Evaluation of Physical Activity and Dietary Habits of Women in Anzali Port and its Relationship to Public Health and Obesity

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The purpose of this study is to assess the level of physical activity and dietary habits among women in Bandar Anzali and examine their relationship to public health and the prevalence of obesity. In this study, 400 women (20 to 70 years old) were examined in Bandar Anzali. Demographic data was collected through questionnaires and interviews. To assess physical activity, the Beck physical activity questionnaire was used. To determine dietary habits, the nutrition questionnaire of Adami and Cordera was used. In addition, 12-item General Health Questionnaire (GHQ) was used to assess general health. To determine the prevalence of obesity, body mass index (BMI) was calculated. To examine the relationships between variables, the Kruskal-Wallis test, chi-square, Mann Whitney and Spearman correlation coefficient were used in 95% confidence. Results showed that the 51-70 year-old group had the least amount of physical activity, the lowest rated general health, eating habits, and the highest mean BMI compared to other groups. Prevalence of overweight and obesity was 42 and 22.5% and increased by aging and decreasing physical activity (P$\leq$0.05). Obese group had the lowest level of physical activity. There was no significant relationship between dietary habits in different categories of BMI. There was a positive significant relationship between obesity and marital status and housing (P$\leq$0.05); however, there was no significant relationship between obesity and education, income, smoking and history of heart diseases (individual and family). The results of this study showed that low educational level, unhealthy dietary habits and low physical activity led to weight gain, obesity and reduced overall health of women. Therefore, increased knowledge and awareness of nutrition and modified lifestyle and physical activity are essential as the best way to prevent obesity and obesity-related diseases.

Key words: Physical activity, Dietary habits, Obesity and public health.

Obesity is a multiple-cause chronic disease arising from interaction between heredity and environment[2]. Not only developed countries[56, 37], but also developing countries are faced with an epidemic obesity in children and adults[57, 43]. Although most researchers agree on the effects of obesity on health, there is little agreement among researchers on how to manage and treat obesity.

Information regarding how and why obesity occurs is incomplete, but it is believed that a combination of social, behavioral, cultural, physiological, metabolic and genetic factors are involved[2].

Some scientific evidence suggests that the lack or low level of physical activity is an important factor in prevalence of overweight and obesity. Nevertheless, researchers are faced with the question that the role of physical activity and exercise to reduce fat and weight control is to what extent and in what form[30].

The most important complications of

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obesity such as insulin resistance, diabetes, hypertension, hyperlipidemia, and hyperandrogenism experienced by women are mainly associated with intra-abdominal fat or upper part rather than accumulation of fat[36, 47].

Recent epidemiological studies indicate a prevalence of overweight and obesity and the metabolic syndrome in Iran, equal to or greater than Europe and the United States[50]. Medical reports suggest that obesity is associated with many physical illnesses and deaths in 75% obese people is 25% more than in normal individuals. Obesity is clearly associated with the risk of cardiovascular disease. On the other hand, 60% of too fat people suffer from hypertension and when they reduced the amount of weight, their blood pressure is reduced. Shortness of breath under reduced vital capacity of the lungs due to an accumulation of fats in the abdominal wall and chest is listed as the other complication of obesity. Interrupted breathing during sleep and low ventilatory syndrome is also associated with obesity. Orthopedically, the flat foot, knee and spine arthritis and gout is increased in obese subjects. Other diseases which can be linked to obesity include diabetes, gastrointestinal and liver problems and types of cancer. In fact, weight control will increase the life span[14]. Poor diet and low physical activity are causes of overweight and obesity[65]. Therefore, physical activity, nutrition care, control of obesity and information in the field of obesity are essential for health planning and public health.

MATERIALS AND METHODS

The methodology used for this study is descriptive correlation. The studied group included all 20-70 year-old women living in Bandar Anzali. As samples, 400 subjects were selected by random cluster sampling.

Using a tape measure and s scale, information on the subjects' height and weight were recorded. The used questionnaire is as follows.

