An investigation into the state of anxiety, depression, and quality of life in overweight and obese people

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Abstract

Background and objective: Obesity is considered a source of psychological distress. Aim of this study is investigating anxiety, depression, and the quality of life in people with obesity and overweight living in Rasht, North of Iran.

Materials and methods: This analytical cross-sectional research was carried out on 134 subjects between 18 and 45 years old who had referred, for the first time, to the Nutrition Ward of Subspecialty Clinic Beesat in Rasht in 2017-18 with overweight or obesity. The Beck Depression Inventory (BDI), the Beck Anxiety Inventory (BAI) and a questionnaire of health-related quality of life known as the 36-Item Short Form Health Survey (SF-36) were used to identify the subjects' level of depression, anxiety, and quality of life. The collected data were analyzed in SPSS 23.

Results and conclusion: Totally, 49 overweight (36.6%) and 85 obese patients (63.4%) were investigated. 46 (34.4%) suffered from moderate to severe anxiety and 38 (28.4%) had moderate to severe depression. Furthermore, the average score of quality of life was 65.54 ± 17.37. There was a significant difference in terms of anxiety and quality of life between overweight and obese people. Also, out of the 8 dimensions of quality of life, physical function and general health had a significant negative correlation with BMI. No significant relationship was found between obesity and depression. An increase in BMI leads to a rise in anxiety and a decrease in the quality of life. By considering the role of psychological factors in obesity, mental health interventions can prevent and control this condition and improve people's quality of life.

Keywords: Anxiety, depression, obesity, overweighting, quality of life

1. Introduction

Overweight and obesity are not limited to physical concepts but also encompass mental health and conditions like depression, anxiety, and low self-esteem as well [1]. Defined by the world Health Organization (WHO) as having a

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BMI of 30 kg/m^2, obesity is the excessive accumulation of fat which is detrimental to one's health [2]. Today, this problem is one of the major public health issues, causing a severe increase in the incidence of various diseases, functional disabilities, and mortality [3]. It negatively affects both physical and mental health [4]. Obesity, which has become increasingly prevalent in the 21st century, increases people's chance of developing the symptoms of depression. The prevalence of depression in obese people is remarkably higher than it is in the general population [5]. While factors associated with increased risk of depression in obese people are multidimensional, recent studies suggest that metabolic health plays a key role here [6].

Obesity and overweight, as well as depression and anxiety, overlap with psychological and pathophysiological [risk] factors. Due to problems in the hypothalamic-pituitary-adrenal (HPA) axis, those with major depressive disorder and anxiety are prone to increase of levels of stress-related hormones and mediators, a condition which gives rise to the accumulation of fat in the body after eating food [7].

As common social stigmas, obesity and overweight are the source of psychological distress. As a result of receiving negative information, obese and overweight people might develop negative attitudes towards their physical appearance [8]. Zhao et al. [9] found that BMI is a predictive factor independent of mental disorders and that higher BMI is associated with depression. Obese people with psychiatric concerns are at an increased risk of death [10]. Studies suggest that the relationship between obesity, overweight, and psychopathology has augmented and that mental pathology is more frequent in obese people than others. In addition to this intensified correlation, the global prevalence of obesity and overweight has attracted the attention of health professionals, researchers, and policy makers to this field. There is also a reciprocal relationship between depression and stress, both of which may affect obesity and overweight. For example, people suffering from depression are more likely to experience stress and, thus, gain weight. Also, stress influences physical activities and lifestyle behaviors such as consumption of foods and drinks [11].

Despite many studies on the association between mental problems and obesity, some have found no correlation between them and have reported contradictory results [12,13]. On the other hand, different climates and habitats lead to specific lifestyles and eating habits, a fact that can affect people's moods. Furthermore, in Iran (including the city of Rasht), few studies have focused on the emotional problems of obese people and the possible effect that environment could play in this context. The present research attempts to take a step in this regard.

2. Materials and methods

It investigates depression, anxiety, and quality of life in obese people and addresses how one might help these people improve their life quality and mitigate obesity and its concurrent depression and anxiety. Specifically, the objective of this research was to determine the score of anxiety, depression, and quality of life in obese and overweight people who had referred to the Nutrition Ward of Subspecialty Clinic Beesat, Rasht (Iran), in 2017-2018.

