Eat Weight Disord (2017) 22:623–631
DOI 10.1007/s40519-017-0430-9

ORIGINAL ARTICLE

Evaluation of disordered eating tendencies in young adults

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Received: 1 March 2017 / Accepted: 7 August 2017 / Published online: 4 September 2017

Abstract
Purpose It was aimed to determine the prevalence of high disordered eating tendencies and its relationship with food addiction, emotional eating and self esteem in participants at 18 and 33 years age group.
Methods This study was planned as a cross-sectional study and conducted with 1359 young adult volunteers ($M = 386$, $F = 973$) with an average age of 22.4 ± 2.84 years. Eating Attitudes Test-26 (EAT-26), Yale Food Addiction Scale (YFAS), Emotional Appetite Questionnaire (EMAQ) and Rosenberg Self-Esteem Scale (RSES) were used. EAT-26 score above 20 was considered as eating disorders risk cutoff.
Results Participants with disordered eating tendencies have higher rates (22.4%) of food addiction compared to participants without high disordered eating tendencies (7.2%). There is no difference for EMAQ and YFAS scores; however, there is a significant difference for RSES and EAT-26 scores according to gender. A positive association of EAT-26 with YFAS and EMAQ-negative scores and a negative association of EAT-26 with RSES and EMAQ-positive were found.
Discussion There is association among EAT-26, YFAS, and Rosenberg Self-Esteem Scale, and Emotional Appetite Questionnaire scores. This study provides information for future studies about high disordered eating tendencies, food addiction and mood that are thought to be important in young adults.
Level of evidence Level V (cross-sectional descriptive study).

Keywords Eating attitudes · Food addiction · Emotional eating · Self esteem

This article is part of the topical collection on Food addiction.

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Introduction

Eating disorders such as anorexia nervosa, bulimia nervosa, and binge eating are serious, rapidly increasing public health problems [1, 2]. Eating disorders, characterized by physiological and psychological complications, may impair physical and mental health [3]. Moreover, positive and negative eating habits acquired at an early age affect the health of the individual in later life [4]. Young adults are at risk of eating disorders due to habits such as unhealthy food choices, body dissatisfaction, and dietary behavior to lose weight [5]. For early diagnosis and therapy, it is crucial to identify individuals with disordered eating tendencies [6].

The prevalence of eating disorders differs in a wide range (2.17–26%) due to the differences between countries and study designs [7–9]. In the last decade, its incidence and prevalence has also reached higher rates in adolescents

and young adults [10]. Based on theoretical models of eating disorders, these are growing public health concerns in the worldwide [11, 12]. Self-esteem is defined as a person's attitude toward him or herself [13], and it may affect quality of life and health [14–17]. Additionally, self-esteem is associated with eating disorders, and high self-esteem plays an important role in the prevention of eating disorders and body dissatisfaction [18–21].

Studies have indicated that the prevalence of eating disorders was 2.17% in female students in China in 2015 [5] and 5.10% in female students in Japan in 2016 [7]. In another study similar in design to the present study, Ghaderi and Scott found the lifetime prevalence of eating disorders to be 7.8% in females aged between 18 and 30 [22]. In a study on 731 male students aged 15–18 years from United Arab Emirates, the proportion of disordered eating attitudes was found to be relatively high compared to many developing and developed countries, and ranged from 33.1 to 49.1% [23]. Furthermore, a study was conducted to establish the diagnostic validity and usefulness of Eating Attitudes Test-26 (EAT-26) for assessing the risk of eating disorders and performed on the Colombian male population aged 14 and older. The study showed that the EAT-26 questionnaire has excellent reliability, sensitivity, and specificity values, and it could be a useful tool to consider when strategies for early detection of eating disorders are implemented in the male population [24].

