Investigation of the Relationship between Exam Anxiety and Binge Eating Disorders in High School Students in the 15-19 Age Range

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Abstract—Eating disorders are mental health disorders as a result of disruption of the diet. This study was conducted to examine the relationship between exam stress and binge eating disorder in high school students. The study was conducted in March 2018 with 60 high school students (31 females, 29 males) aged 15-19 years. Personal characteristics and eating habits of individuals were measured by using a questionnaire prepared by the researcher. The binge eating disorder status of the individuals participating in the study was determined by the Bulimic Investigatory Test Edinburgh (BITE); test anxiety status was determined by Revised Exam Anxiety Scale. Statistical analysis of the data obtained from the study was done by IBM SPSS Statistics 23 program. While there was no significant relationship between the points obtained from the Bulimia Research Test Edinburgh and the consumption of something after the dinner (p > 0.05), there was a significant relationship with need to eat when stressed (p < 0.05). It is seen in 43.3% of individuals that there is no binge eating disorder, but abnormal eating behavior is observed. In 8.3% of the students, binge eating disorder (BED) was seen. No significant difference was found between male and female students in terms of BED (p > 0.05). It was determined that 60% of the participants who have BED had a medium level of anxiety and 40% had a high level of anxiety. A significant relationship was found between BITE and revised test anxiety (RTA) scale scores (p < 0.05). However, the relationship between the need for eating and the BMI and RTA scores were not significant (p > 0.05). In the study, the desired parameter was positive; there was a positive relationship between the BED and the test scores. In this period which is the starting time of dietary issues and different mental issues, for example, youthfulness, there should be regular trainings on the methods of coping with anxiety and on the principles of healthy nutrition in order to prevent health problems.

Keywords—Binge eating disorder, nutrition, obesity, test anxiety.

I. INTRODUCTION

NUTRITION is the process of providing or obtaining the food necessary for health and growth [1]. Human beings have to be fed to maintain their life, while nutrition problems affect humans' physiological and psychological functions, some factors in life may affect nutritional status of individuals. Eating disorders and obesity are diseases that have affected human life for various reasons since ancient times. These diseases disrupt the functionality of the human life and reduce the quality of life. Eating disorders are mainly mental health disorders in which the disruption of diet is the result [2].
It was thought that the reasons such as emulation to

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mannequins or not accepting their own physical and sexual development played a role in the period when these disorders first appeared. However, eating disorders are caused by many factors such as genetic, familial, psychological and sociocultural factors. Body mass index (BMI) is obtained by body weight (kg) divided by the square of height (m²). Overweight BMI classification: If it is between 25-29,9 kg/m² that is slightly overweight and if it is between 30-34,9 kg/m² that is I. class obesity, if it is between 35-39,9 kg/m² that is II. class obesity, if it is 40 kg/m² and above that is class III obesity [3]. When the skinfold thickness value is over 97th percentile in children and adolescents, it is considered to be obesity [4].

Although obesity is not included in the class of eating disorders in the DSM-V (Diagnostic and Statistical Manual of Mental Disorders) [5], it is usually caused by impaired eating behavior and can result in many negative consequences due to excessive fat accumulation in the body as a result of weight gain. Anthropometric measurements are used in the diagnosis of obesity. These are classified as;
- Body weight and height
- Calculation of body fat
- Calculation of lean body mass [3]

Psychopathologies accompanying obesity include major depression, bipolar disorder, and anxiety disorders. The risk and prevalence of depression in obese individuals is higher and the prognosis is worse [6].

Exam anxiety is a different kind of anxiety which causes the individual to have a mixed anxiety in the academic context. The levels of anxiety in adolescents may be affected by age, gender, occupations of parents, attitudes, academic success of the individual in previous years, level of education, number of siblings, socioeconomic level, individual's self-perception and personality traits [7].

This study was carried out to determine the relationship between BED and test anxiety among high school students aged 15-19 years. According to the DSM-V issued on 2013 [5], BED is considered as an eating disorder and there is limited number of studies in Turkey [5]. This study aims to draw attention to this issue.

II. MATERIAL AND METHOD

This research is an analytical and cross-sectional study conducted in March 2018 with a total of 60 students (31 female, 29 male) aged between 15 and 19 years, attending a high school in Istanbul to determine the relationship between

exam anxiety and BED. 31-item questionnaire was prepared using the literature. Survey questions include data about; personal information, food consumption habits, non-alcohol and water consumption status, physical activity habits, sleep duration. The questionnaire was filled with face to face interview method. During the study, the participants were informed about the aim and confidentiality of the study and informed consent form was obtained from the individuals.