Demographic information questionnaire

Demographic data included income, education, marital status, history of cardiovascular diseases in first-degree relatives of the subjects, smoking status and housing. The subjects were divided into three groups according to age, young,

middle-aged and adult[26].

Beck physical activity questionnaire

This questionnaire is highly correlated to physical activity (r = 0.69) and it is recognized appropriate for epidemiological studies. The questionnaire included questions on three parts, jobs, sports and leisure time[29].

12-item General Health Questionnaire (GHQ)

This questionnaire used to assess the general health of subjects is a screening method based on self-reporting which is formed from the lowest levels of morbidity existing in important psychological disorders[12]. General Health Questionnaire contains four subscales including somatic symptoms, anxiety and insomnia, social dysfunction and depression[9].

Dietary Habits Questionnaire

This author-developed questionnaire is derived from the nutritional status questionnaire for Mediterranean people (Adami and Cordera). Dietary habits include overeating or anorexia, consuming vegetables, yogurt and dairy products, the use of salt, the amount of fruit and so on.

Measurement of physical activity

Beck physical activity questionnaire[29] was used to assess the physical activity. Questionnaire has five items which are scored according to the intensity of physical activity, from one to five. Accordingly, 1 represents the lowest level of physical activity. Finally, an overall score of physical activity was calculated from the achieved average.

Assessment of general health among subjects

Information on general health of subjects was obtained from a 12-item general health questionnaire (GHQ). The questionnaire consists of 12 items which are evaluated based on Likert scoring system. Each item has four choices; therefore, the overall score will vary from 0 to 36. The lower scores indicate better mental health.

Evaluation of dietary habits

The questionnaire is used to assess information on dietary habits of subjects. Based on the responses to the questionnaire, subjects were evaluated for eating habits.

BMI

To determine the body mass index, the values of weight in kilograms and height in meters were placed in the equation to calculate the body mass index in kg/m^2. In this study, the BMI equal

to or greater than 30 was used to determine obesity:

BMI = weight (kg) / Height (m²)

Obesity

Body mass index was used to determine obesity. Subjects who have a body mass index equal to or greater than 30 were considered obese. BMI was used as a measure of obesity and non-obesity of subjects and non-obese and obese subjects were divided into two groups.

Methods

Descriptive statistics were used for describing data. For analytic statistics, Kolmogorov-Smirnov test was used for normality of data distribution. The Kruskal-Wallis test, chi-square and Mann–Whitney were used to determine differences between groups and the Spearman correlation coefficient to determine the relationships between variables in 95% confidence. In all the statistical steps, the software package SPSS (version 19) was used.

RESULTS

Table 2 shows the prevalence of overweight (42%) and obesity (22.5%) in women living in Bandar Anzali.

Table 3 presents distribution of different age groups and mean and standard deviation of physical activity, public health, dietary habits and body mass index (BMI). The results show that the level of physical activity, public health and dietary habits reduced by aging; accordingly, the age group of 51 to 70 years had the minimum amount of physical activity, the lowest rated general health,

dietary habits, and the highest average body mass index (BMI).

As Table 4 shows distribution and mean of different variables including single, married and divorced women, the highest distribution of physical activity and mental health belongs to married women, while the lowest BMI belongs to single women.

According to Table 5, there is a significant difference between the level of physical activity in different groups of body mass index (acceptable weight, overweight and obesity) among women living in Bandar Anzali. Based on the average

Table 1. Classification of obesity by WHO [219]

Groups	BMI (kg/m)	Risk to Health
Lightweight	Less than 5.18	Low
Normal weight	9.24 to 5.18	Average
Overweight	25 and above	
Step before Obesity	29.9 to 25	Slightly high
Obesity, type 1	9.34 to 30	Relatively high
Obesity type 2	9.39 to 35	Severe
Obesity type 3	40 and more	Extreme

Table 2. Prevalence of overweight (42%) and obesity (22.5%)