Food addiction is associated with the increase in the prevalence of eating disorders [25, 26] and the assessment of food addiction using the Yale Food Addiction Scale (YFAS) in individuals with eating disorders and obesity has become a popular subject [26, 27]. Food addiction incidence varies depending on factors such as age range and body mass index (BMI). Davis et al. [25] found that food addiction incidence was 37.5% in obese adults; however, Pedram et al. found a lower incidence (5.4%) in their study [27]. Additionally, food addiction, measured using YFAS, was found to be associated with binge eating behavior [28], night eating syndrome [29], and bulimia nervosa [26].

Emotional mood has significant effects on eating attitudes and behavior [30], as emotions affect the control of basic behavior mechanisms and motivational functions [30, 31]. Feelings such as anger, fear, sadness, and happiness influence eating response such as eating speed, food preference, and swallowing [32]. Emotional eating usually appears as a response to negative feelings, ego threat, or distress and may result in overeating, binge eating, bulimia nervosa, and obesity [33]. However, it is difficult to predict how emotions affect eating behavior due to their variability [34].

In Turkey, and worldwide, eating disorders are increasing in young adults and adolescents; nevertheless, limited studies examine the 18–33 age group. Therefore, this study aimed to

1. evaluate disordered eating tendencies in young population,
2. determine differences in disorder tendencies according to gender, and
3. identify the relationship between food addiction, emotional eating, and eating attitudes.

Materials and methods

Participants and procedure

The research was planned and conducted as a cross-sectional study. In total, 1359 (386 males and 973 females) young adult volunteers were recruited from four educational institutions using non-probabilistic sampling. Participants with chronic diseases and those using antidepressant drugs, and pregnant and lactating females were excluded from the study. The questionnaire was completed during face-to-face interviews between January 2016 and June 2016. A pilot study was conducted on 30 individuals at the beginning of the study, and the individuals who agreed to participate in the study were recruited.

Measures

The questionnaire was divided into six sections:

1. General information (sex, occupation, age, height, body weight, smoking and alcohol consumption status and frequency), nine items
2. General eating habits [main meal skipping and snack skipping status, which meals are skipped more often (breakfast, lunch, and dinner), eating out habits (frequency, which meals, and where the person eats out most often)], nine items
3. Emotional Appetite Questionnaire (EMAQ), 22 statements [35]
4. Eating Attitudes Test-26 (EAT-26), 26 statements [36]
5. Rosenberg Self Esteem Scale (RSES), ten statements [37]
6. Yale Food Addiction Scale (YFAS), 25 statements [38].

The Emotional Appetite Questionnaire (EMAQ)

Nolan et al. developed the EMAQ [35], and Demirel et al. conducted its Turkish validity and reliability assessment [39]. They found the internal consistency reliability of the scales to be Cronbach's alpha = 0.730. In this study, it was 0.865, and the coefficient of concordance was high (>0.80) in Turkish young adults.

The EMAQ consists of 22 items, and it was evaluated with the rating for each item as "much less" (1–4), "much more" (6–9), and "the same" (5). This assessment includes the existence of negative or positive emotions (14 items) and negative or positive situations (eight items). Negative emotions and situations can be totaled to obtain an EMAQ-negative score, and positive emotions and situations can be totaled for an EMAQ-positive score. This was used to determine which emotions were dominant in emotional eating.

Eating Attitudes Test-26 (EAT-26)

Eating Attitudes Test-26 was developed by Garner et al. to measure anorexia nervosa symptoms [36]. The validity and reliability of its Turkish version has been demonstrated by Savasir and Erol; factorial validity was shown in a population sample, and the reliability coefficients of the Turkish version of the test were found to be high [40]. In this study, the confidence coefficient of the scale (Cronbach's alpha) was calculated as 0.866, and the coefficient of concordance was excellent (>0.80) with Turkish young adults.

EAT-26 is a 26-item scale, with each item answered on a 6-point Likert scale ranging from ''never'' to ''always'' The most symptomatic response receives a score of 3, the next most symptomatic response receives a score of 2, and the least symptomatic receives a score of 1. The remaining three choices receive a score of 0. Total scores are derived as a sum of the composite items, ranging from 0 to 78. Scores ≥20 on the EAT-26 indicate abnormal eating attitudes and behavior, and they may identify those with high disordered eating tendencies [36].

