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Comparing trait-state anxiety as well as positive and negative affect among obese and normal women (Ahvaz city, Iran, 2017)

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Abstract

Background: Obesity leads to a wide range of problems. Hence, this research was conducted to compare the trait-state anxiety as well as positive and negative affect in obese and normal women.

Materials and Methods: This descriptive study was performed in eight sports clubs within the time period of 2017 to 2018 in Ahvaz. To do this, a sample of 200 women, who referred to sports clubs was selected by the convenience sampling method. The tools included the positive and negative affect scale and the Spielberg's state-trait anxiety inventory. The data were analyzed using SPSS (Version 23), the multivariate analysis of covariance (MANCOVA), and the Pearson's correlation coefficient.

Results: According to the results, the multivariate analysis of variance at the level of $P<0.001$ showed that there was a significant difference between the mean scores of the obese and normal women. The difference was in terms of trait anxiety (normal, 39.27±9.23; obese, 46.73±8.73), state anxiety (normal, 38.20±8.62; obese, 47.07±8.01), positive affect (normal, 42.15±6.12; obese, 38.40±7.69), and negative affect (normal, 23.35±5.98; obese, 30.12±7.04).

Conclusion: In this study, the data analysis showed that negative affect and positive affect were different in the two groups. Moreover, the obese women had a higher negative attitude than the normal women. In addition, the results demonstrated that trait-state anxiety was different in obese and normal individuals. Our results indicate that obese people are more anxious than normal people.

Keywords: Obesity, Emotions, Anxiety, Affect, Women, Depression.

Introduction

Obesity is currently considered as a public health predicament worldwide. Between 15% and 20% of adults in Europe are obese, and 64% of the adults in the United States are estimated to be overweight or obese (1). In addition to biological factors, cultural factors, such as knowledge, attitude, and dietary habits can play an important role in the development of obesity (2). Obesity is associated with an increased risk of chronic diseases, most of which being connected with depression (3). Extremely obese people are regarded irresponsible and mentally weak. This may lead to major effects on the quality of their life, such as lower self-esteem and less participation in social and sports activities (4, 5). Overweight and obese adolescents believe that they have a poorer health than normal adolescents (6). In addition, obese people are more likely to experience depression than normal people (7, 8). Individuals who suffer from both obesity and common mental health disorders may also face particular risks to their health and well-being, since these conditions may intensify each other (9).

In a study conducted by Cserjesi et al., it was proved that the role of negative emotional states, such as anxiety and depression as mediating variables in

weak and executive functions could reduce the capacity of executive functions in obese people (10). Most demographic studies have concluded that the risk of major depression and anxiety disorders increases with an increase in the body mass. Obese or overweight women experience a higher rate of depression, anxiety disorders, social phobia, and specific panics than the women of normal weight (11). Obese or overweight women have social anxieties and the tendency to feel apprehensive about having one's body evaluated negatively by critical observers in social settings (12). Crockett et al. reported that the susceptibility to the state of feeling bored and the difficulty in emotion regulation led to inappropriate eating behaviors, including overeating in response to boredom along with other negative emotions and external cues (13). Harney et al. reported that the levels of depression and anxiety were lower in the partially recovered group than the group with active eating disorders (14).

Apart from physiological problems, obesity leads to psychological consequences, such as anxiety and depression (15, 16). Although several studies have investigated obese people's anxiety and depression (12, 13, 14), few studies have focused on these emotions in obese women. However, the effects of affection is not well understood in the overweight or obese population. Thus, it is necessary to understand the possible relationship between emotions and obesity, especially in obese adults who try to lose weight. In this research, we attempted to compare obese and normal women in terms of positive and negative affect as well as state-trait anxiety. It is evident that obese women are more likely to suffer from the higher levels of anxiety and depression than women of normal weight (17, 18). This study was conducted to compare anxiety and depressed moods between obese women and women of normal weight.

