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The Relation of Anxiety, Depression, and Happiness with Binge Eating Disorder among Binge Eating Applicants of Weight-Loss

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ABSTRACT

Background: This descriptive study sought to assess the relation of anxiety, depression, and happiness with binge eating disorders (BED) among overweight and obese individuals. **Methods:** To conduct this study, 200 individuals who referred to Nutrition Clinics in Isfahan, were selected randomly. They were asked to complete some questionnaires which were then scored according to Gormally scale. Respondents with scores of 17 and higher were selected as BED and entered the study. Final sample size consisted of 120 participants (28 men and 92 women). The management tools were Gormally et al.'s, the Oxford Happiness, Beck Depression Inventory, and the Kettel anxiety questionnaires. **Results:** Statistical assessment consisted of descriptive statistics, pearson correlation coefficient, multiple regressions, and Fisher's Z test. Results showed that BED had significant and linear correlations with depression (r = 0.51), happiness (r = 0.27), and anxiety (r = 0.24) (all $P < 0.01$). Depression as the only included factor for analysis explained 25% of the analysis variance. Although, BED had a positive correlation with depression, anxiety, and happiness among men ($P < 0.05$) and women ($P < 0.01$), it did not have any association with either of the three mentioned factors (Z = 0.50, Z = -1.15, and Z = 0.62, respectively). It was shown that depression, anxiety, and absence of happiness had important roles in the process of weight reduction among applicants of weight loss. **Conclusions:** Anxiety and depression lead to over-eating and over-eating inturn reinforces both depression and anxiety.

Keywords: *Binge eating disorder; Happiness; Anxiety; Depression*

Introduction

Eating disorders (ED) are nutritional and mental disorders that cause negative disturbances to a person's eating behaviors (Gaetani *et al.*, 2016); obsession with body weight, food habits, and eating behavior are common in ED. These illnesses could develop over time and lead to many side effects including malnutrition, osteoporosis, amenorrhea, anxiety, and depression which all may cause Bulimia nervosa, Anorexia nervosa, or Binge eating disorders (BED) unless ED symptoms get

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diagnosed and treated in the right time (Dorard and Khorramian-Pour, 2016).

In BED, people lose control over their eating and unlike the Bulimia nervosa, there is no purging (misuse of diuretics, laxatives or enemas, self-induced vomiting, excessive physical activity, or fasting) after the periods of BED (Dorard and Khorramian-Pour, 2016); whilst, they often feel ashamed, distressed, or guilty about their eating. In the study by Stunkard et al, it was observed that there were same eating patterns in obese and BED individuals in almost 21% to 51.6% of them (Stunkard, 1959).

In the fifth Diagnosis Statistical Manual of MentalDisorders, BED is defined as a disorder for further investigations which involves EDNOS (Eating Disorder Not Otherwise Specified) (DSM, 2015). BED is the most common eating disorder in the United States with a prevalence of 4% among American people which is 2-6.4% more than the prevalence of Bulimia nervosa. Women are more prevalent to BED than men with a ratio of 3 to 2, respectively. Moreover, the prevalence of behavioral disorders, as the most common disorders among individuals with BED, is 32-91% (Smink *et al.*, 2012).

Overweight and obesity are of serious concerns, since they are followed by many critical co-morbidities including diabetes, hypertension, hyperlipidemia, coronary artery diseases, and different types of cancers. Based on recent studies, obesity and the lowest quality of life are followed by various health considerations and costs (Wang *et al.*, 2013).

Mental trauma and personal disorders are significantly correlated with the intensity of BED. Cluster B personality disorder (dramatic, overly emotional, unpredictable thinking, or behavior which are usually followed by antisocial, borderline, histrionic, and narcissistic personality disorders), predict the presence of BED significantly (Berenbaum *et al.*, 2008).

Obesity is not necessarily the symptom of BED; in fact, BED can occur in overweight or even normal weight individuals; people with BED are usually embarrassed and expressextreme un-satisfaction with their weights. Gluck et al. conducted a study on obese individuals and reported that stress was the first stimulator for their over-eating; some researches on the biological functions of the brain showed that serotonin, endorphin, and dopamine are the most important factors in BED periods (Gluck, 2006).