The Rosenberg Self-Esteem Scale (RSES)

Rosenberg developed the Self-Esteem Scale [37], and Çuhadaroğlu adapted it for the Turkish population [41]. In the present study, the confidence coefficient (Cronbach's alpha) was found to be 0.915. The scale, consisting of 63 items, has 12 subscales. The first of these consists of 10 items measuring self-esteem, and this is the subscale used in this paper. This scale ranges from "strongly agree" to "strongly disagree" on a four-point Likert scale (1: strongly agree, 2: agree, 3: disagree, 4: strongly disagree). The first three questions, the fourth and fifth questions, and the ninth and tenth questions are evaluated together, but the sixth, seventh, and eighth questions are evaluated on their own.

The scoring is reversed for questions 3, 5, 8, 9, and 10. In other words, for these questions, 1 = 4, 2 = 3, 3 = 2, and 4 = 1. For the remaining questions, the scores are simply added. The scale scores range from 0 to 6. Scores between 0 and 1 demonstrate high self-esteem, 2 and 4 moderate self-esteem, and 5 and 6 low self-esteem.

The Yale Food Addiction Scale (YFAS)

Gearhardt et al. [38] developed the Yale Food Addiction Scale in accordance with the seven symptoms listed in the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)* to examine the eating habits of individuals over the previous 12 months [38, 42]. In Turkey, Bayraktar et al. [43] conducted the validity and reliability studies in Turkish, and the internal consistency was 0.88. In this study, the confidence coefficient (Cronbach's alpha) was found to be 0.874, and the scale's coefficient of concordance was good (>0.60 and <0.80) with Turkish young adults.

The Yale Food Addiction Scale contains 25 self-reported questions using a dichotomous and Likert-type format. The categories of response are frequency (ranging from never to four or more times weekly to daily) and dichotomous scoring (yes or no). Responses (except primer questions) were recoded as seven symptoms or criteria. After computing cut offs, the questions under each substance dependence criterion (e.g., tolerance, withdrawal, clinical significance, etc.) were summed. If at least one question for each criterion was scored as 1, this criterion was met. The YFAS provided both a count of food addiction symptoms and a diagnosis of food addiction as scoring options.

In this study, the food addiction symptoms and diagnosed scoring were used. A continuous symptom count could be calculated for diagnosis by adding the criteria met (except impairment or distress). This symptom score should range between 0 and 7. To score the dichotomous version, a variable could be computed in which clinical significance must equal 1 and the symptom count must be ≥3. This should be a score of either 0 or 1 (no diagnosis or diagnosis met).

Anthropometric measurements

Researchers obtained anthropometric measurements in the study. Body mass measurements (kg) were taken with a calibrated and 0.5 kg-sensitive scale device. Measurements were made early in the morning while the participants were fasting and wearing light garments without shoes. Height was measured (cm) with feet close together and the head in the Frankfort plane position using a 0.1 cm-sensitive portable stadiometer. The square of the height was taken in meters and divided by body mass to calculate the BMI value (kg/m^2). The BMI values of the participants were grouped into three categories according to World Health Organization classification: underweight (BMI < 18.5 kg/m^2), normal or healthy weight (18.5–24.9 kg/m^2), and overweight or obese (25.0 ≤BMI kg/m^2) [44].

Statistical analysis

Normality of data for continuous variables was assessed using histogram graphics, detrended plots, the Kolmogorov–Smirnov test, and skewness or kurtosis. Central tendency measures were presented with mean values and frequencies, and propagation measures were presented with ±standard deviation (SD). Student's t test was performed to determine mean values, while a Chi-square test was performed to compare characteristic features. Furthermore, linear regression testing was used to determine correlations between variables of EMAQ, EAT-26, RSES, and YFAS according to BMI. For BMI, EAT-26, YFAS, RSES, and the EMAQ-negative and positive subscales were evaluated using Pearson correlation, with $p < 0.05$ was considered statistically significant. All statistical data were analyzed using SPSS (The Statistical Package for Social Sciences) Version 22.0 (SPSS Inc., Chicago, IL, USA).