BMI	Number	%
Acceptable	142	35.5
Overweight	168	42
Obese	90	22.5

Table 3. Distribution of different age groups

Age group	Variables	Number	%	Mean and standard deviation
20-35	Physical Activity	207	51.8	38.87±8.01
	Public Health	207	51.8	25.29±4.60
	Dietary habits	207	51.8	9.84±1.23
	BMI	207	51.8	25.67±4.16
36-50	Physical Activity	178	44.5	37.25±7.62
	Public Health	178	44.5	25.42±4.23
	Dietary habits	178	44.5	9.73±1.16
	BMI	178	44.5	28.18±4.62
51-70	Physical Activity	15	3.8	36.92±6.74
	Public Health	15	3.8	25.40±5.26
	Dietary habits	15	3.8	9.66±1.34
	BMI	15	3.8	28.90±4.92

Table 4. Distribution and mean of different variables

Age group	Variables	Number	%	Mean and standard deviation
2Single	Physical Activity	46	11.5	37.40±7.96
	Public Health	46	11.5	24.60±4.37
	Dietary habits	46	11.5	10.58±1.25
	BMI	46	11.5	23.14±4.01
Married	Physical Activity	348	87	38.20±7.85
	Public Health	348	87	29.41±4.45
	Dietary habits	348	87	9.68±1.16
	BMI	348	87	27.41±4.43
Divorced	Physical Activity	6	1.5	36.12±4.72
	Public Health	6	1.5	27.33±5.46
	Dietary habits	6	1.5	9.66±1.21
	BMI	6	1.5	26.80±3.87

Table 5. Level of physical activity in different groups of body mass index

	BMI	Number	%	Mean score	Chi-square	Degree of freedom	Sig.
Physical activity	Acceptable	142	35.5	217.65	6.857	2	0.032*
	Overweight	168	42	192.26			
	Obese	90	22.5	181.47			

Table 6. Level of physical activity and housing status of women

	Housing status	Number	%	Mean score	Chi-square	Degree of freedom	Sig.
Physical activity	Private	281	70.2	187.77	7.312	2	0.010
	Rental	99	24.8	224.05			
	Organizational	20	5	262.75			

Table 7. Levels of BMI in different age groups

Age groups	Acceptable		Overweight		Obesity		Mean score	Chi-square	Sig.
	Number	%	Number	%	Number	%			
20-35	91	44	89	43	27	13	213.45	26.795	0.000*
36-50	47	26.4	75	42.1	56	31.5	186.69		
51-70	4	26.7	4	26.7	7	46.7	185.73		

Table 8. Levels of BMI and marital status

Marital status	Acceptable		Overweight		Obesity		Mean score	Chi-square	Sig.
	Number	%	Number	%	Number	%			
Single	33	71.7	9	19.6	4	8.7	126.52	24.567	0.000*
Married	107	30.7	156	44.8	85	24.4	210.35		
Divorced	2	33.3	3	50	1	16.7	196.33		

scores, the greatest amount of physical activity was related to acceptable group and the lowest was related to the obese group.

According to Table 6, there is a significant relationship between the level of physical activity and housing status of women living in Bandar Anzali.

According to Table 7, there is a significant relationship between levels of BMI in different age groups.

According to Table 8, there is a significant relationship between levels of BMI and marital status.

DISCUSSION

There is a significant difference in physical activity level of the normal weight group and obese women in Bandar Anzali, while there is no significant difference in physical activity of normal group and the overweight group as well as overweight group and obese group. There is no significant relationship between dietary habits and physical activity among women in Bandar Anzali. There is no significant relationship between public health and level of physical activity among women in Bandar Anzali. There is no significant relationship between demographic characteristics (age, education, history of heart diseases (individual and family), smoking, marital status, and income) and the amount of physical activity among women in Bandar Anzali, while there is a significant difference between physical activity and housing. There is no significant relationship between dietary habits of different groups of BMI among women in Bandar Anzali. There is a significant difference in general health of various groups of BMI (normal weight, overweight and obese) among women living in Bandar Anzali. There is a significant relationship between different groups of BMI, age groups and marital status of women in Bandar Anzali, while there is no significant relationship between different groups of BMI, education, housing status, history of heart diseases (individual and family), smoking and income.

