Acıbadem Univ. Sağlık Bilim. Derg. 2023; 14 (2): 228-234
https://doi.org/10.31067/acusaglik.1238538

Evaluation of The Relationship Between Addiction-like Eating Behavior, Mindful Eating, and Obesity in Adults

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ABSTRACT

Purpose: This study aimed to evaluate the relationship between addictive-like eating behavior, mindful eating, and obesity and the factors affecting them.

Materials and Methods: This study was conducted with 459 adults (47.7% male, 52.3% female, mean age 27.2±10.52 years). The study data were obtained with a web-based questionnaire. The questionnaire form includes the socio-demographic characteristics, anthropometric measurements, Addiction-Like Eating Behaviors Scale (ALEBS), and Mindful Eating Questionnaire (MEQ).

Results: 36.6% of the participants were overweight or obese. The mean MEQ score was 3.3±0.47, and the ALEBS score was 39.9±11.69. Smokers had a significantly higher ALEBS score (p=0.027). While the MEQ score was significantly lower in obese individuals (p<0.05), the ALEBS score was significantly higher (p<0.05). A negative correlation was found between the total MEQ score and the total ALEBS score (r= -0.618; p<0.001). BMI was negatively correlated with the MEQ score (r= -0.149; p= 0.001); it was positively correlated with Appetitive derive and Low diet control subscales (r= 0.307; p<0.001; r= 0.380; p<0.001, respectively).

Conclusion: This study supports that mindful eating and addiction-like eating behavior scores may related with body weight. Smoking may be a factor associated with food addiction. In preventing and treating obesity, early intervention studies are essential to increase the mindful eating in individuals and reduce food addiction.

Keywords: Mindful Eating, Addiction-Like Eating Behavior, Obesity

Yetişkin Bireylerde Bağımlılık Benzeri Yeme Davranışı, Yeme Farkındalığı ve Obezite Arasındaki İlişkinin Değerlendirilmesi

ÖZET

Amaç: Bu çalışmanın amacı, bağımlılık benzeri yeme davranışı, yeme farkındalığı ile obezite arasındaki ilişkinin ve bunları etkileyen faktörlerin değerlendirilmesidir.

Gereç ve Yöntem: Bu araştırma, 459 yetişkin birey (%47.7 erkek, %52.3 kadın, yaş ortalaması 27.2±10.52 yıl) ile yürütülmüştür. Çalışma verileri, web-tabanlı anket formu ile elde edilmiştir. Anket formunda, bireylerin sosyo-demografik özellikleri, antropometrik ölçümleri, Bağımlılık Benzeri Yeme Davranışları Ölçeği (BBYDÖ) ve Yeme Farkındalığı Ölçeği (YFÖ) yer almaktadır.

Bulgular: Katılımcıların %36.6'sı fazla kilolu veya obezdir. Ortalama YFÖ puanı 3.3±0.47, BBYDÖ puanı 39.9±11.69 olarak belirlenmiştir. Sigara içen bireylerde BBYDÖ skoru anlamlı olarak yüksek bulunmuştur (p=0.027). Obez bireylerde YFÖ skoru anlamlı olarak düşük iken (p<0.05), BBYDÖ skoru ise anlamlı olarak yüksektir (p<0.05). Toplam YFÖ puanı ile toplam BBYDÖ puanı arasında negatif ilişki olduğu saptanmıştır (r= -0.618; p<0.001). BKİ ise YFÖ skoru ile negatif ilişkiliyken (r= -0.149; p= 0.001); İştah açıcı dürtü ve Düşük diyet kontrolü alt boyutları ile pozitif ilişkilidir (sırasıyla r= 0.307; p<0.001; r= 0.380; p<0.001).

Sonuç: Bu çalışma yeme farkındalığı ve bağımlılık benzeri yeme davranışlarının, vücut ağırlığı ile ilişkili olabileceğini destekler niteliktedir. Sigara kullanımı, yeme bağımlılığı ile ilişkili bir faktör olabilir. Obezitenin önlenmesi ve tedavisinde, bireylerde yeme farkındalığını arttırmak, yeme bağımlılığını azaltmak adına erken müdahale çalışmaları önem taşımaktadır.