Results

The characteristic features of participants according to EAT-26 scores are presented in Table 1.

According to EAT-26, 19.4% of males and 19.3% of females had disordered eating tendencies ($p > 0.05$). Most of the participants (71.1%) with disordered eating tendencies had normal BMI, 20.2% were obese, and 8.7% were underweight. No statistical significance was found between groups ($p > 0.05$).

Food addiction was higher in participants with disordered eating tendencies (22.4%) compared to participants without disordered eating tendencies (7.2%; $\chi^2 = 53.893$, $p < 0.001$). The high self-esteem percentage was 30.4% in the disordered eating tendencies group and 34.5% in the group without disordered eating tendencies ($p = 0.026$). However, moderate self-esteem was higher in the disordered eating tendencies group ($\chi^2 = 7.285$, $p = 0.026$; Table 1).

The mean ($\bar{x}$) and standard deviation (SD) values of EAT-26, YFAS, RSES, and the EMAQ subscale values according to gender are presented in Table 2.

The scores of negative emotion and situation were higher in females than in males ($F = 49.4 \pm 19.25$, $M = 48.7 \pm 17.21$, $p > 0.05$), and positive emotion and situation scores were lower (42.5 ± 11.38 and 43.6 ± 11.81, $p > 0.05$, respectively).

There was no statistical difference between YFAS scores according to gender: 2.8 ± 1.48 (F), 2.7 ± 1.58 (M), $t = -0.516, p = 0.61$ (Table 2). The mean EAT-26 scores of females (13.4 ± 9.39) were higher than those of males (12.3 ± 10.80), $t = -1.937$, $p = 0.05$. Furthermore, self-esteem scores were statistically high in males ($M = 3.6 \pm 2.24, F = 2.9 \pm 2.24$, respectively), $t = 5.468$, $p < 0.001$ (Table 2).

Table 1 The distribution of participants' gender, BMI, RSES and YFAS scores according to EAT-26

Characteristics of individuals	EAT-26 <20		EAT-26 ≥20		χ^2	p
	n	%	n	%		
Gender[a]					0.002	0.964
Male	311	80.6	75	19.4		
Female	785	80.7	188	19.3		
BMI classification[b]					4.096	0.129
Underweight	126	11.5	23	8.7		
Normal weight	798	72.8	187	71.1		
Overweight and obese	172	15.7	53	20.2		
YFAS[b]					53.893	0.000**
Food addiction	79	7.2	59	22.4		
No food addiction	1017	92.8	204	77.6		
RSES[b]					7.285	0.026*
Low	445	40.6	96	36.5		
Normal	273	24.9	87	33.1		
High	378	34.5	80	30.4		

BMI body mass index, *EAT-26* Eating Attitudes Test-26, *RSES* Rosenberg Self-Esteem Scale, *YFAS* Yale Food Addiction Scale

* $p < 0.05$; ** $p < 0.001$

[a] Line percentage

[b] Column percentage

Table 2 Arithmetic mean ($\bar{x}$) and standard deviation (SD) of EAT-26, YFAS, RSES and EMAQ scores of participants according to gender

Scales	Male ($n = 386$)	Female ($n = 973$)	Total ($n = 1359$)	t	p
EMAQ					
EMAQ-negative	48.7 ± 17.21	49.4 ± 19.25	49.2 ± 18.69	−0.691	0.49
EMAQ-positive	43.6 ± 11.81	42.5 ± 11.38	42.8 ± 11.51	1.494	0.14
EAT-26	12.3 ± 10.80	13.4 ± 9.39	13.1 ± 9.81	−1.937	0.05*
RSES	3.6 ± 2.24	2.9 ± 2.24	3.1 ± 2.26	5.468	0.000**
YFAS	2.7 ± 1.58	2.8 ± 1.48	2.8 ± 1.51	−0.516	0.61

