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ORIGINAL ARTICLE

The Relationship of Emotional Eating Behavior with Stress and Depression In Adults

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Summary. *Aim:* The purpose of this study is to investigate the relationship of emotional eating behavior with stress and depression in adults. *Methods:* This is a descriptive and cross-sectional study. The sample of the study consisted of 384 individuals who satisfied the study's inclusion criteria and volunteered to participate in the study. The data of the study were collected with the method of face to face interview using a personal information form, the Emotional Eating Scale, Ways of Coping Questionnaire and Beck Depression Inventory. *Results:* In the study, the Pearson's correlation analysis revealed a negative correlation between EES and the Effective Coping subscale ($p<0.01$). There was a positive correlation between EES and the Ineffective Coping subscale scores and the total mean score of depression. The predictive power of the linear regression model was calculated as 53%. While the scores for EES were positively correlated with variables such as BMI, ineffective coping methods, Beck Depression Inventory scores, they were negatively correlated with age and effective coping methods levels. *Conclusion:* This study found significant relationships in the positive direction between emotional eating and scores of ineffective coping methods and depression.

Key words: emotional eating behavior, stress, depression

Introduction

Emotional eating is mostly defined as excessive eating as a response to negative events beyond a certain mood and emotion (1). Emotional eating is a situation that negatively affects the life of the individual from many aspects and emerges in relation to several factors. The concept of emotional eating is derived from the psychosomatic theory that asserts that emotional eaters cannot distinguish between hunger and the physiological state associated with negative emotions. Normally, emotions trigger physiological changes that resemble fullness and lead to a loss of appetite. However, individuals who emotionally eat respond to the negative emotions they experience by eating. It was generally observed that negative emotions trigger the emotional eating behavior, and it was hypothesized that such interpretation of intrinsic states may be one of the primary underlying causes of obesity in some individuals (2).

It is assumed that emotional eating is rather the behavior of forming a response to stress situations. It is believed that stress leads to longing for food and excessive eating behaviors (3). Especially high exposure to stress because of natural disasters may affect eating behaviors (4). Studies have determined that depression (5) and stress (6) are associated with emotional eating. A study reported that, among women, perceived stress may be used as a significant method for reducing binge eating and emotional eating (7). In a study on 345 young individuals who did not have regular eating habits, it was concluded that stress leads individuals to show a tendency towards high levels of emotional

eating behaviors by reducing their capacities to form a response to hunger and fullness signals (8).

It was reported that, in depression with atypical characteristics, individuals tend to develop abnormal eating behaviors such as emotional eating, that is, they consume excessive amounts of food as a response to negative emotions. Accordingly, it was reported that these individuals prefer to consume food to cope with stress, anxiety, disappointment, sorrow, and anger (5). Individuals who feeling depressed are normally associated with loss of appetite and subsequent weight loss, but atypical depression is characterized by increased appetite, typical obesity risk and weight gain (8). In relation to depression, it was stated that emotional eating may be a way for producing more positive emotions (9). It was reported that emotional eating is highly prevalent in the adult population and it causes weight gain in time (10). With increased body weight, these eating habits make individuals more prone to the risk of developing diabetes and cardiac diseases (11).

Nevertheless, very few studies have investigated the effects of stress and depression on emotional eating behaviors. The purpose of this study is to examine the relationships between these two psychological variables and emotional eating and investigate the effects of a set of sociodemographic factors on emotional eating in adults.

Research questions

Research question 1: What are the mean scores of participants from the Emotional Eating, Stress and Depression scales?

Research question 2: Are there a relationship and differences among the Emotional Eating, Stress and Depression scale scores of participants?

Research question 3: What are the sociodemographic characteristics that affect the mean Emotional Eating scores of participants?

Methods

Design

The cross-sectional study was carried out with individuals in a district between July 2019 and May 2020.

Population

The sample size was determined as 384 by the method of sample calculation in the case of unknown population. For the calculations, a 95% confidence interval, 5% standard deviation and 50% unknown distribution were used.