Materials and Methods

This was a descriptive study conducted on all women exercising at sports clubs in Ahvaz city in the time period of 2017 to 2018. The convenience sampling method was used to select the subjects, so with the consent and collaboration of eight sports clubs, 25 subjects were selected from each club. Hence, 200 women were selected as the study population. The inclusion criteria of the research were obese and normal women aged 18 to 48 who had referred to sports clubs of Ahvaz city. In fact, the two groups were similar in terms of age. In this study, some characteristics, including marital status, education, and occupation were recorded. According to the minimum sample size in the descriptive research, 100 individuals were selected for each group to increase the credibility of the investigation and 25 individuals for each variable to improve its normality (19). In addition, the researchers did not consider any criteria for the existing research, except the satisfaction of the subjects. The authors guaranteed the confidentiality of all information obtained in this research. The researchers presented necessary explanations to the participants. In addition, they recorded the participants' height and weight to calculate their body mass index. The data were analyzed by software after completing and collecting the questionnaires.

The body mass index (BMI) was calculated using the formula of weight (kg)/height2 (m2). A BMI of 25.0 kg/m2 or more is overweight, while the healthy weight is within the range of 18.5 to 24.9 kg/m2. BMI applies to most adults 18 to 65 years old (20).

To measure trait anxiety, the participants completed the State-Trait Anxiety Scale (STAI) (21) at the baseline. This particular instrument was used to simplify the distinction between state anxiety and trait anxiety as well as the feelings of anxiety and depression. The STAI included 40 questions taking approximately 10-20 minutes for completion, with the test administered in tens of different languages worldwide. The test was split into the S-Anxiety scale and the T-Anxiety scale, with each having 20 items. The test questions were answered based on a 1-4 scale, with the focused areas including worry, tension, apprehension, and nervousness. The numbers 20-19-16-15-11-10-8-5-2-1 and 39-36-34-33-30-27-26-23-21 were reverse questions in the S-Anxiety scale and in the T-Anxiety scale, respectively. Low scores, medium scores, and high scores indicated a mild, a moderate, and a severe form of anxiety, respectively. Both scales had anxiety-absent and anxiety-present questions (21). Anxiety-absent questions implied the absence of anxiety in a statement like, "I feel secure", yet anxiety-present questions implied the presence of anxiety in a statement like "I feel worried." More STAI examples of anxiety-absent and anxiety-present questions are listed below. Each measure had a different rating scale. The 4-point scale for S-anxiety included the scores of 1 indicating not at all (30-20), 2 indicating somewhat (42-31), 3 indicating moderately so (53-43), and 4 indicating very much so (54 and more). The 4-point scale for T-anxiety also included the scores of 1 implying almost never, 2 implying sometimes (35-45), 3 implying often (46-56), and 4 implying almost always (57 and more). The trait subscale of the STAI demonstrated the excellent reliability of the study, i.e. α=.90 (20, 22). In Iran, Panahi Shahri recognized the internal consistency of this questionnaire using the

Cronbach alpha method (23). In this sample, Cronbach's alpha was 0.85 and 0.77.

The Positive and Negative Affect Schedule (PANAS) is a self-report questionnaire consisted of two 10-item scales to measure both positive and negative affect. Each item is rated on a 5-point scale of 1 (not at all) to 5 (very much). This measurement is mainly used as a research tool in group studies, yet it can be utilized by clinical and non-clinical populations as well. Shortened, elongated, and children's versions of PANAS have been developed, taking approximately 5–10 minutes to complete. The overall score range for each point is from 10 to 50. Clinical and non-clinical studies have considered PANAS as a reliable and valid instrument in the assessment of positive and negative affect (24).

Low PA scores reflect "sadness and lethargy", yet high PA scores reflect "high energy, full concentration, and pleasurable engagement" (24). Low NA scores describe "a state of calmness and serenity", whereas high NA scores imply "subjective distress and unpleasable engagement". Positive affect questions included items 1, 3, 5, 9, 10, 12, 14, 16, 17, and 19, whereas negative affect questions included items 2, 4, 6, 7, 8, 11, 13, 15, 18, and 20. Regarding negative scores, a lower score indicated a less negative affection. The internal consistency coefficients were positively affective at 0.088 and negatively affective at 0.87. The test-retest design with an 8-week interval for the positive emotion was 0.068 and 0.071 for the negative affect. These two emotions were independent of each other (24). In Iran, Mohammadzadeh and Jomehri-Kohneshahri confirmed the two-factor structure of the positive and negative affect list. Cronbach's alpha coefficients were calculated for both sub-scales of 0.87 (25). In this sample, the high internal consistency was found for PA and NA as Cronbach's alpha at 0.75 and 0.78, respectively.