EAT-26 Eating Attitudes Test-26, *EMAQ* Emotional Appetite Questionnaire, *RSES* Rosenberg Self-Esteem Scale, *YFAS* Yale Food Addiction Scale

* $p < 0.05$; ** $p < 0.001$

Table 3 Multiple regression model for EAT-26, EMAQ, EAT-26, RSES, YFAS scores

	Coefficient	SD	p	Min	Max	R	R^2	F
Constant	16.433	2.059	0.000	12.395	20.472	0.314	0.01	30.876
EMAQ negative	0.018	0.014	0.203	−0.010	0.046			
EMAQ positive	−0.140	0.023	0.000	−0.185	−0.095			
YFAS	1.893	0.171	0.000	1.557	2.229			
RSES	−0.178	0.113	0.116	−0.399	0.044			
BMI	−0.136	0.080	0.090	−0.294	0.021			

BMI body mass index, *EAT-26* Eating Attitudes Test-26, *EMAQ* Emotional Appetite Questionnaire, *RSES* Rosenberg Self-Esteem Scale, *YFAS* Yale Food Addiction Scale, *Constant* EAT-26, *Predictors* BMI, YFAS, EMAQ, RSES

* $p < 0.001$

The associations between EAT-26, YFAS, RSES, and EMAQ and BMI according to multiple regression analysis are presented in Table 3. EMAQ, YFAS, RSES, and BMI were considered predictors and EAT-26 a constant. According to this analysis, EMAQ-positive and YFAS scores were found to be predictors for EAT-26 ($p = 0.000$, $p = 0.000$, respectively).

Correlations (adjusted for BMI and gender) between EAT-26, YFAS, RSES, and EMAQ subscales are presented in Table 4. There was a positive correlation between EAT-26 and YFAS scores ($r = 0.278$). YFAS scores were also positively correlated with RSES and EMAQ-negative scores ($r = 0.202$, $r = 0.215$, respectively). EMAQ-negative scores were correlated with EMAQ-positive scores ($r = 0.301$).

Discussion

In recent years, eating habits such as the "compulsive" consumption of foods have been focused on elaborately [45]. This study examined disordered eating tendencies, self-esteem, and the relationship between food addiction, emotional eating, and eating attitudes.

In the present study, disordered eating tendencies were not associated with BMI and gender. However, it has previously been found that males have more normal nutritional habits than females [46]. For example, one study indicated that students with normal BMI have no disordered eating tendencies and there was no association between BMI and EAT-26 [47]. Contrary to this result, in a study conducted in Iran, it was stated that there was a positive correlation between EAT-26 and BMI [48].

In the present study, participants with disordered eating tendencies had greater food addiction (22.4%) than participants without disordered eating tendencies (7.2%). This result is similar to the result Mason et al. reported, where 8% of the participants (Nurses' Health Study II) met the criteria for food addiction in their study [49]. Food addiction may be associated with the severity of eating disorder symptoms. Clark et al. found no relationship between YFAS and EAT-26 in their study [50], which may have been the result of the sample that consisted of participants aged 18–30. Likewise, in this age group, food addiction rates were higher due to the consumption of some specific foods [51, 52].