$n = (t2 \text{ X } (Pq) / d2)$

p = Observation frequency of the examined event (probability) (0.5)

q = Non-observation frequency of the event (1 - p) (0.5)

t = Theoretical value found on the t-table at a certain degree of freedom and determined error rate (1.96)

d^2 = Aimed deviation based on the observation frequency of the event (5% deviation as 0.05)

When these values were applied in the formula, the sample size was determined as 384 individuals.

The inclusion criteria were as follows: not being diagnosed with eating disorders (at least 6 months ago), being older than 18 years old and agreeing to participate in the study. The exclusion criteria were as follows: having eating disorders and having communication problems.

Data Collection Instruments

The data were collected using a Personal Information Form, the Emotional Eating Scale, Ways of Coping Questionnaire and Beck Depression Inventory. The questionnaire form also included questions on height and weight to calculate the participants' Body Mass Index (BMI) values. BMI is the value obtained by dividing body weight (kg) by the square of body height (in meters) (BMI = kg / m^2). Individuals with a BMI of 18.5–24.9 kg / m^2 are considered to be normally weighted; those with a BMI of 25.0-29.9 kg / m^2 are considered to be overweight; those with a BMI of 30.0-34.9 kg / m^2 are considered to be class I obese; those with a BMI of 35.0-39.9 kg / m^2 are considered to be class II obese, and those with a BMI of ≥40.0 kg / m^2 are considered to be class III obese (12).

Personal Information Form

The form developed by the researchers by utilizing the information in the literature consisted of 19 questions on some sociodemographic and nutrition-related characteristics of the participants including height, weight, sex, age, marital status, education status, economic level, physical exercise status and number of meals (1, 3-5, 7, 8, 11).

Emotional Eating Scale

The scale was developed by Bilgen (2016). EAS consists of 30 items that express eating behaviors in cases of positive and negative emotions (2). Internal consistency of Emotional Eating Scale Cronbach's alpha was 0,94. EAS is a 5-point Likert-type scale, and each item is scored in the range of 1-5. Among the items of this scale, 27 express the desire to eat at times of emotional change, while 3 express self-restraints. The 3 items expressing self-restraints are inversely scored. The lowest possible score in the scale is 30, while the highest score is 150. High scores and emotional eating behaviors are directly proportional (2).

Ways of Coping Inventory

This questionnaire was developed by Folkman and Lazarus (1980) to determine the ways people use to cope with stressful situations, while its validity and reliability study in Turkish was conducted by ahin and Durak (1995). Cronbach's alpha reliability coefficient of Ways of Coping Inventory was 0,783. The questionnaire is a 4-point Likert-type scale scored in the range of 0-3. The questionnaire consists of 5 factors including the confident approach (C.A.), helpless approach (H.A.), submissive approach (S.A.), optimistic approach (O.A.) and social support seeking approach (S.S.S.A.). These may be categorized under two groups as effective coping including C.A., O.A. and S.S.S.A. and ineffective coping including the submissive approach. The Cronbach's alpha internal consistency coefficients were found to be in the ranges of 0.49-0.68 for the optimistic approach, 0.62-0.80 for the confident approach, 0.64-0.73 for the helpless approach, 0.47-0.72 for the submissive approach and 0.45-0.47 for the social support seeking approach (13).

Beck Depression Inventory

BDI, which was developed by Beck (1961), is a 21-item self-report scale that aims to measure the severity of symptoms observed in the emotional, cognitive, and motivational dimensions in relation to depression. Each item consists of a statement that expresses a behavioral pattern specific to depression and is scored from the lowest to the highest level. It is a 4-point Likert-type scale. The lowest possible score from the scale is 0, while the highest is 63. These statements are related to the symptoms of depression. These symptoms include pessimism, crying episodes, feelings of guilt, depressive mood, dissatisfaction, feelings of failure, restlessness, loss of appetite, social withdrawal, indecision, fatigue, disrupted body image, sleep disorders, somatic occupations, work inhibition and loss of libido. Cronbach's alpha reliability coefficient of Beck Depression Inventory was 0.80. The validity and reliability studies of this scale in Turkish were carried out respectively by Teğin (1980) and Hisli (1988, 1989), and it was reported that the cutoff score of BDI is accepted as 17 (14).