After data collection, the data were analyzed using descriptive statistics. The multivariate analysis of variance (MANOVA) was used for the hypotheses 1 to 4, and to compare the demographic variables, the chi-square test was used. Moreover, the Levin–Box (L-B) test was used to ensure the normal data distribution. Furthermore, a significance level of 0.05 was considered.

Results

According to table1, from among all participants in the study, 97 (50%) and 97 (50%) of the individuals were obese and normal, respectively. Besides, 19.6% and 77.3% of the subjects were married and single, respectively. In addition, 16.5% and 15.5% of the normal and obese participants were occupied, respectively.

Additionally, 16.5% and 0.32% of normal and obese women were undereducated, respectively. Likewise, 0.33% of normal women and 38.1% of obese women had high school diplomas. Besides, 30.9% of normal women and 16.5% of obese women had undergraduate degrees; in addition, 3.1% of the normal women and 1.2% of the obese women had graduate degrees. The majority of obese and normal women had high school diplomas.

Table 1: The participants' demographic information in Ahvaz City, 2017

Variable	Group	Normal		Obese		Chi-square test	
		Percentage	Frequency	Percentage	Frequency	χ^2	P-value
Number	**Female**	50	97	50	97	0	1
Degree	**Undergraduate degree**	5.16	16	0.32	31	0.478	0.029
	High school diploma	0.33	32	1.38	37	0.36	0.547
	Associate degree	5.16	16	3.11	11	0.92	0.336
	Bachelor's degree	9.30	30	5.16	16	4.26	0.039
	Master's degree	1.3	3	1.2	2	0.20	0.655
Job status	**Employee**	5.16	16	15.5	5	5.76	0.016
	Free	8.27	27	6.20	20	1.04	0.307
	Housewife	7.55	54	2.74	72	2.57	0.109
A History of obesity	**Have a history of obesity**	3.44	43	5.82	80	11.13	0.001
	No history of obesity	7.55	54	5.17	17	19.28	0.001
A history of diabetes	**Have a history of diabetes**	21.6	21	61.9	61	19.51	0.001
	No history of diabetes	78.4	76	37.1	36	14.28	0.001

Regarding the obesity background of the participants, 44.3% of the normal women and 82.5% of the obese women had a family history of obesity; in contrast, 55.7% of the normal women and 17.5% of the obese women did not have a history of familial obesity. According to the results of the current study, the obesity rate of the family of obese women was twice more than that of the normal women. The results showed that 62.9% of the obese women had a family history of diabetes, yet 78.4% of the normal women did not have such a history.

Table 2 shows the BMI correlation between the affect status, and state-trait anxiety among women. The results of this table indicate that there is a significant positive correlation between BMI and negative affect among women (p<0.001). It means that an increase in one of the variables will be followed by an increase in other variables, and vice versa.

Table 2: **The Pearson's correlation that implies the relationship between BMI, affects status, and state/trait anxiety in Ahvaz City, 2017**

Variable	Negative affect	Positive affect	Trait anxiety	State anxiety
BMI	0.33**	-0.18*	0.27**	0.36**
Negative affect		-0.69**	0.65**	0.68**
Positive affect			-0.61**	-0.65**
Trait anxiety				0.72**

*The correlation is significant at the 0.05 level (2-tailed)
**The correlation is significant at the 0.01 level (2-tailed)

Before examining the results of the hypotheses, the presumptions of the multivariate analysis of variance, namely, Box and Levine tests were examined. Due to the lack of significance of the Box test (p=0.001) and the Levin's test concerning state anxiety (p=0.001), trait anxiety (p=0.001), negative affect (p=0.001), and positive affect (p=0.001), the homogeneity of co-variance in MANOVA and equality among group variances were established. Therefore, it was possible to report the results of the multivariate analysis of variance.