This study pursues practical goals and its method of collecting data is analytical cross-sectional. Its statistical population consisted of all people who had for the first time visited the above-mentioned center in 2017-2018. Out of this population, a sample consisting of 134 subjects (18 to 45 years old) with overweight (30≥BMI≥25) or obesity (BMI≥30) was collected using convenience sampling method. The sample was proportional to the total number of people who had visited the center. The sampling process (from March to May, 2017) began after making coordination with the Deputy of Research, obtaining the approval of the Ethics Committee of Guilan University of Medical

Sciences, and presenting the permit to the Nutrition Ward of Subspecialty Clinic Beesat.

The inclusion criteria consisted of patients' referring to the ward for the first time, being 18 to 45 years old, and being overweight (25BMI≥>30) or obese (BMI≥30). Alternatively, the exclusion criteria were suffering from psychotic diseases and bipolar disorder based on the definition provided by the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5), menopause (for women), taking psychiatric medications such as tranquilizers, benzodiazepines as well as antidepressants like citalopram, a history of diabetes, high blood pressure, chronic renal failure based on Harrison's Principles of Internal Medicine (2015), and patients' reluctance to take part in the study.

The obese and overweight patients were examined by a dietician, and their height and weight were measured. Then, those meeting the inclusion criteria were identified. After being notified about the goals of the research and assured of the confidentiality of their personal information, they declared their informed consent and completed the Beck Depression Inventory (BDI), the Beck Anxiety Inventory (BAI), and the 36-Item Short Form Health Survey (SF-36). Those who were not sufficiently literate completed this questionnaire with the assistance of the project executive.

2.1. Beck depression inventory (BDI)

BDI is one of the most appropriate tools for assessing depression. It features 21 items which measure physical, behavioral, and cognitive symptoms. Each item has 4 options scored from 0 to 3, identifying the level of depression ranging from mild to severe. The maximum score in this test is 63 and the minimum is zero. Here, scores between 0 and 9 suggest no or minimum depression, scores between 10 and 16 represent mild depression, scores between 17 to 29 imply average depression, and 30 and higher scores indicate severe depression.

Analyzing the Beck Depression Inventory showed its internal consistency coefficient to be between 0.73 and 0.93 with an average of 0.86. Obtained through test-retest method based on interval times and the type of statistical population, the validity coefficients were between 0.48 and 0.86. Based on Beck's and Brown's reports, the internal consistency of this tool ranges from 0.73 to 0.92 with an average of 0.86 [14].

2.2. Beck anxiety inventory (BAI)

BAI is a self-report questionnaire designed to measure the level of anxiety in adolescents and adults [15]. In this tool, already translated into Persian, 0 to 7 indicate no or minimal anxiety, 8 to 15 represent mild anxiety, 16 to 25 suggest moderate anxiety, and 26 to 63 reveal severe anxiety [16]. This questionnaire features a high reliability, its internal consistency coefficient (Cronbach's alpha) is 0.92, its reliability obtained via test-retest method with a one-week interval is 0.75, and the correlation of its questions ranges from 0.3 to 0.76. According to studies performed outside Iran, five types of content validity, concurrent validity, simple validity, diagnostic validity, and factor validity have been measured for BAI, all demonstrating its high effectiveness in measuring anxiety [17], clinical use, health policy assessment, and public population studies.

2.3. Quality of life questionnaire SF-36

SF-36 was designed by Ware and Sherbourne in the United States in 1992. Its validity and reliability have been explored on various groups of patients. Concepts assessed by SF-36 are not limited to specific ages, groups, or diseases. Its objective is to evaluate both physical and mental health by combining the scores of 8 areas comprising one's health. SF-36 has 36 questions assessing physical activities (10), playing one's physical role (4), bodily pain (2), general health (5), fatigue or vitality (4), social performance (2), playing one's emotional role (3), and mental health (5). These are as determine individuals' quality of life (phrase no. 2 is not included in any

of the sub-scales and is just added to the total score).

The lowest score in SF-36 is 0 and the highest is 100. The scores for each scale vary from 0 to 100, where zero reports the worst and 100 the best status in the scale. The score of each dimension is determined by the score of its dimension [11]. According to Field and Ramos, the internal consistency of *SF-36* is high and its Cronbach's alpha is between 0.7 and 0.94 [18]. Moreover, the reliability and validity of its Persian version have been verified in Iran by Montazeri et al [19].