Anahtar Kelimeler: Yeme Farkındalığı, Bağımlılık Benzeri Yeme Davranışları, Obezite

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Received: 18 January 2023
Accepted: 15 March 2023

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Obesity remains a major public health problem. According to the World Health Organization European Regional Obesity Report, Turkey has the highest prevalence of overweight/obesity among European countries (1). In the WHO European Region, approximately 60% of adults and one-third of children are overweight or obese (29% of boys and 27% of girls) (1). External and internal factors influencing eating behaviors are complicated and interrelated (2). Obese individuals have more frequent food cravings, addictive-like eating behaviors, eating more in response to emotional states, more binge eating, decreased awareness of hunger and satiety signals, and are more sensitive to rewards (3,4).

There is increasing interest in the potential role of addictive-like eating behaviors in obesity (4-6). A meta-analysis study shows that food addiction is associated with high BMI (3). It has been reported that food addiction in obese individuals varies between 15-25%, and is higher in overweight/obese individuals than in individuals with normal body weight (3,7-8). Neurobiological studies show that obese people are more sensitive to the reward effect of food than individuals with normal body weight (9). Also, the reward effect of fatty and sugary foods is more common in obese individuals, and therefore these foods are consumed more (10).

Behavior change is important in the treatment of food addiction (11). In this context, mindfulness-based practices, particularly mindful eating, play a prominent role in behavior change therapy. Mindful eating is defined as the conscious awareness of thoughts and actions during the act of eating (12). It is assumed that mindful eating makes individuals more sensitive to the body's responses to food and hunger-satiety signals. Thus, it is believed that individuals can increase their awareness of emotional and environmental stimuli that encourage healthy food consumption and increase their enjoyment of food (13). Thus, mindful eating encourages individuals to eat healthier and protects against overeating. Practices to increase mindful eating can be a protective approach to reduce addiction-like eating behaviors. A study shows that mindful eating is lower in obese individuals (4). Although studies found differences according to gender in mindful eating and food addiction scores (4,14), some studies have found no differences (15,16). This study aimed to evaluate the relationship between addictive-like eating behavior, mindful eating, and obesity and the factors affecting them.

Materials and Methods

This cross-sectional study was conducted with 459 adults (47.7% male, 52.3% female, mean age 27.2±10.52 years) between 18-65 who agreed to participate in Erzurum/Turkey (one of the metropolitan cities in the east of Turkey). Study data were obtained with a web-based questionnaire. The questionnaire includes socio-demographic characteristics, anthropometric measurements, Addiction-Like Eating Behaviors Scale (ALEBS), and Mindful Eating Questionnaire (MEQ).

Addiction-Like Eating Behaviors Scale

The Addictive-Like Eating Behaviors Scale (ALEBS) was developed by Ruddock et al. (2017) to determine addiction-like eating habits (17). The Turkish validity and reliability of this scale were conducted by Demir et al. (2021) (18). The first ten items of the scale are presented in response options ranging from "1-Never" to "5-Always". Items 11, 12, 13, 14, and 15 are presented in response options ranging from "1-Strongly Disagree" to "5-Strongly Agree". Items 6, 11, 12, 13, and 14 are reverse-scored. The total score is obtained by adding the scores obtained from the items in the scale (maximum score = 75). The maximum score that can be obtained from the Appetitive drive subscale (1-5, 7, 9, 14, 15) is 45, and the maximum score that can be obtained from the Low dietary control subscale (6, 8, 10, 11, 12, 13) is 30. The Cronbach's alpha coefficient was 0.86 (18).

Mindful Eating Questionnaire

The Mindful Eating Questionnaire (MEQ) was developed by Framson et al. (2009) (19). Kose et al. (2016) adapted to Turkish as MEQ-30 (20). The subscales were Emotional eating, Disinhibition (mindless eating), Conscious nutrition, Eating control, Eating discipline, Mindfulness, and Interference (20). The Cronbach's alpha coefficient value of the scale was 0.73. The scale is evaluated using a 5-point Likert scale. While scoring the scale, the arithmetic mean of the subscales and the total score is taken. As the score obtained from the scale increases, the mindful eating increases (20).