Procedure

The participants were informed about the objective and scope of the study, and the written/verbal consent of the participants who satisfied the inclusion criteria was obtained. The data were collected by the method of face to face interview by the researchers from individuals living in a district. Each interview lasted for about 20-30 minutes.

Ethics approval

This study was conducted in accordance with the ethical standards of the Declaration of Helsinki. Ethics approval was obtained for the study from the Scientific Studies Ethics Board of the Faculty of Medicine at Trakya University (number: TÜTF-BAEK 2019/274, date: 01.07.2019). Additionally, attention was paid to the principle of volunteerism of participation, and the written consent of the included participants was obtained.

Statistical analysis

For data analysis, the SPSS 21.0 software (SPSS, Inc., Chicago, IL, USA) was used. The comparison of the variables that were normally distributed according to the results of Kolmogorov Smirnov test was performed using t-test and one-way analysis of variance (Tukey's-b test as a post-hoc comparison). Pearson's correlation analysis was used to investigate the association among the Emotional Eating Scale, Ways of Coping Questionnaire and Beck Depression Inventory. Multivariate linear regression analysis was used for the variables predicting the participants' emotional eating. The confidence interval was constructed on a level of 95%. $p<0.05$ was accepted as statistically significant.

Results

Participants' characteristics

Among the participants in the sample, 68.8% were female, 50.1% were married, and 50.3% were high school graduates. According to their BMI values, 57.6% of the participants were normally weighted. 74% stated that they used a method to lose weight, 39.1% reported they dieted, and 36.2% said they exercised.

Participants' emotional eating, coping styles and depression levels

In the study, the scores the participants obtained from the overall Emotional Eating Scale ranged from 31 to 143, with a mean of 66.82±23.14. The mean scores for the Eating When Nervous subscale, Eating to Cope with Negative Emotions subscale, Self-Control subscale and Control against Stimuli subscale were 24.07±10.79, 19.84±9.18, 16.12±4.72 and 8.53±2.98, respectively. The mean scores for the Effective Coping subscale was 30.85±7.35, and that for the Ineffective Coping subscale was 16.76±6.40. Additionally, the mean scores the participants obtained from the overall Beck Depression Inventory was 12.99±9.40 (Table 1).

Table 1. Descriptive Statistics of Participants Emotional Eating Scale, Coping Styles Inventory and Beck Depression Inventory Scores (N=384)

Scales	Mean ± SD	Min–Max
Emotional Eating Scale	66.82±23.14	31-143
Eating when nervous subscale	24.07±10.79	12-60
Eating to cope with negative emotions subscale	19.84±9.18	10-50
Self-Control subscale	16.12±4.72	6-30
Control against stimuli subscale	8.53±2.98	3-15
Ways of Coping Questionnaire		
Effective coping subscale	30.85±7.35	7-60
Ineffective coping subscale	16.76±6.40	0-36
Beck Depression Inventory	12.99±9.40	0-41
Abbreviation: SD, standard deviation		

Table 2. Participants' Characteristics and Comparison of Emotional Eating

Characteristics	n	%	Mean ± SD	t / F	p
Gender					
Women	264	68.8	69.21±24.07	3.026	0.003
Men	120	31.2	61.58±20.05		
Age (Mean±SD: 33.91±13.96)	303	78.9	67.37±22.87	0.897	0.373
18-44 years	81	21.1	64.79±24.17		
≥45 years					
Marital status					
Married	195	50.1	63.95±22.79	-2.482	0.014
Single	188	49.9	66.79±23.25		
Education level					
Literate and lower	140	36.5	66.67±24.68	2.074	0.127
Primary school	193	50.3	65.37±20.61		
High school and higher	51	13.2	72.76±27.09		

Emotional eating levels by participants' characteristics

Table 2 shows the distribution of the participants' emotional eating levels in terms of some variables. The emotional eating levels were significantly higher in the female, those who were in the age group of 18–44 and those who were single ($p<0.05$).