In this cross-sectional study, the prevalence of overweight and obesity was 22.5 and 42% among 20 to 70 year-old women, respectively. Azizi et al (2005) reported the prevalence of obesity in women aged 80-20 in

Tehran as 40.3%[29]. In a study by Azadbakht et al (2004) in Tehran, the prevalence of overweight and obesity was reported 41.6 and 14.2% in men and 37 and 29.1% in women[5].

Akhavantabib et al (2004) studied people over 19 years in Esfahan, Najafabad and Arak for prevalence of overweight in men and women (30.3 and 33.3%) and the prevalence of obesity in men and women (9.3 and 23.4%), respectively[2].

Najafi et al (2009) reported the prevalence of obesity (14.9%) and overweight (36.1%) in women aged 25-64 years living in Khorramabad[23]. Sadr Bafghi et al (2009) reported the prevalence of overweight (52.7%) and obesity (24.2%) in women living in Yazd[16].

Ayatollahi al (2010) conducted a study in Shiraz on the prevalence of obesity (22.5%) and overweight (63.9%) in women, which indicates 17.4% increase in women over 14 years[27].

Amiriparsa et al (2013) reported the prevalence of overweight (42.4%) and obesity (31.6%) in women living in Sabzevar[4]. Aqa'alinejad et al (2013) reported the prevalence of overweight (53%) and obesity (18.6%) in women aged 15-64 years who live in Ardabil, Isfahan, Ahvaz, Tehran, Rasht, Kerman and Mashhad[7]. The prevalence of obesity among women in Bandar Anzali is largely similar to prevalence of obesity in Isfahan, Najaf Abad, Arak, Yazd and Shiraz. The prevalence of overweight is similar to Sabzevar. Differences in the prevalence of overweight and obesity in Bandar Anzali and some cities may be due to the differences in levels of physical activity, socioeconomic and nutritional differences among the studied populations.

In the present study, there is a significant difference in physical activity of normal group than the obese women. The physical activity of normal group was more than the obese and overweight groups; however, this difference is not statistically significant between normal group and the overweight group. Generally, the maximum amount of physical activity was observed in women with normal weight and the lowest amount was among obese women.

Lahti-koski et al (2002) studied the relationship between BMI and obesity and physical activity, food intake, alcohol consumption and smoking on 45,777 people (men and women) aged 25-64 in Finland. They found a negative

relationship between physical activity and obesity. Active people experienced lower weight gain than those who were inactive. In addition, inactive people had higher BMI than those who were active[45].

Evaluating the national health in Spain among adults aged from 20 to 60 years, Gutierrez et al (2002) found that BMI of people who had no physical activity in leisure time was higher than that of people with physical activity. Moreover, the odds ratio of obesity reduced by increasing physical activity levels in men and women[38].

Abdul-Rahim et al (2003) found a negative relationship between physical activity and BMI in men and women in rural and urban Palestine[25].

Sternfeld et al (2004) showed that any reduction in daily physical activity is associated with weight gain[62].

Kaphingst et al (2007) found a significant difference in physical activity of the normal group and overweight and obese groups[40]. Studying 28 provinces in Iran, Kelishadi et al (2007) found that the physical activity in overweight and obese men and women was considerably less than normal-weight men and women[41].

Hajian et al (2009) reported a negative relationship between physical activity and obesity; they believed that low level of physical activity is one of the most important causes of general and abdominal obesity in men and women in northern Iran[35].

Studying 1500 men and women living in Yazd Province, Motefaker et al (2008) found that the level of physical activity is generally low. They observed a negative relationship between physical activity and obesity, but no significant difference in level of physical activity of obese and overweight groups and normal group[19].