The BMI was calculated by using the body weight and height values obtained by interrogation [BMI = Body weight (kg) / Square of length (m²)] and evaluated according to the World Health Organization classification [8].

The BED status of the students included in the study was evaluated by the BITE, developed by Henderson and Freeman [9]. BITE is a 33-item scale that measures the symptoms of bulimia neurosis or binge eating. There are two subscales, "Symptom scale" and "severity scale". The highest score determined from the test is 30. Evaluation;
- No BED and no abnormal eating behavior; 0-10 points,
- No BED but abnormal eating behavior; 11- 19 points,
- There is a BED: 20 or more points [9].

In this study, RTA Scale which was developed by Benson and El-Zahhar [10] to determine the students' exam anxiety levels was used. The RTA Scale consists of 20 items and 4 sub-scales: Tension, Somatic Symptoms, Anxiety, Unrelated Thoughts. The scale has a 4-way rating which are; (1) Never (2) Sometimes (3) Most of the time and (4) Always. In the scale, the score is not gradual and the high score from the scale shows that there is a high level of exam anxiety. The highest score is 80 and the lowest is 20. The scale gives a score for the sub-dimensions [10].

While evaluating the scores obtained from the RTA scale, normality analysis was applied on the test anxiety scores of the individuals and it was observed that the distribution was not normal (p < 0.05). Evaluation of the scores;
- Low anxiety, between 20 and 31 points
- Moderate anxiety between 32 and 43 points
- High anxiety between 44 and 80 points.

Statistical analysis of the data obtained from the study was done by IBM SPSS Statistics 23 program. Descriptive statistical methods (mean, standard deviation, frequency) and qualitative data were compared by using chi-square test and Fisher Exact chi-square test. Significance was evaluated at p < 0.05.

III. RESULTS

A total of 60 individuals, 31 (51.7%) female and 29 (48.3%) male, participated in the study. The age of the individuals ranged from 17 to 19, and 63.3% were 17, 35% were 21 and 1.7% were 19 years old. 21.7% of the individuals stated that they were doing physical activity and the difference between the physical habits of making physical activity according to gender was not statistically significant (p > 0.05). When the food consumption of the individuals after the dinner is examined; 90% of the individuals consumed various foods after dinner. It is seen that fresh/dry fruits consumption as 46.7%, foods such as chocolate, wafer, ice cream are consumed as 45%, crackers, biscuits, cakes, etc. are consumed more than other foods. When the need for food consumption during studying is examined; 36,7% of the participants stated that they need to consume food while 41,7% of them indicated that sometimes they need to consume food and 21,7% of them do not need food consumption. When the preferred foods are examined it is seen that; while 53.3% of individuals need to consume foods such as chocolate, wafers, ice cream, 40% of them prefer to eat crackers, biscuits, cakes, and 36.7% of them prefer fresh/dry fruits. Sleep duration of the participants in the study was 3.3% below 4 hours, 53.3% between 4-6 hours, 41.7% between 6-8 hours and 1.7% at more than 8 hours. When the body weight and height measurements of individuals were examined, the mean body weight was found to be 62.51 ± 10.58 kg and the mean height was 170.58 ± 8.14 cm. No significant difference was found between the BMI of female and male students (p > 0.05).

TABLE I
THE RELATIONSHIP BETWEEN BODY PERCEPTION AND BMI CLASSIFICATION OF INDIVIDUALS

BMI (kg/m²)	Body Perception									
	Weak		Normal		Overweight		Very Overweight		Total	
	n	%	n	%	n	%	n	%	n	%
Weak (<18.5)	3	60	2	40	0	0	0	0	5	8,3
Normal(18.5-24.9)	10	20,4	32	65,3	6	12,2	1	2	49	81,7
Overweight (25-29.9)	0	0	1	16,7	4	66,7	1	16,7	6	10

When the relationship between individuals' body perception and BMI classification is examined; 40% of the weak individuals are thinking that they're in normal weight, 20.4% of normal weight individuals are thinking they are weak (Table I). There was no significant correlation between BMI classification and meal skipping (p > 0,05). However, the relationship between BMI classification and eating status was found to be significant (p < 0.05)

TABLE II

THE RELATIONSHIP BETWEEN INDIVIDUALS' BMI CLASSIFICATION AND BITE SCORE ASSESSMENT

BMI Classification (kg/m²)	No BED		BE Behavior		Positive BED		p
	n	%	n	%	n	%	
Weak (<18.5)	3	60	2	40	0	0	
Normal(18.5-24.9)	25	51	19	38,8	5	10,2	0,283
Overweight (25-29.9)	1	16,7	5	83,3	0	0	

There was no significant relationship between BMI and

BITE scores (p> 0.05).