YFAS was developed due to the theoretical similarities of "loss of control" and compulsive eating that are central features of binge eating [53]. Although the term "food addiction" emerged in 1956 for the first time, limited studies were conducted for many years, with the topic becoming widespread in recent years. It has been found that palatable foods affect the body through similar mechanisms as illicit and licit drugs. Moreover, food

Table 4 Correlation of EAT-26, YFAS, RSES, EMAQ-negative and positive subscales

	EAT-26	YFAS	RSES	EMAQ-negative	EMAQ-positive
EAT-26		0.278**	0.148	0.177	0.151
YFAS			0.202**	0.215**	0.127**
RSES				0.180	0.087
EMAQ-negative					0.301**
EMAQ-positive					

BMI body mass index, *EAT-26* Eating Attitudes Test-26, *EMAQ* Emotional Appetite Questionnaire, *RSES* Rosenberg Self-Esteem Scale, *YFAS* Yale Food Addiction Scale

* $p < 0.05$, ** $p < 0.01$, adjusted for BMI and gender

addiction has been found to be a proxy for eating disorders, obesity severity, trauma, posttraumatic stress disorder, and psychiatric comorbidity. For the treatment of food addiction, the 12-step approach is used. In addition, cognitive behavior therapy, dialectical behavior therapy, motivational interviewing and motivational enhancement therapy, mindfulness-based therapies, family therapies, and pharmacotherapies are considered in treatment [54]. Dietitians and health-care professionals must investigate the food addictions of patients who want to lose weight, as this facilitates adherence to diet and prevents bad outcomes [55].

A study indicated that participants with higher BMI values consumed unhealthy foods to deal with emotional problems [53]. According to the literature, studies mostly support that food addiction increases with higher BMI values [26, 27, 56] and that obese individuals have higher YFAS scores [25, 57, 58]. On the other hand, Meule et al. noted that participants with food addiction have lower BMI values than the no food-addiction group [59]. These results proved that there might be a two-sided correlation between food addiction and BMI. Nevertheless, some studies found no relationship [25, 57, 58, 60, 61], which may be related to the sample design including normal BMI or obese participants. Another prediction is a non-linear association between BMI and food addiction symptomatology. In addition, the sample including participants with normal BMI and compensatory behavior for food addiction may cause a decrease in the relationship between BMI and YFAS. In studies with a wide BMI range for participants, the relationship between BMI and food addiction can be explained more clearly [27, 62, 63]. Similarly, in a study conducted in Poland, it was found that low distress tolerance correlated with emotional eating, external eating, and general overeating. After adjusting for variables such as age and sex, a significant relationship was found between low distress tolerance and a high BMI [64]. In another study, the depression levels of bariatric surgery patients aiming to lose weight, who were diagnosed with food addiction, using YFAS were observed to be higher [65]. Therefore, all these factors must be considered during treatment of food addiction, weight loss, and maintenance of weight loss [64].

In this study, low self-esteem was higher in participants with disordered eating tendencies ($\chi^2 = 7.285$, $p = 0.026$). In a similar study, it was found that females with disordered eating tendencies have low self-esteem and that there was a negative correlation between RSES and EAT-26 scores [66]. In the present study, females had higher EAT-26 scores (13.4 ± 9.39) than males (12.3 ± 10.21; $p = 0.05$; see Table 2). Thomas et al. found comparable EAT-26 scores of young females (13.31 ± 10.21) [67]. However, high disordered eating tendency ratios were similar between males and females (19.4, 19.3%, respectively). In a study in Turkey, it was found that high disordered eating tendencies were more common among females than males (25.7, 20.4%, respectively) [68]. In another study in Pakistan, females had higher ratios of high disordered eating tendencies (19.9, 2.7%, respectively) [69]. In this study, similar ratios for high disordered eating tendencies between males and females may be related to increased ratios of greater muscle weight in the male population.

Furthermore, in this study, the RSES scores of males (3.6 ± 2.24) were higher than those of females (2.9 ± 2.24; Table 2). Grilo et al. [70] found no relationship between RSES and gender. Nevertheless, the results of this study align with those of several other studies [46, 71–73].

