secondary	19.0	51.3	29.7	
	Diploma$^+$	25.0	45.0	30.0	
Residential Area					
	Urban	19.3	45.2	35.5	**0.933**
	Rural	18.8	47.9	33.3	
Number of Children					
	0	25.3	39.4	35.4	
	1	14.1	52.5	33.3	**0.101**
	2	22.3	45.3	32.4	
	3	15.8	41.7	42.4	
	≥4	21.2	40.9	37.9	
Employment					
	Yes	23.9	43.2	35.7	**0.499**
	No	18.6	45.7	33.0	
Menopausal status					
	Pre-menopause	17.6	40.5	41.9	
	Peri-menopause	20.5	44.0	35.4	**0.318**
	Post- menopause	18.9	48.6	32.4	
Family income					
	High	20.2	49.7	30.1	
	Medium	18.6	43.6	37.9	**0.280**
	Low	22.4	50.0	27.6	
Life satisfaction					
	High	18.1	47.8	34.1	
	Moderate	19.2	44.9	35.9	**0.695**
	Low	23.4	39.0	37.7	

Table 3: Obesity risk-assessment model among middle-aged women

Variables	β Coefficient	SE(β)	P-Value	Odds Ratio (OR)	95% CI* for OR
Educational level					
<12 years	042	0.17	0.013	1.52	
≥12 years	-	-	-	1.00	**1.09-2.10**
Menopause Status			0.084		-
Pre-menopause	0.46	0.21	0.026	1.58	**1.06-2.36**
Peri-menopause	0.18	0.17	0.304	1.20	**0.85-1.69**
Post- menopause	-	-	-	1.00	-
Constant	**-1.04**	**0.17**	**<0.001**	**-**	

*CI: Confidence Interval

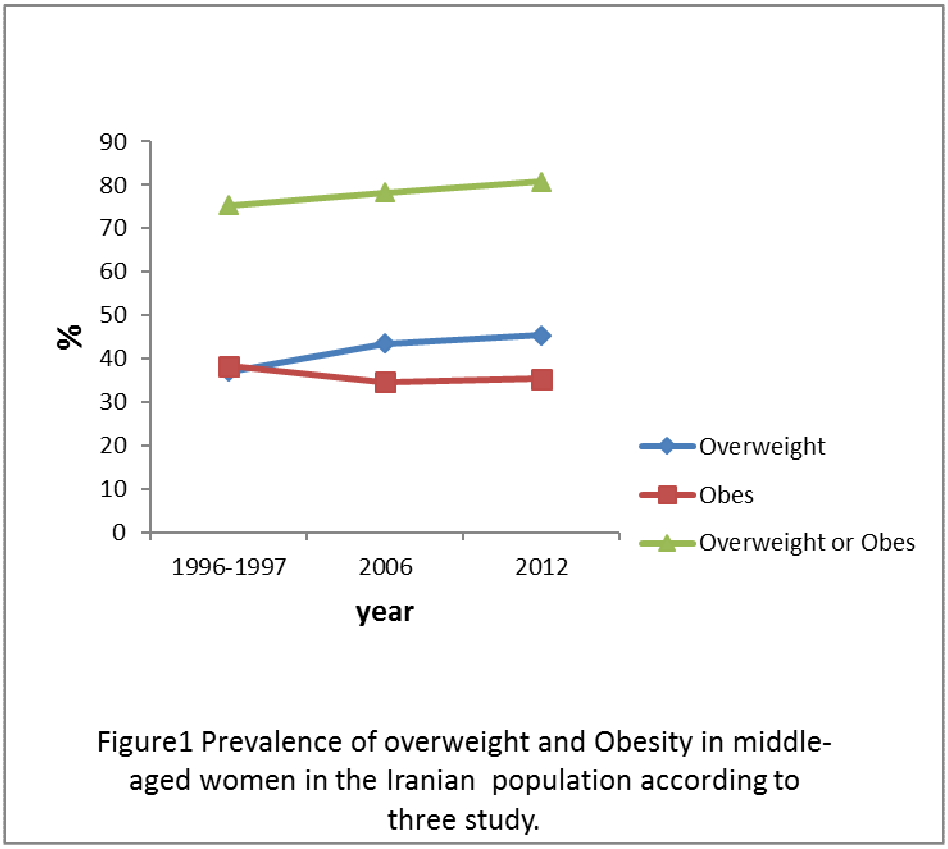

Figure1 Prevalence of overweight and Obesity in middle-aged women in the Iranian population according to three study.