Absence of self-confidence, internalizing social standards, preoccupations with food, poor body-images, un-satisfaction with body weight, and depression are in common symptoms of mental pathology of BED. In a study by Fairburn and co-workers, it was observed that major predictable factors of BED among women were painful experiences in their childhood such as sexual or physical abuse, family issues including psychiatric disorders of parents, lack of attention, over restrictions, timidity, or childhood obesity (Fairburn *et al.*, 1998).

However, there have been no published articles assessing the relation of BED with anxiety, depression, or happiness; thus, this study aimed to investigate this specific correlation.

Materials and Methods

Study population: The present correlation study was conducted in two stages: in the first phase, 200 participants, who referred to the nutrition clinics for losing their weights were randomly selected in Isfahan, Iran in 2010 – 2011. They were asked to fill the binge eating scale (BES) questionnaire so that patients with BED can be identified from the non-BED individuals. In order to motivate the collaboration among individuals and to keep privacy, their names and personal details were not asked, except for their gender and age. The completed questionnaires were then scored according to Gormally scale (Gormally *et al.*, 1982), individuals with scores of 17 and higher were selected as BED and entered the study. The final sample size consisted of 120 individuals (28 men and 92 women). Finally, participants were asked to fill the following questionnaires: Oxford Happiness, Beck Depression Inventory, and Cattell anxiety scale.

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Binge Eating Scale (BES) Questionnaire: A scale was designed by Gormally et al. to assess the severity of BED among obese persons; the scale consisted of 16 items that each of them had three or four sentences. Participants were asked to select the statement that describes them best. The items were classified from zero to three and thus the total score of BES could vary from zero to 46; scores higher than 17 indicated the present of BED (Gormally *et al.*, 1982).

The English, Portuguese and Italian versions of the mentioned scale are more reliable, sensitive, and specific. Dezhkam et al. examined the psychometric properties of Persian version of BES that showed a test-retest reliability of 0.71, split half of 0.67, Cronbach's alpha coefficient of 0.85, sensitivity of 84.6%, and specificity of 80.8% using a cut point of 17% (Dezhkam M *et al.*, 2009).

Oxford Happiness Questionnaire: Various methods have been applied to measure happiness, including Oxford Happiness Questionnaire as one of the best methods developed by Argyle and Lou. There are 29 items in the final form of Oxford happiness Questionnaire; Argyle et al. conducted an Alpha coefficient of 0.90 with 347 participants while Farnham and Bronig used an Alpha of 0.87 with 101 patients (Argyle M and Lu L, 1990). The questionnaire includes 29 groups of statements expressing different states of depression to exaltation. The statements of each group are scored from zero to three, and the sum of all scores indicates the range of every person's happiness. The reliability and validity of this questionnaire were investigated based on the Cronbach's alpha of 0.93 and split-half reliability of 0.92. In addition, the test-retest reliability of the questionnaire was 0.79 after three weeks (Alipoor and Noorbala, 1999).

Beck Depression Inventory (BDI): The BDI (Beck *et al.*, 1988) is suitable for individuals of 13 years or older with at least pre-school education. This questionnaire is a 21-item depression scale that assesses the emotional, behavioral, and somatic symptoms rated from low to high levels. Researchers have indicated the high validity and reliability of the test (Kumar and Robson, 1984).

Cattell Anxiety Scale Questionnaire (ASQ): The ASQ consists of 40 items with three options, it was prepared by Cattell in 1963 (RB, 1963). Based on extensive researches, this is probably the most effective tool provided as a short questionnaire which can be used for ages of 14-15 years and older in most cultures. Sararoudi reported reliability of the test by calculating the Cronbach's alpha of 0.80; the Cronbach's alpha and split-half methods that have been used to measure the reliability of the scale, were estimated at 0.65 and 0.51, respectively; moreover, the validity of the test was 0.61(Sararoudi *et al.*, 2011).