Eating Attitudes Test-26 (EAT-26), YFAS and EMAQ are scales used to determine disorder eating tendencies. In addition, RSES may be associated with BMI and disordered eating tendencies. Kristjansson et al. found a negative association between RSES and BMI [74]. The validity of EAT-26 was investigated using multiple regression analysis, which indicated that predictors had a positive association with EAT-26 ($R = 0.314$). However, this association was weak, accounting for only 10% of the variance in EAT-26. Only EMAQ-positive and RSES were significant predictors for EAT-26 ($p = 0.000$, $p = 0.000$, respectively). Positive correlations between EAT-26 and YFAS also supported this result (Table 4). There was no

correlation between EAT-26 and EMAQ-positive scores; however, multiple regression analysis revealed that the EMAQ-positive score was a predictor for EAT-26.

In the present study, there was a positive association between EAT-26 and YFAS ($r = 0.278$; Table 4). Chen et al. found a positive correlation similar to the present study ($r = 0.483$, $p < 0.01$) [75]. In contrast, Clark et al. found no association between EAT-26 and YFAS [50]. YFAS is a scale used to measure food addiction, but EAT-26 has a greater association with disordered eating symptoms. The positive correlation between EAT-26 and YFAS may be associated more with bulimic episodes, which are determined with EAT-26. YFAS scores also correlated positively with RSES, EMAQ-negative, and EMAQ-positive scores ($r = 0.202$, $r = 0.215$, $r = 0.127$). Clark et al., found a positive association between YFAS and EMAQ scores ($r = 0.368$, $p = 0.05$) [50]. Contradictory to this, Gearhardt et al. found a negative association between YFAS and RSES scores [28] and in a 2009 study, presented similar positive correlations between YFAS and EMAQ scores ($r = 0.051$, $p = 0.01$) [38]. Nevertheless, because YFAS is a scale used to measure food addiction, these similar study results support the role of YFAS to evaluate other eating pathologies. This may be explained through the possible role of food addiction in other eating disorder tendencies. Brewerton identified food addiction and its relationship to eating and related disorders and asserted that food addiction might be used as a proxy for certain pathological conditions, including bulimic eating disorder severity, intensity of psychiatric comorbidity, and severity of obesity. This supports our results.

In conclusion, disordered eating tendencies may be related to emotional mood, food addiction, and self-esteem. Individuals' response to negative situations ends in increased eating behavior. This may cause food addiction and affect self-esteem via BMI values and the presence of disordered eating tendencies. Moreover, the relationship between EMAQ, RSES, and YFAS may support this hypothesis. The results of this study provide important data for young adults attempting to cope with disordered eating tendencies, emotional situations, food addiction, and self-esteem problems. These tools are reliable and simple for our population to evaluate eating disorder tendencies, and they are practical for use in clinical and non-clinical populations.

Treatments of eating disorders vary depend on individual assessment and diagnosis. The Disordered Eating Food Addiction Nutrition Guide (DEFANG) is a tool for showing the scope of treatment goals and aiding sustainable recovery. Further studies on specific nutrition intervention strategies and the effects of eating disorders on the structure of the brain must be conducted [76].

Limitations

The present study includes several limitations. The researchers attempted to include as large a number of people as possible. However, because of the prevalence of a patriarchal lifestyle in Turkey, men did not agree to participate, and homogeneous sampling could not be achieved. It would have been beneficial if greater participation of adult men could have been achieved. Additionally, this study includes only people who live in central Anatolia and does not reflect the whole country. Finally, it may be better to use a depression scale for obtaining results that are more accurate in studies that investigate eating habits and high disordered eating tendencies.

Acknowledgements The authors thank all individuals who devoted their time to participate in this study. They are warmly acknowledged for their help and whole hearted cooperation.

Compliance with ethical standards

Conflict of interest Nevin Sanlier declares that she has no conflict of interest. Semra Navruz Varli declares that she has no conflict of interest. M. Sedanur Macit declares that she has no conflict of interest. Hande Mortas declares that she has no conflict of interest. Tugba Tatar declares that she has no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The study protocol was approved by the Ethical Committee of the Gazi University of Ankara/Turkey (27/01/2016, Decision no: 11663).

Informed consent Informed consent was obtained from all individual participants included in the study.

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