Schroder et al (2004) found that people following the Mediterranean (healthy) dietary had more physical activity and were more active[61].

Comparing the dietary patterns of active and inactive people, Deshmukh-Taskar et al (2007) found that active people had healthier dietary pattern than inactive people. Active people tended to eat more fruit, fruit juice, fish, vegetable oils, low-fat foods and vegetables than inactive individuals[49].

The difference between findings of this study and the current study can be due to the fact that percentage of sedentary people is more than those with moderate and high physical activity in Bandar Anzali; this is why the relationship between physical activity and dietary habits is not significant.

In the present study, there was no significant relationship between physical activity and public health score. Studying emotional and mental health of elderly women in Australia, Lee (2002) examined the effect of physical activity on mental health and the relevant variables in three groups of young (18-23 years), middle-aged (45-50 years) and elderly (70-75 years). The results show that women of all three groups had higher levels of mental health and there was a direct relationship between physical activity and mental health[46].

McDowell (2003) examined the relationship between physical activity and its effect on mental health. The subjects were divided into two groups: active and inactive. The study reported an inverse relationship between depression and physical activity. However, no relationship was found between sports and other psychologically healthy subscales[31]. Aarnio et al (2002) concluded that physically active subjects had better general health and social relations than inactive subjects[24].

Examining the relationship between physical activity and general health of elderlies in Tehran, Aslankhani et al (2005) found a positive significant relationship between the level of mental health and the physical activity[3]. Ebrahimi et al (2013) found a significant relationship between mental health of athlete students and during of exercise. Mental health status (total indexes) of the students who had regular physical activity was better than students without regular physical activity[1]. The difference could be due to differences in population and socioeconomic conditions or methods of assessing physical activity and low levels of active people in the study.

In the present, level of physical activity reduced by aging; however, there was no significant relationship. The highest activity was related to the age group of 20-35 years and the lowest activity belonged to the age group of 51-70 years. By increasing the level of education, physical activity reduced, but this relationship was not significant. In addition, there was no significant

relationship between level of physical activity and marital status, smoking, history of heart diseases (individual-family), dietary habits. The maximum amount of physical activity was related to people with an income of less than 150 thousand Tomans. However, the relationship between physical activity and housing conditions was significant.

Gutierrez et al (1995) showed that physical activity reduced by aging, although this difference was not significant between different age groups[38].

Norman et al (2002) showed that physical activity decreased with age. Younger people were more physically active than older people. One reason for the decline in physical activity in older people was reduced energy costs of their physical activity during leisure time. Physical activity also decreased by increasing levels of education. Decline in physical activity by higher levels of education was associated with reduced physical activity of the workplace[55].

Aqa'alinejad et al (2006) reported no significant relationship between socioeconomic status and the level of physical activity, but a negative significant relationship between physical activity and economic capital. That is, the level of physical activity reduced by higher economic capital[6].

Motefaker et al (2008) reported a negative relationship between the level of physical activity and aging; by aging, the level of physical activity gradually reduced. However, there was no relationship between physical activity and marital status. As they reported, increase in level of education significantly reduced physical activity and people with higher socioeconomic level had lower physical activity. It seems, the lack of sport-welfare facilities is not a factor for the low level of physical activity and the lack of motivation can play a more important role[19].

Dias-da-Costa et al (2005) in Brazil showed that levels of physical activity was lower in people with higher socioeconomic level than those with lower socioeconomic level; this can be related to lack of time for physical activity and less access to sports facilities[33]. The difference can be due to differences in socioeconomic conditions of the studied groups.

In the present study, the score of dietary habits was better in those with normal weight than people with overweight and obesity, but this relationship was not significant. Janssen et al (2004) reported no significant relationship between overweight and obesity and dietary habits. Increased BMI was negatively related to consumption of fruits, vegetables and healthy drinks and positively related to consumption of fast foods, chips and sweets[44]. Togo et al (2001) reported a negative relationship between obesity and a regime including vegetables, fruit and low-fat foods, and a positive relationship between a regime including meat, sweets, foods high in fat and calories[63].