The multivariate test table displays the four tests of significance for each model effect. Like univariate tests, the "ratio" of the hypothesis SSCP matrix to the error matrix was used to evaluate the intended effects. More specifically, the eigenvalues of the test matrix were defined by the matrix product of the appropriate hypothesis of the SSCP matrix; in the same vein, the inverse of the error SSCP matrix was used to compute the statistics in the multivariate test table.

The Pillai's trace is a positive-valued statistic. An increase in the values of the statistic indicates that the effects contributed more to the model.

Wilks' Lambda is a positive-valued statistic within the range of 0 to 1. A decrease in the values of the statistic indicates the effects contributed more to the model.

The Hotelling's trace is the sum of the eigenvalues of the test matrix. It is a positive value statistic and an increase in its values indicates the effects contributed more to the model. The Hotelling's trace is always larger than the Pillai's trace, but when the eigenvalues of the test matrix are small, these two statistics are nearly equal. This indicates that the effect may not contribute much to the model.

The Roy's largest root is the largest eigenvalue of the test matrix. Thus, it is a positive-valued statistic for which an increase in its values indicates the effects that contribute more to the model. The Roy's largest root is always smaller than or equal to the Hotelling's trace. When these two statistics are equal, the effect is mostly associated with one of the dependent variables, there is a strong correlation among the dependent variables, or the effect does not contribute much to the model.

As Table 3 demonstrates, the difference between the two groups is significant (P <0.001), according to the dependent variables, with the difference (Eta) being 28%.

Table 3: Results of the multivariate analysis of variance (MANOVA) for research variables in Ahvaz City, 2017

Presumptions	Size	F	Df hypothesis	Df error	Eta	P-Value
Pillai's trace	0.28	18.34	4	189	0.28	< 0.001
Wilk's Lambda	0.72	18.34	4	189	0.28	< 0.001
Hotelling's trace	0.38	18.34	4	189	0.28	< 0.001
Roy's greatest root	0.38	18.34	4	189	0.28	< 0.001

First hypothesis: There is a significant difference between obese and normal women in terms of negative and positive affect. As Table 4 shows, the hypothesis is significant (P<0.001). In other words, negative affect and positive affect are different in both groups. Moreover, obese women have a greater negative attitude than the normal women do. Therefore, the research hypothesis is confirmed.

Table 4: The results of the multivariate analysis of variance (MANOVA) for comparing obese and normal women in terms of negative and positive affect in Ahvaz City, 2017

Variable	Group	Mean ± SD	Mean squares	Effect size	P-value	F
Negative affect	**Normal women**	23.53 ± 5.98	2104.74	0.20	< 0.001	49.25
	Obese women	30.12 ± 7.04				
Positive affect	**Normal women**	42 .15 ± 6.12	682.96	0.07	< 0.001	14.12
	Obese women	38.40 ± 7.69				

Second hypothesis: There is a significant difference between obese and normal women in terms of state-trait anxiety.

As Table 5 shows, this hypothesis is significant (P<0.001). In other words, state anxiety and trait anxiety are different in both groups. Moreover, the obese women show a higher level of anxiety than the normal women do. Therefore, this research hypothesis is confirmed.

Table 5: The multivariate analysis of variance (MANOVA) to compare obese and normal women in terms of state-trait anxiety in Ahvaz City, 2017

Variable	Group	Mean ± SD	Mean squares	Effect size	P-value	F
State anxiety	**Normal women**	38.20 ± 8.62	38124.37	0.22	< 0.001	55.00
	Obese women	47.07 ± 8.01				
Trait anxiety	**Normal women**	39.27 ± 9.23	2694.47	0.15	< 0.001	33.48
	Obese women	46.73 ± 8.73				

Discussion

The purpose of this study was to compare obese and normal women in terms of trait-state anxiety as well as positive and negative affect. Considering the variable of negative affect, the results showed that obese women had a higher negative attitude than the normal women did.

The results of this study confirmed the findings of the studies by Dingemans et al. (26), Hong & Hur (27), and Machat (28). The authors concluded that negative and unhealthy emotions could play a crucial role in emotional eating, thereby contributing to the initialization of mechanisms in morbid obesity.