In the individuals who participated in the study, 89.7% of those without BED, 92.3% of those with binge eating behavior and 80% of those with BED consume a snack after dinner. When questioned about the need to eat something while studying; 34.5% of those who do not have BED are in need of eating something while studying, 41.4% is sometimes, 24.1% did not have the answer. It was observed that 42.3% of the patients had eating needings, 34.6% of them felt the need to eat, and 23.1% of them did not feel the need for eating. When the situation of eating food when stressed; it was found that 13.8% of them ate when they were stressed, 41.4% of them ate when they were stressed, 44.8% of them started to eat. In those with binge eating behavior, it was found that 50% ate food while stressed, 26.9% ate food while stressed, while 23.1% did not eat while stressed. In those with BED; It was observed that 80% of the patients needed to eat while stressed and 20% did not eat while they were stressed. A significant relationship was not found between the points obtained from the Bulimia Research Test-Edinburgh and the consumption of something after the course (p>0.05), there was a significant relationship between the need to eat when stressed (p <0.05). 48.4% of the girls received a low anxiety score of 1-31, 38.7% received a moderate anxiety score of 32-43, and 12.9% received a high anxiety score of 44-80. 17.2% of the males received low anxiety score, 48.3% had moderate anxiety and 34.5% had a high anxiety score. A significant difference was found between the scores of female students and male students in terms of their scores of exam anxiety (p <0.05)

Table 3. Relationship of BMI Classification and Examination Anxiety Scale Scores

	Test Anxiety Scores						p
	1-31 Low anxiety		32-43 middle anxiety		44-80 High anxiety		
BMI (kg/m²)	n	%	n	%	n	%	
Weak (<18.5)	1	20.0	3	60.0	1	20.0	0.489
Normal(18.5-24.9)	18	36.7	21	42.9	10	20.4	
Overweight (25-29.9)	1	16.	2	33.	3	50.	
	7	3	0				

The relationship between the BMI values of the individuals and the RTA scores is given in Table 3. 20% of the weak individuals are low, 60% are moderate, and 20% are highly anxious. 36.7% of normal weight individuals were low, 42.9% were moderate, and 20.4% were highly anxious. While 16.7% of mild fat individuals have low, 33.3% have moderate, 50% have high anxiety. There was no significant relationship between BMI scores and RTA (p> 0.05)

Table 4. Relationship between BITE and RTA Scale Scores

Test Anxiety Scores							
	1-31 Low anxiety		2-43 middle anxiety		44-80 High anxiety		p
BITE Score Assessment	n	%	n	%	n	%	
No BED	13	44.8	14	48.3	2	6.9	
Positive BE Behavior, No BED	7	26.9	9	34.6	10	38.5	0.032
Positive BED	0	0.0	3	60.0	2	40.0	

When the relationship between BITE and exam anxiety scale scores of the participants were examined; 44.8% of patients without BED had low anxiety, 48.3% had moderate anxiety, and 6.9% had high anxiety levels; 26.9% of people with binge eating behavior have low, 34.6% have moderate, 38.5% have high level of anxiety and 60% of those with BED high anxiety level. A significant relationship was found between BITE and exam anxiety scale scores (p <0.05).

DISCUSSION

It has been proved that physical activity is important for health. It was found that physically inactive was responsible for 27% of diabetes, 21-25% of some cancers and 30% of ischemic heart diseases [11]. In our study, 13 (21.7%) of the individuals performed physical activity while 47 (78.3%) did not have physical activity. The difference between physical