Anthropometric Measurements

Height and body weight measurements were taken based on the self-reports of individuals. Body Mass Index (BMI) of participants were calculated. BMI classification is below 18.50 kg/m^2 underweight, between 18.50–24.99 kg/m^2 normal, between 25.0–29.99 kg/m^2 overweight, and above 30.0 kg/m^2 obese (21).

Data Analysis

The data was analyzed using the SPSS 23.0. Normality test was performed to determine whether the parametric test assumptions were met. T test, Mann Whitney U test, ANOVA or Kruskall Wallis test were applied to find value differences between groups. The Spearman or Pearson correlation coefficient was conducted to analyze the correlation between the parameters. The correlation coefficient is 0.05-0.30 for "low or insignificant correlation"; 0.30-0.40 for "low moderate correlation"; 0.40-0.60 for "moderate correlation"; 0.60-0.70 for "good correlation"; 0.70-0.75 for "very good correlation"; and 0.75-1.00 for "excellent correlation." (22) The statistical significance level was set at $p<0.001$ and $p<0.05$.

Ethical Approval

"Ethics Committee Approval" was received from Erzurum Technical University Ethics Committee (Meeting Number: 8, Decision Number: 6, 29.08.2022) to conduct this research. The research was carried out following the Declaration of Helsinki. Participants' consent was obtained.

RESULTS

The general characteristics of the individuals participating in the study are given in Table 1. The participants' mean age was 27.2±10.52 years (47.7% male, 52.3% female). 36.6% were overweight or obese. Most participants (57.6%) were high school graduates, and 34.2% were employed. 78.4% of the individuals reported skipping at least one main meal or snack, and 34.4% smoked. The mean MEQ score of the participants was 3.3±0.47, and the ALEBS score was 39.9±11.69.

Table 1. General characteristics of the participants (n: 459)

	n	%
Gender		
Male	219	47.7
Female	240	52.3
Education		
Primary school	12	2.6
Secondary school	13	2.8
High school	264	57.6
Bachelor/Master degree	170	37.0
Working status		
Employed	157	34.2
Unemployed	302	65.8
Smoking status		
Yes	158	34.4
No	301	64.6
BMI classification		
Underweight	40	8.7
Normal	251	54.7
Overweight	128	27.9
Obese	40	8.7
Skipping meals		
Yes	360	78.4
No	99	21.6
	Ẋ±SD	
Age (years)	27.3±10.52	
Education duration (years)	12.2±5.49	
Main meals number	2.4±0.52	
Snacks number	1.6±0.68	
MEQ	3.3±0.47	
Disinhibition	3.3±0.86	
Emotional Eating	3.4±1.07	
Eating control	3.5±0.91	
Mindfulness	3.2±0.41	
Eating discipline	2.9±0.80	
Conscious nutrition	3.2±0.41	
Interference	3.5±0.90	
ALEBS	39.9±11.69	
Appetitive drive	23.5±7.28	
Low dietary control	16.4±4.86	

ALEBS: Addictive-Like Eating Behaviors Scale, MEQ: Mindful Eating Questionnaire

There was no difference between MEQ and ALEBS scores according to gender, educational status, working status and skipping meals ($p>0.05$). However, the ALEBS score was found to be significantly higher in smokers ($p=0.027$). At the same time, significant differences were found in MEQ and ALEBS scores according to BMI classification. Accordingly, the MEQ score in obese individuals is lower than in other groups ($p<0.05$). ALEBS score was observed to be different in all groups and the highest score was detected in the obese group ($p<0.05$) (Table 2).

Table 2. The mean and standard deviation values of the total scores of MEQ and ALEBS according to the socio-demographic characteristics, meal skipping status and BMI classification of the participants