Table 3. The Correlation Between Participants' Emotional Eating, Coping Styles and Depression Levels

		Emotional Eating Scale	Ways of Coping Questionnaire-Effective coping subscale	Ways of Coping Questionnaire-Ineffective coping subscale	Beck Depression Inventory
Emotional Eating Scale	r	1	-0.246*	0.208*	0.231*
	p		**0.000**	**0.000**	**0.000**
Ways of Coping Questionnaire-Effective coping subscale	r			-0.117*	-0.210*
	p			**0.022**	**0.000**
Ways of Coping Questionnaire-Ineffective coping subscale	r				0.330*
	p				**0.000**

Pearson Correlation Analysis, *p<0.01

Table 4. Predictive Factors of Participants' Emotional Eating

Variables	B (95% CI)	SE	ß	t	p
Constant	52.491	8.342		6.293	<.001
Age	-0.391	0.089	-0.236	-4.397	<.001
BMI	1.357	0.260	0.276	5.210	<.001
Effective coping styles	-0.603	0.150	-0.192	-4.017	<.001
Ineffective coping styles	0.540	0.179	0.150	3.021	<.001
Beck Depression Inventory	0.277	0.125	0.113	2.210	<.001

R= 0.42, Adj. R^2=0.17, F= 16.60, p= <0.001
Adj.R^2: Adjusted R squared; B: Partial regression coefficient; ß: Standard partial regression coefficient; 95% CI: 95% confidence interval.

Correlation between participants' emotional eating, coping styles, and depression

The correlations between EES, Coping Methods subscales scores and Beck Depression scores are shown in Table 3. The Pearson's correlation analysis revealed a negative correlation between EES and the Effective Coping subscale (p<0.01). There was a positive correlation between EES and the Ineffective Coping subscale scores and the total mean score of depression (p<0.001).

Factors predicting participants' emotional eating levels

The results of the regression analysis explaining the factors affecting the participants' emotional eating levels are given in Table 4. The potential influencing factors showing statistically significant association with t-test, ANOVA or correlation were selected in the multivariate regression analyses. The predictive power of the linear regression model was calculated as 53%. While the scores for EES were positively correlated with variables such as BMI, ineffective coping methods and Beck Depression levels, they were negatively correlated with age and effective coping methods.

Discussion

The purpose of this study was to determine the relationship of emotional eating behaviors with coping with stress and depression in adults. The emotional eating mean score of the participants was found as 66.82±23.14. Accordingly, it may be stated that the emotional eating behaviors of the participants were on a moderate level. İlker found the mean EAS score in their study as 72.0±22.9 (15). It was determined that emotional eating was on a higher level in the women, the participants in the age group of 18-44 and those that were single. In eating disorders, the age of onset is usually reported as adolescence, and

these disorders are seen more frequently in women than men (16) Considering the socio-cultural factors that trigger eating disorders, it is seen that the ideal female image portrayed by the media triggers the formation of negative judgements regarding body image, therefore causing a decrease in body satisfaction levels and an increase in eating disorder symptoms (17). The results in this study were in parallel to the literature. It is recommended to perform the necessary screenings towards groups under risk in terms of emotional eating/depression and BMI and conduct preventive intervention efforts.