activity habits and gender was not statistically significant (p> 0.05). The reason for the low frequency of physical activity can be shown as the reason of the lack of time for students to prepare for the exam. However, considering the importance of physical activity in terms of health; these students should be directed to activities that will protect their health and also help them to stress and increase their motivation. In a study about eating behaviors of high school students, the rate of eating something while studying was found to be 65.5% [12]. In another study, ready-to-eat food consumption rate was found to be 7.8% and 15.7% [13]. In our study; 36.7% of the subjects stated that they needed to consume nutrients while they were studying, 41.7% sometimes needed, and 21.7% stated that they did not need food consumption. When the preferred foods are examined; while 53.3% of individuals need to consume foods such as chocolate, wafers, ice cream, 40% of them prefer to eat crackers, biscuits, cakes, and 36.7% of them prefer fresh / dry fruits. There are many studies investigating the effect of stress on eating behavior. In a study, 29.9% of the students stated that they eat when they are stressed [14]. In our study, 35% of the participants indicated that they eat when they are stressed. While 53.3% of individuals consume foods such as chocolate, wafers and ice cream while they are stressed, 30% of them prefer nutrients such as crackers, biscuits, cakes. The relationship between BMI classification and stressful eating status was significant (p<0,05). Studies show that inadequate sleep, especially less than 6 hours of sleep, can lead to increased adipose tissue and weight gain [15]. In our study, 53.3% of the individuals were sleeping in the range of 4-6 hours, and 41.7% were sleeping in the range of 6-8 hours. The proportion of individuals who sleep less than 6 hours should be reduced in order to increase the concentration and success rate and decrease the risk of obesity. Body perception is the name given to how individuals perceive themselves. In a study, the relationship between BMI classification and body perception of the individuals who participated in the study was examined; Of the women who are overweight, 26.3% see themselves as overweight, 2.5% are obese, and 44.4% of the women with normal weight see themselves normal weight [8]. In our study, 40% of the weak individuals are in normal weight, 20.4% of normal weight individuals are weak,

12.2% are overweight and 2% are overweight and 16.7% of overweight individuals normal, 16.7% also think they are very overweight. Although BED is considered to have just entered the diagnostic classification of the American Psychiatric Association, there are many studies investigating its frequency. In a study investigating the frequency of BED in university students, 23.1% of the students were found to have BED [2]. In another study, while 3,7% of individuals had BED, 96,3% did not have BED [8]. In our study; In 43.3% of individuals, there is no BED, but abnormal eating behavior is observed. Of these, 46.2% is female and 53.8% is male. 8,3% of the students have BED and 60% of them are female and 40% are male. No significant difference was found between male and female students in terms of BED (p> 0.05). In the literature, the information on BED is mostly accompanied by obesity. In a study, it was found that the rate of BED was 8% in obese individuals [16]. However, the relationship between BMI and BITE scores was not significant in our study (p> 0.05). It is thought that the majority of the sample is composed of normal weight individuals. Based on the assumption that eating status is one of the factors that make up the TYB in the stressful times, the need for eating and the BITE scores were compared in the course of dinner and during stressful times, and the results were found to support the literature in terms of stress [17,18]. While there was no significant relationship between the points obtained from the Bulimiya Research Test-Edinburgh and the consumption of something after the course (p> 0.05), there was a significant relationship with eating need (p <0.05). There are many studies conducted on students to determine the various dimensions of exam anxiety. In a study, it was revealed that male students had more delusional attitudes than female students in terms of exam anxiety and gender [19]. The results of our study are similar to this study. There was a significant difference between the scores of female students and male students on the exam anxiety scale, and male students were more anxious than girls (p <0.05). Exam anxiety may decrease nutrient intake in some individuals and increase appetite by increasing appetite in some individuals. In the literature, two cases in which the food intake decreased and the diagnosis turned to Anorexia nervosa due to test anxiety before the university

exam was mentioned and it was found to be related to Anorexia nervosa with the anxiety of examination [20]. So in our study, the relation between BED and test anxiety was investigated and it was found that 26.9% of individuals with BE behavior had low, 34.6% had moderate, 38.5% had high anxiety level, and 60% of those with BED had moderate and 40% had high level of anxiety. The research was positive; A significant relationship was found between BITE and revised RTA scores (p<0.05). However, the relationship between the need for eating and the BMI and RTA scores were not significant (p> 0.05).

In the study, the desired parameter was positive; there was a positive relationship between the BED and the test scores. In this period which is the beginning age of eating disorders and various psychological problems such as adolescence, there should be regular trainings on the methods of coping with anxiety and on the principles of healthy nutrition in order to prevent health problems.