Schroder et al (2004) observed a negative relationship between obesity and Mediterranean diet. People who followed a Mediterranean diet consumed more fruits, vegetables, vegetable oils and fish and tended to use less low-fat foods, processed foods, processed red meat, and sweets. The prevalence of obesity was low in this population[61].

Damirchi and Mehrabani (2010) showed a negative significant relationship between obesity and score of dietary habits. Obesity was positively related to high-fat foods, sweets, salt, snack, dessert after a meal. There was also a negative correlation between obesity and nutritional care[13]. The difference may be due to differences socio-economic conditions of the studied populations.

In the present study, there was a significant relationship between different groups of BMI and age groups; that is, the prevalence of obesity increased by aging. In addition, prevalence of overweight and obesity decreased as the level of education increased; this may be due to the increased awareness of educated people about the risks associated with overweight and obesity. The relationship between different groups of BMI and the housing situation was not significant, while the prevalence of obesity was higher in people who had leased the house. There was no significant relationship between different groups of BMI and heart diseases (personal, family). There was a significant relationship between different groups of BMI and marital status and the prevalence of overweight and obesity was higher in married adults than single people. There was no significant relationship between different groups of BMI and smoking and income. The highest prevalence of obesity was observed in patients who had a

monthly income of less than 150 Tomans. Sarshar and Khajavi (2008) reported a significant relationship between the prevalence of obesity and education and marital status. Obesity is more prevalent in illiterate women. The overweight and obesity was higher in married women than in single people and severe obesity was observed only in married women[15].

Gutierrez et al (1995) investigated the relationship between demographic and socioeconomic factors and obesity; they found a significant relationship between age and obesity. This means that obesity increased by aging. One reason cited for this is reduced amount of physical activity associated with aging[38].

Ma et al (2003) found a significant relationship between the risk of obesity and higher education. In contrast, no significant relationship was observed between incidence of obesity and age, sex, smoking, race and culture[48].

Erem et al (2004) studying 5016 Turkish men and women aged 20 years observed that obesity is positively correlated with age in both sexes. Increase in obesity can be due to reduced physical activity in men and women. There was a positive relationship between obesity and marital status and smoking cessation and a negative relationship between physical activity, smoking, level of education and family income. By rising incomes, the ability of people to purchase high-calorie foods will increase; this cause energy imbalance resulting in increased obesity. Moreover, those with a family history of obesity, diabetes and hypertension had higher prevalence of obesity than those without a history[34].

Kilicarslan et al (2006) reported that the prevalence of obesity was higher in married people than in singles; they also reported a significant negative relationship between obesity and education. The prevalence of obesity was higher in people with a family history of obesity than in those without history[42].

Panagiotakos et al (2006) observed that obese and overweight people had lower education and physical activity than those with normal weight and they were older. They also found no relationship between smoking and income and obesity and overweight in both sexes[9].

Mazloomzade et al (2007) reported a significant relationship between obesity and gender, age, education and marital status. So that, the prevalence of obesity was three times higher in women than in men and it increased by aging in both sexes. The prevalence of obesity was higher in people with lower education and married people[20].

Studying the prevalence of obesity in women aged 18-25 in Tehran, Barzin et al (2010) observed a significant negative correlation between BMI and education[8].

Assessing overweight and obesity in men and women aged 25-64 years in Khorramabad, Najafi et al (2009) found a direct relationship between prevalence of obesity and aging and marital status and an inverse relationship between prevalence of obesity and education[23]. Damirchi and Mehrabani (2010) reported the prevalence of obesity increased with age, decreased physical activity, low level of education, increased revenues, history of cardiovascular diseases and higher number of family members[13].

In a study by Vaghari et al (2012) in Golestan province, a negative significant relationship was found between overweight and obesity and the level of education. So that, illiterate people were exposed to double risk of obesity that those with a college education. The urbanization along with economic recovery can lead to weight gain because of sedentary[4].

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