In a study conducted by Cserjesi et al., the role of the negative emotional state, including anxiety and depression was confirmed as a mediating factor in weak and executive functions. Hence, depression can reduce obese people's capacity of executive functions (10). Pinaquy et al. reported that obese women who would not express their feelings easily tended to respond to their emotions by overeating, especially women of negative affect (29).

A study conducted by Dakanalis et al. Verified that negative emotions associated with the body shape or appearance influenced the development of binge eating (30). Despite the large volume of the literature, few reviews have reported bivariate correlations between the factors of negative emotions and obesity (31). In explaining this finding, one can say when obese people are compared in social aspects and with self-depersonalized images of self-reprobate, they express negative emotions, such as anger, sadness, anxiety, and depression; hence, the stereotype of self-acceptance makes weight gain create a negative mood in obese people (32). Blaine reported that depressed female adolescents had a higher risk of being overweight by overeating in order to eliminate negative emotions (33).

In addition, the results of the current study suggest that the obese women have a less positive mood than the normal women do. This finding is consistent with the studies conducted by khodapanah et al. (34) and Cserjesi et al. (10).

To explain this finding, research shows that weight stigma is consistently associated with medication non-adherence, mental health, anxiety, perceived stress, antisocial behavior, substance use, coping strategies, and social support. Such factors undermine positive affect and disrupt mental health (35).

The results of the hypothesis testing indicated that obese women had a higher level of anxiety than the normal women did. In a study (36, 37), the authors reported that the mean scores of obese and overweight people in terms of isolation, anxiety, and depression were higher than those of the individuals of normal weight. In this regard, Assar Kashani et al. reported lower self-confidence in obese and overweight individuals in their research (38).

In general, a significant decrease is expected in the self-confidence of the subjects with low state anxiety. The findings of this study are in line with the ones conducted by Namakin et al. (36) and Harding et al. (39). To explain about this state, it is implied that individuals faced with an enlarged body due to obesity lose their confidence in performing social activities. Hence, the resulting isolation and withdrawal from the society lead to the low quality of their life. It can also be stated that the poor quality

of health and personal lifestyle, as the sources of stress, can lead to the prevalence of obesity (40).

Individual anxiety appears to correlate positively with an increase in the body mass, psychosocial stress, including both perceived stress, and life events stress, being positively associated with weight gain, but not with weight loss. Such associations are varied according to age, smoking, obesity, and the multiple sources of stress (39). The results of the study by Namakin et al. have also shown that anxiety and depression have a significant correlation with the abnormality in the body mass index, with this abnormality leading to depression and anxiety in adolescents (36).

In the same vein, Hong & Hur presented the following reasons to explain why the depression rate could be higher among relatively obese individuals. As they put it, firstly, individuals with depression demonstrate either reduced or increased appetite. In obese women, depression increases appetite by causing the brain to release an excessive amount of the stress hormone, cortisol, compared with normal women. Due to associated physical, psychological, and economic problems, understanding the relationship between obesity and emotion is taking on added importance, as they are both prominent public health issues (27).

One of the most important limitations of this study was that apart from the creation of negative emotions, other problems of the participants effective in mood disorders, anxiety, and depression, including close relatives, divorces, and infertility were uncontrollable in this research. In addition, the variable of age was considered in this study as an interventional variable, yet almost half of the participants did not mention their age; as a result, this variable was excluded, creating another limitation for the study. It is suggested that future research on obesity take cultural, ethnically, and socio-economical perspectives of people into account. Besides, longitudinal studies are required to determine the assessment of the risks associated with weight changes in normal weight, overweight, and obese people.

Conclusion

In this study, the data analysis showed that higher trait anxiety in women was associated with a higher body mass index. Negative affect and positive affect were also shown to be different in both groups. Moreover, it was demonstrated that obese women had a higher negative attitude than normal women did. Moreover, the results demonstrated that trait anxiety and state anxiety were different in obese and normal individuals. Since obesity as a phenomenon is linked directly to medical, psychological, and social problems, studying it requires a multidisciplinary approach. Therefore, the implementation of preventive programs and the promotion of the lifestyles that prevent obesity are considered as protective factors.

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