Data analysis: Stepwise regression analysis and correlation coefficient were used to examine the relationship between binge eating disorder and depression, happiness and anxiety among individuals. Results were considered significant at $P < 0.05$.

Results

The findings show that BED, as a dependent variable had a significant linear relationship with depression, happiness, and anxiety, while no significant relationship was observed between BED and predictor variable of age. The highest and lowest correlations belonged to a positive correlation of BED with either of depression ($r = 0.51$) or anxiety ($r = 0.24$). A negative correlation was also found between BED and happiness ($r = -0.27$).

The stepwise regression analysis (**Table 1**) showed that the model entered depression score in Step 1, and depression could explain 25% of the variance ($R^2 = 0.25$).

Table 2 illustrates the significant "F" in the analysis of variance table along with the amounts of "t". The regression equation for the model are as follows:

BED =15.65 + 0.39 (Depression).

According to the results presented in **Table 3**, all the four predictor variables showed a significant correlation with binge eating disorder among females diagnosed with BED who were candidates for weight loss. The highest significant positive correlation was perceived between depression and

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BED (r = 0.49) while the least significant positive correlation was observed between age and BED in females (r = 0.19); a negative correlation was also found between happiness and BED (r = -0.22).

The results in **Table** 3 indicated a significant correlation among three predictor variables of depression, happiness, and anxiety with binge eating disorder in males with BED. There was a highest significant positive correlation (r = 0.54) between depression and BED. The least significant positive correlation at the level of 0.05 (r = 0.36) was shown between anxiety and BED in males; moreover, a significant negative correlation at the level of 0.01 (r = -0.45) was found between happiness and BED.

Comparing males with females, results indicated that depression, happiness, and anxiety had a significant positive correlation with BED in both groups; however, this relationship was higher in males than females in all three variables.

As it is clear from the results of **Table 4**, Fisher's Z values that were obtained from the correlation difference between depression and BED in males and females were -0.50, -1.15, and -0.62 for depression, happiness, and anxiety, respectively, which were less than the Z score at the level of 0.05 (Z = 1.96). As a result, no significant differences were observed for depression, anxiety, and happiness among males and females with BED.

Table 1. Stepwise regression of binge eating disorder based on predicting variables

Model Variable	R	R^2	ΔR^2	Std. Error
Depression	0.51	0.26	0.25	5.35

Table 2. Stepwise regression coefficient of binge eating disorder based on depression

Model Variable	B	Std. Error	β	t	P-value
Constant	15.65	1.79		8.74	<0.001
Depression	0.39	0.06	0.51	6.44	<0.001

Table 3. Correlation matrix of predicting variables and binge eating disorder in women and men

Sex/ Predicting Variables	Age	Depression	Happiness	Anxiety
Women	0.19[a]	0.42[b]	-0.22[a]	0.23[a]
Men	0.10	0.54[b]	-0.45[b]	0.36[a]

[a]: $P < 0.05$; [b]: $P < 0.01$

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Table 4. Differences between correlation coefficient of Binge Eating Disorder in Men and Women

Variables	Men	Women	Zr_1	Zr_2	Z[a]
Depression	0.49	0.54	0.54	0.65	-0.50
Happiness	-0.22	-0.45	0.22	0.48	-1.15
Anxiety	0.23	0.36	0.24	0.38	-0.62

[a]: z fisher's test was used

Discussion

The present study was conducted for the first time in Iran. The overall aim of this study was to investigate the relationship among depression, anxiety, and happiness with binge eating disorder among individuals diagnosed with BED, who were candidates for weight loss. The results reported considerable anxiety, depression, and unhappiness among people with BED who were candidates for weight loss. BED is characterized by specific features such as shame, guilt, and secrecy; individuals with BED usually try to hide their needs and a small number of them look for treatment or professional help. Thus, recognizing of this disorder in society is complex and difficult (Hoek and van Hoeken, 2003).