Its reliability was evaluated via analyzing its internal consistency, and its validity was assessed through known-groups comparison as well as convergent validity test. It was shown that except for the vitality scale ($\alpha = 0.65$), other scales of the Persian version of SF-36 have the minimum coefficients of reliability standard, ranging between 0.77 to 0.9.

Known-groups comparison indicated that the Persian version of SF-36 is able to differentiate population subgroups in terms of gender and age.

The convergent validity test, aimed at investigating the measurement hypotheses by the correlation of each question with the hypothesized scale, also yielded favorable results. Here, all correlation coefficients exceeded the recommended value of 0.4 (the range of coefficient changes is 0.58 to 0.95).

Moreover, factor analysis provided two main components which justify a 65.9% dispersion among the scales of SF-36. Overall, the results showed that the Persian version of SF-36 enjoys a great reliability and validity in measuring the health-related quality of life [19].

3. Results and discussion

The present study consisted of 134 participants including 120 females (89.6%) and 14 males (10.4%) with an average age of 33.5 ±7.4. Table 1 indicates the results associated with demographic variables and some of the research variables in the two groups.

Table 1- The results of demographic variables and some of the research variables in the overweight and obese groups

BMI	Total	Overweight	Obese	p-value
Demographic variables	**Frequency (percent)**	**Frequency (percent)**	**Frequency (percent)**	
Sex				
Female	120 (89.6)	44 (89.8)	76 (89.41)	0.826
Education				
Elementary and lower	16 (11.9)	2 (4.1)	14 (16.47)	0.098
Diploma	64 (47.8)	19 (38.8)	45 (52.9)	
Associate Degree	11 (8.2)	6 (12.2)	5 (5.9)	
Bachelor	33 (24.6)	17 (34.7)	16 (18.82)	
Master's degree and higher	10 (7.5)	5 (10.2)	5 (5.9)	
Occupation				
Unemployed	80 (59.7)	27 (55.1)	53 (62.35)	0.385
Employed	33 (24.6)	16 (32.7)	17 (20)	
Self-employed	13 (9.7)	2 (4.1)	11 (12.94)	
Other	8 (6.0)	4 (8)	4 (4.7)	
Location				
City	110 (82.1)	42 (85.7)	68 (80)	0.120

Diet History

Had	72 (53.7)	31 (63.3)	41 (48.2)	0.240
Total	134 (100.0)	49 (100.0)	85 (100.0)	

Chi-square test was used to measure the difference between these two groups in terms of demographic variables as well as diet history. As observed in Table 1, the significance level is over 0.05, meaning that there has been no significant difference between the overweight and obese groups in terms of demographic variables as well as diet history.

The descriptive and inferential results related to anxiety and depression scores have been provided in Table 2. Over 70% of the subjects in the overweight group had mild anxiety and, hence, no complication. In the subjects with 30≤BMI, the highest frequency percentage was related to mild and moderate anxiety. Also, with regard to depression, the highest frequency percentage in both overweight and obese groups was associated with those who had no complication. Here, 30.6% of overweight subjects and 27.07% of obese ones had moderate or severe depression. The frequency percentage of those who had severe anxiety was 8.23 in the obese group and 6.1 in the overweight group.

Furthermore, the independent t-test was used to compare anxiety scores in the two groups. The results suggested a significant difference in this regard (p = 0.038). Here, the average score of anxiety in obese patients was higher than in overweight patients. However, the results of the independent t-test demonstrated that the depression scores of the two groups do not differ significantly (p = 0.582). Even so, the average score of depression in the overweight group was higher than that in the obese group.

Moreover, the independent t-test was used to compare the quality-of-life score and its sub-components in both overweight and obese groups. It was revealed that the quality of life of the two groups differs significantly (p = 0.037). Among the sub-components of quality of life, physical function and general health, with the significance levels of <0.001 and 0.024 had a significant difference in the two groups such that overweight subjects had better physical function and general health compared to their obese counterparts.