In this study, significant relationships in the positive direction were found between emotional eating and the scores of effective coping and depression. Additionally, in the multiple regression analysis, the relationship of the dependent variable of emotional eating with BMI, ineffective coping and depression was tested, and it was determined that these variables had a positive effect on emotional eating. In the absence of alternative behaviors, food may be accepted as a natural reward or habit of satisfaction in coping with negative emotions (5). One of the negative coping strategies is emotional eating (18). A previous study determined that experiential avoidance (having a tendency towards incompatible coping in multiple contexts) mediates the relationship between negative emotions and emotional eating (19). In a study by Young and Limbers (2017), on stress levels that were perceived higher, an avoidant coping style increased the tendency of adolescents towards depressive emotional eating (20). It was reported in previous studies that emotional eating has a moderate level on the relationship between restlessness and actual food intake (5). Macht and Simons (2000), in their study with 23 women, determined that most eating motivations increased in periods of negative emotions, and the women showed a tendency to cope with negative emotions through eating and more symptoms of bodily hunger (21). A study on young people determined that daily stress showed a positive correlation with daily eating and hunger desires (22). Emotional eating is highly prevalent, and it is assumed that it is an important mechanism in starting and sustaining the vicious cycle of obesity as an incompatible emotional regulation (ER) strategy (22). By association of negative emotions with systematic food intake, individuals may be conditioned to experience an increasing desire to eat (23). Beck Depression Inventory scores were found to be significantly related to increased emotional eating scores (24). A previous study reported that depressive symptoms are related to higher emotional eating, and a higher increase is seen in the Body Mass Index independently of depression (8). It was determined that participants with high levels of depressive symptoms reported higher levels of emotional eating (25). Konttinen et al. (2010) also determined a positive relationship between emotional eating and depressive symptoms (26). Dressler and Smith (2015) found that depressive participants had a tendency towards eating due to emotional reason (27). Recently, for targeting and reducing emotional eating, both Cognitive Behavioral Therapy (CBT) and Dialectical Behavior Therapy (DBT) were proposed (11). In this sense, applying these therapy methods to individuals showing emotional eating may provide a benefit.

In this study, it was determined that emotional eating had a positive effect on BMI. A study on African American women reported that Mediation analysis suggests that emotional eating mediates anger, shyness, guilt, and BMI (28). In the literature, it was reported that excessive eating is related to emotional eating (29). Dohle et al. (2014) conducted a nutrition and activity behavior study on a Swiss sample and associated higher emotional eating scores with BMI levels of the following year (30). In studies in the literature, emotional eating was found to be related to BMI (5 ,31). By failing to take emotional eating under control, an increase in BMI will be an inevitable outcome. In order to control the emotional eating behavior and prevent the increase in BMI, effective coping methods should be taught to individuals who use emotional eating and ineffective coping methods to cope with stress. Moreover, it may be beneficial to ensure that individuals showing depressive symptoms are provided with psychological support/treatment, to monitor BMI at certain intervals and to direct the individual towards different physical/social activities rather than preferring emotional eating as a method of coping with negative emotions. Emotional and uncontrolled eating behaviors are a

significant risk factor for the individual's recurring weight gain. For this reason, professionals relevant for the psychological and nutritional status of individuals (psychiatrist, psychologist, dietician, psychiatry nurse, internal medicine nurse, etc.) should keep in mind and assess bot the psychological statuses and nutritional habits of individuals and create a treatment plan. Adequate-balanced nutrition trainings to be given effectively and continuously will lead to changing incorrect habits and behaviors, preventing problems and practices that threaten people's health and conversion of the knowledge that is gained into an attitude (4).

Conclusion

This study found significant relationships in the positive direction between emotional eating and scores of ineffective coping methods and depression.

It is believed that it would bring positive outcomes for psychiatry nurses and internal medicine nurses to prepare intervention programs on the emotional eating behaviors of individuals by collaboration.

Limitations

The study was carried out on an adult population; further research in different population groups is required to assess the consistency of this finding. However, this study would serve as an important role for future research that employs longitudinal studies to evaluate the long-term effect relationships among the variables. Despite these limitations, findings from this study highlighted the importance. These findings have practical implications. Research findings show that emotional eating behavior is high in women and young people. The relationship between EE and depression, ineffective coping, and BMI indicates that individuals with ineffective coping skills are at risk. Health professionals should educate the public, and particularly individuals at risk, about effective coping methods.

Conflict of Interest: The authors have no conflict of interest to declare.

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