REFERENCES

[1] Baysal A (2014) Beslenme. 15.Baskı.Hatiboğlu Yayıncılık,Ankara,: 9

[2] Kızıltan G,Karabudak E,Ünver S,Sezgin E,Ünal A (2005) Nutritional status of university students with binge eating disorder. Ankara Üniversitesi Tıp Fakültesi Mecmuası 58:167-171

[3] Baysal A,Aksoy M,Besler T,Bozkurt N,Keçecioğlu S,Mercanligil SM,Merdol TK,Pekcan G,Yıldız E.(2014) Diyet El Kitabı.8.Baskı.Antropometrik Ölçümler, :58,99-122,Ankara.

[4] Köksal G, Özel HG.(2012) Çocukluk ve Ergenlik Döneminde Obezite. Sağlık Bakanlığı Yayın No: 729,Ankara.

[5] çev.Köroğlu E (2014) Amerikan Psikiyatri Birliği,Ruhsal Bozuklukların Tanısal ve Sayımsal Elkitabı.Beşinci Baskı. Ankara : Hekimler Yayın Birliği,s:173-176,121-122

[6] Başer SZ, Balcıoğlu İ.(2008) Obezitenin psikiyatrik yönü. Türkiye'de Sık Karşılaşılan Psikiyatrik Hastalıklar Sempozyum Dizisi No:62 Mart 2008 S:341-348

[7] Kurt AS,Balcı S,Köse D.(2014) Test anxiety levels and related factors: students preparing for university exams. J Pak Med Assoc. 2014 Nov;64(11):1235-9.

[8] Hacıarif A. (2015) Yetişkin Bireylerin Beslenme Durumlarının İncelenmesi ve Tıkınırcasına Yeme Bozukluğunun Belirlenmesi,Okan Üniversitesi Sağlık Bilimleri Enstitüsü,Yüksek Lisans Bitirme Tezi,İstanbul (Danışman:Yrd.Doç.Dr.Funda Şensoy)

[9] Henderson M, Freeman CPL." A self-rating scale for bulimia. The "BITE"", Bri J of Psyhiatry, 1987, 150: 18-24

[10] Şeftalici B. (2017) Lise Son Sınıf Öğrencilerinde Sınav Kaygısı Ve Maneviyat Şanlıurfa-Viranşehir Örneği. Yüksek Lisans Tezi. Adana / 2017

[11] WHO, Physical Activity. Erişim: http://www.who.int/dietphysicalactivity/pa/en/ , Erişim Tarihi: 6 Mayıs 2018.

[12] Tanrıverdi D,Savaş E,Gönüllüoğlu N,Kurdal E,Balık G.(2011) Lise Öğrencilerinin Yeme Tutumları, Yeme Davranışları ve Benlik Saygılarının İncelenmesi, Gaziantep Tıp Derg 2011;17(1):33-39.

[13] Erdoğan EG, Akın B (2017) Lise öğrencilerinde beden kütle indeksi durumunun sosyodemografik ve beslenme özellikleri ile ilişkisi. Journal of Human Sciences, 14(2), 1571-1589.

[14] Kathryn E. Phillips, PhD, ANP-BC a, ⬦, Susan Kelly-Weeder, PhD, FNP-BC b , Katherine Farrell, BSN, RN (2016) Binge eating behavior in college students: What is a binge? Applied Nursing Research 30 (2016) 7–11

[15] Peuhkuri K, Sihlova N. "Diet promotes sleep duration and quality", Nutrition Research, 2012; 32; 309-319.

[16] Turan Ş,Poyraz CA,Özdemir A (2015) Tıkınırcasına yeme bozukluğu, Psikiyatride Güncel Yaklaşımlar : 419-435

[17] Poorrezaeian M, Siassi F, Qorbani M, Karimi J, Koohdani F, Asayesh H, Sotoudeh G.(2015) .Association of dietary diversity score with anxiety in women. Psychiatry Res. Dec 15;230(2):622-7.

[18] Emond M, Ten Eycke K, Kosmerly S, Robinson AL, Stillar A, Van Blyderveen S.(2016) The effect of academic stress and attachment stress on stress-eaters and stress-undereaters. Appetite. May 1;100:210-5.

[19] Erözkan A. (2004), Ünversite Öğrencilerinin

Sınav Kaygısı Ve Başa çıkma Davranışları, Muğla Üniversitesi SBE Dergisi Bahar 2004 Sayı 12.
[20] Üneri ÖŞ.(2010) ,Anoreksiya Nervoza ve kaygı bozuklukları. Türkiye Çocuk Hastalıkları Dergisi , Cilt 4, Sayı 4