In the current survey, a significant relationship was reported between depression and BED. In a research that was conducted among people seeking remedy for BED, binge-eating behavior showed a positive correlation with depression and other psychological disturbances (Mussell *et al.*, 1995). In another investigation, a direct and significant correlation was found among depression, severe negative mood, and increased binge-eating behavior in individuals with BED (Peterson *et al.*, 2005). The outcomes of the present study are inconsistent with a previously published result (Lilenfeld *et al.*, 2008).

As mentioned in the present study, a positive correlation was observed between anxiety and BED in patients with BED. A recent research showed a direct and significant relationship between BED and psychological disturbances, such as anxiety and panic disorder (Bulik *et al.*, 2002). In an investigation performed among female collage-students, the group with BED reported the greatest periods of binge eating in stressful days along with negative mood compared with the control group (Wolff *et al.*, 2000). The results of this study are consistent with those of researches indicating a significant positive correlation between anxiety and BED (Antony *et al.*, 1994, Grilo *et al.*, 2009). While, our results reported a significant inverse relation between BED and happiness, no previous investigations were found on the relationship between happiness with BED. However, the results of a study by Buckholdt et al. on university students showed that emotional dysregulation leads to binge eating and uncontrolled eating behaviors partly due to magnifying sadness shown by parents. The mentioned study indicated a positive correlation between eating disorders and sadness which was in line with our study. This indicates a negative relationship between BED and happiness (Buckholdt *et al.*, 2010).

Accordingly, it can be stated that there are probably concurrent anxiety, depression, and BED in patients with BED. Anxiety and depression increase the binge eating behavior, this in turn leads to enhanced anxiety and depression which reduce the happiness of individuals (Lilenfeld *et al.*, 2008).

The presence of multiple socio-cultural, familial, and biological factors affecting nutritional abnormalities can be effective on the development of depression and anxiety. It is likely that the pressure and suffering caused by the development of an eating disorder can lead to mood abnormalities. As a result, it can be perceived that most of the people have depression, anxiety, or nutritional disorders (Dorard and Khorramian-Pour, 2016). In

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this study, there was no significant relationship between BED and predictor variable of age. However, a significant correlation was observed among the three variables of depression, happiness, and anxiety with BED in both groups and no significant difference was observed among depression, anxiety, and happiness of males and females with BED. The investigations conducted on the topic of BED and eating disorders have been carried out often on females, for example, in a study by Hsu et al. obese women with BED reported more changes in their weights and eating behavior disorders (Hsu *et al.*, 2002) as well as considerable degree of anxiety and depression compared with obese women without BED (Webber, 1994).

Differences in the frequency of eating disorders in males and females could be explained with cultural issues; history showed that different communities have always been more attracted to appearance of women than men, this has made women to have more attention for losingtheir weights or more willing to have diets which all makes them more vulnerable to eating disorders. As a result, BED, anxiety, and depression could simultaneously exist in males and females suffering from BED, in which each of these three disorders would increase or reinforce each other (Mitchell and Mazzeo, 2004).

Larsen et al. conducted a study and compared the levels of BED, emotional eating, and personality traits of dysthymia between men and women, they observed a strong and positive correlation between males and females (Larsen *et al.*). In another study, it was indicated that binge eating and depressive symptoms were significant predictors for unsuccessful self-efficacy levels for losing weight among women than men (Presnell *et al.*, 2008).

Some limitations of our study include the small sample size of the study; much higher sample size could result in better and stronger consequences; furthermore, considering more details of co-morbidities of individuals including endocrine diseases that might affect the appetite or the exact behaviour of participants' eating and involving such criteria as confounding factors in future studies, might establish preferable outcomes.

Conclusions

As it was shown in the present study, anxiety, depression, and unhappiness have fundamental roles in BED. Given the importance of the issue, the lack of adequate investigations in this field in Iran, and since small sample size was the limitation of our study, further researches with larger sample sizes are highjly recommended in this area to obtain more precise results as well as to help people with BED to maintain their weights using related reliable educations and treatments which are specific for psychological disorders.

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Authors' contributions

Haghani M designed the paper and analyzed the data; Safi S conducted the study; Razmpoosh E and Safi S wrote the manuscript; all authors read and approved the final manuscript.

Conflicts of Interest

The authors have no conflict of interests.

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