Table 2- The descriptive and inferential results of anxiety and depression scores in the study groups

BMI	Overweight (mean ±SD)	Obese (mean ±SD)	p-value
Anxiety	11.06 ± 7.465	13.33± 8.74	0.038
City	10.48±7.48	13.49±9.21	0.139
Village	14.87±6.80	12.71±6.76	
Had a diet	9.33±11.17	10.03±14.32	0.174
Did not have a diet	11.00±6.3	7.08±12.27	
Depression	11.94 ±9.09	12.81±8.68	0.582
City	11.83±9.16	12.56±8.81	0.612
Village	12.57±9.30	13.82±8.28	
Had a diet	9.44± 9.63	13.52± 9.54	0.561
Did not have a diet	13.39± 8.58	12.05± 7.68	
Quality of life	68.92±16.05	63.60±17.89	0.037
City	68.12±16.34	65.34±18.13	0.046
Village	73.71±14.24	56.65±15.46	
Had a diet	11.17± 9.33	14.32± 10.03	0.174

Did not have a diet	11.00±6.3	12.27± 7.08	
Sub-scales of quality of life		
Physical function	82.24±16.71	68.82±23.89	<000.0
Role limitation for physical reasons	75.00±27.95	69.41±37.08	0.362
Physical pain	70.63±17.41	66.47±21.27	0.247
General health	62.04±15.99	54.75±18.73	0.024
Vitality	63.88±16.34	58.53±18.66	0.097
Social performance	76.00±19.33	71.35±23.00	0.235
Role limitation for emotional reasons	57.10±41.99	56.47±44.23	0.861
Mental health	64.41±20.12	60.89±18.80	0.312

The results of the present study confirm the relationship between obesity and anxiety so that obese people have a higher average score of anxiety compared to those with overweight. Also, in regard to depression, the findings indicated that there was no significant difference between overweight and obese groups such that their frequency distribution was very close in terms of depression score. However, the average score of depression was higher in obese people than overweight subjects. These results are in line with those reported by Kasen et al. [20], Pinna et al. [21], Matos et al. [22], Andersonet al. [23], Askari et al. [12], Kress et al. [13], and Ohayon et al. [24].

For example, in research conducted by Anderson et al.in New York between 1983 and 2003, the relationship between anxiety and depression disorders as well as gaining weight was explored from childhood to adulthood. The results of examining 820 patients (403 females and 417 males) who were between 9 and 18 years old at the outset of the study and were studied until they were 28 to 40 years old revealed that 310 (119 males and 191 females) suffered from anxiety disorders and 148 (50 males and 191 females) developed depression. Further, women with anxiety disorders had a significantly higher BMI than those of the same age and status who had not experienced these problems.

In Anderson's study, as in the current research and other above-mentioned studies, BMI was adopted to assess obesity, and as in two other studies [20,21], face-to-face interview was used according to the diagnostic criteria of DSM-4 to investigate anxiety and depression. However, in the present work, the Beck Anxiety Inventory was chosen to evaluate anxiety.

In a study by Matos et al. [22], the State-*Trait* Anxiety Inventory *(*State-State, State-Trait) was utilized to assess anxiety status of the participants. Clearly, using a different measurement instrument can yield more accurate information about the relationship between obesity and anxiety.

In most studies that examine the relationship between obesity and anxiety, despite the variety of measurement tools, the results were compatible, as they are with those of the current study. This finding can be explained by noting that changes in social norms, people's devotion to fashion, excessive attention to being slim, and social stigma towards obesity may lead to negative emotions and anxiety in obese people. Furthermore, knowing the effects of obesity on one's physical health can probably give rise to stress and anxiety.

On the other hand, Stice et al. [25] observed that there is a complex relationship between eating behaviours and negative emotions. Their research suggest that eating distracts people from negative emotions and any type of disturbance. In fact, eating is more a kind of coping style for overweight people. This prompts a defective cycle which intensifies obesity.

On the other hand, this finding is not consistent with some studies. For instance, in 2013, Vafaie et al. [26] explored the level of anxiety, stress, and depression and their correlation with BMI in 300 nursing students in Tehran. They concluded that the majority of these subjects suffered from no mood and weight disorders and that there was no significant relationship between BMI and the states of anxiety and depression. In this study, the standard DASS-21 scale was used to determine the level of anxiety. Thus, the dissimilarity in conclusions can be due to different measurement tools. Also, in that study, most subjects in the sample had normal weight and the obese individuals formed a minority, a fact that reduces the effect of obesity and overweight on individuals' emotions and moods. Indeed, in this research, those with normal weight and higher level of fitness who were probably less anxious undermined both the negative relationship between obesity and anxiety and the significant relationship between BMI and anxiety.

In 2013, Askari et al. [12] carried out a study aimed at investigating the correlation between depression and obesity. They examined a sample of 400 people aged between16 and 50 who had referred to a health centre in the city of Yazd, Central Iran. The sample consisted of 200 obese individuals with a BMI of over 30 and 200 people with normal weight. In this study, as in the present research, the Beck Depression Inventory was adopted to determine the level of depression and it was found that obesity had no significant impact on depression. However, in general, the average depression score in obese subjects was higher than those with normal weight.

Also, Anderson et al. [23] in a study carried out in New York in 2007 found that obese teen age girls are at a high risk of major depression and anxiety disorders. Nevertheless, in a study on the relationship between obesity and mental disorders, Hatch et al. [24] observed that obesity does not increase the risk of mental disorders and it is not associated with the decreased feeling of well-being. The results also showed that obesity is not a valid indicator for the fall in the quality of life.

Another research by Pimenta et al. [27], aimed at exploring the correlation between disorder in one's body image and depression, indicated that there is no significant relationship between impaired body image and depression. The reason for such inconsistent findings may be due to different tools used to measure data. For example, in a study by Kazen and Pina, face-to-face interviewing based on DSM-4 diagnostic criteria was adopted to evaluate depression, where as we used the Beck Depression Inventory for that purpose.

Another factor leading to incompatibility between the results can be the unique study population analysed in each case. In the current research, most subjects were housewives who are less likely to be present in the society; hence, they are judged less based on their appearance. On the other hand, in western societies with freer clothing styles, obese people are more likely to be negatively viewed and, therefore, obesity is more related to depression compared to societies with hijab. Also, in the present study, the subjects were selected among those who had referred to a health center to treat their overweight and obesity. Indeed, these people had a motivation to become slim and they were less likely to have depression. On the contrary, in Swagger's study, the sample was selected from high school teens; and in Simon's study, it was chosen from the general population who did not belong to a specific organization.

Other findings of the present research suggest that there is a significant negative correlation between the total score of quality of life and BMI. In other words, as BMI increases, the overall score of quality of life diminishes. In general, the scores of all 8 sub-components of quality of life shrink with an increase in BMI. These sub-components include physical function, general health, bodily pain, limitation in playing one's

role due to physical health problems, emotional problems, social performance, vitality, and mental health. Additionally, two dimensions of physical function and general health were significantly correlated with BMI. Thus, it can be deduced that obesity and overweight have the most negative effects on these two dimensions of life. This finding is consistent with those of many studies such as the one carried out by Yackobovitch-Gavan et al. [28]. They believed that following a weight loss period, a significant increase in the health-related quality of life emerges in many patients. This finding confirms the report by Amiri et al. [29] that suggested depression and the quality of life significantly differ between obese women with diverse levels of BMI and normal women.

Ghorbani et al. [30] found that obese females, compared to those with normal weight, have significantly lower scores in six aspects of quality of life: physical function, limitation in playing one's professional role, bodily pain, conceptual health, vitality, and social function.

Obese people typically experience low levels of physical and mental health, specifically poor degrees of physical and social well-being.

Explaining this suggestion, one can first mention the negative effects of overweight and obesity on physical function. As various studies have reported, obesity is associated with other disabling physical complications such as high blood pressure, cardiovascular disease, stroke, diabetes, and various types of cancer [31]. The possibility of comorbidity, particularly in people with higher BMI, can have a profound negative impact on physical functions such as physical activity, sexual functions, and social mobility in social situations. As a result, quality of life deteriorates due to problems in one's physical limitations.

One of the limitations of the current study concerns the use of simple sampling, which restricts the generalizability of its findings. Also, due to the nature of this research, the effect of obesity on anxiety, depression, and quality of life

is not quite clear. Indeed, the role of mediator psychological variables such as bodily image that obese women have has not been taken into account. Therefore, it is suggested that prospective studies with larger samples be developed to investigate the effect of these latter variables in obesity.

4. Conclusion

Obesity, besides having extensive physical outcomes, entails significant mental complications that augment the suffering of the affected individuals and result in a lower quality of life. Hence, taking preventive measures against obesity is the first step in combatting behavioral problems. Furthermore, considering the mental problems of obese people, commonly appearing as exacerbating complications or concurrent disorders, can play a prominent role in identifying obesity's associated factors.

5. Conflict of interest

Authors declare that they have no conflict of interests.

6. Acknowledgments

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