	n	%	MEQ Ẋ±SD	ALEBS Ẋ±SD	p*	p**
Gender						
Male	219	47.7	3.3±0.48	39.8±11.78	0.775	0.853
Female	240	52.3	3.2±0.46	40.1±11.62		
Education						
Primary school	12	2.6	3.5±0.46	40.7±9.87	0.101	0.922
Secondary school	13	2.8	3.2±0.39	38.0±10.08		
High school	170	37.0	3.2±0.49	39.8±12.44		
Bachelor/Master degree	264	57.6	3.4±0.54	38.8±12.91		
Working status						
Employed	157	34.2	3.3±0.48	39.0±11.94	0.052	0.243
Unemployed	302	65.8	3.2±0.46	40.4±11.54		
Smoking status						
Yes	158	34.4	3.1±0.50	42.5±11.63	0.223	0.027
No	301	64.6	3.3±0.46	39.4±11.64		
BMI classification						
Underweight	40	8.7	3.4±0.44[a]	30.7±9.22[a]	0.021	<0.001
Normal	251	54.7	3.3±0.45[a]	38.3±10.67[b]		
Overweight	128	27.9	3.2±0.50[a]	42.4±11.06[c]		
Obese	40	8.7	2.9±0.47[b]	52.1±10.15[d]		
Skipping meals						
Yes	360	78.4	3.2±0.45	40.1±11.63	0.413	0.571
No	99	21.6	3.3±0.53	39.4±9.93		

**The difference between MEQ scores by groups, ** Difference between ALEBS scores by groups*
a,b,c,d Groups with the same letters in a column are not different compared to pairwise comparisons.

Table 3 shows the correlation between MEQ, ALEBS and their subscales scores. A negative correlation was found between the total MEQ score and the total ALEBS score (r= -0.606; p<0.001). The significant negative correlations were determined between MEQ's subscales and ALEBS's subscales. At the same time, while age was positively associated with MEQ score (r= 0.232, p<0.001), it was not associated with ALEBS (p>0.05). BMI was negatively associated with the MEQ score (r= -0.149; p=0.001); It was positively associated with Appetitive drive and Low dietary control subscales (r= 0.307; p<0.001; r= 0.380; p<0.001, respectively).

DISCUSSION

Obesity is a multifactorial disease affected by environmental and genetic factors (23). Its rising prevalence in Turkey and worldwide is concerning (1). For this reason, it is essential to determine the modifiable risk factors that cause obesity and to create action plans for these. According to the WHO European Regional Obesity Report, Turkey has the highest obesity prevalence among European countries. According to this report, 66.8% of the adult population is overweight or obese, and 32.1% is obese in Turkey (1). It was determined that 36.6% of the individuals participating in this study were overweight or obese.

Table 3. Evaluation of the relationship between MEQ and ALEBS

	ALEBS total score	Appetitive drive	Low dietary control	MEQ total score	Disinhibition	Emotional Eating	Eating control	Mindfulness	Eating discipline	Conscious nutrition	Interference
ALEBS total score	-										
Appetitive drive	0.975**	-									
Low dietary control	0.942**	0.843**	-								
MEQ total score	-0.606**	-0.530**	-0.618**	-							
Disinhibition	-0.509**	-0.447**	-0.518**	0.819 **	-						
Emotional Eating	-0.491**	-0.435**	-0.497**	0.773 **	0.641 **	-					
Eating control	-0.366**	-0.319**	-0.373**	0.670 **	0.515 **	0.315 **	-				
Mindfulness	-0.114*	-0.088	-0.123*	0.203 **	-0.011	0.020	0.089	-			
Eating discipline	-0.275**	-0.243**	-0.279**	0.408 **	0.083	0.093	0.155*	0.198*	-		
Conscious nutrition	-0.283**	-0.255**	-0.284**	0.464 **	0.315 **	0.175 **	0.229*	-0.062	0.220*	-	
Interference	-0.333**	-0.272**	-0.353**	0.648 **	0.534 **	0.513 **	0.391*	-0.006	0.121*	0.216*	-

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

Eating disorders and mindless eating behaviors are among the important factors as a cause obesity (24,25). The results of this study show that individuals with high BMI have lower eating awareness and higher addiction-like eating behavior. Many studies show that mindful eating is lower and the risk of food addiction is higher in obese individuals (4,25-27). Although studies found differences according to gender in mindful eating and food addiction scores (4,14), some studies have found no differences (15,16). In this study, there was no difference in scores according to gender. However, it was determined that mindful eating increased with increasing age. This result is consistent with findings from previous research (19,31). It is believed that individuals tend to eat more consciously with increasing age.

Mindfulness is based on observing thoughts and feelings rather than evaluating and changing thoughts and feelings. Mindful eating is believed to provide a permanent solution in the prevention/treatment of eating behavior disorders and obesity, as it enables the awareness of eating related emotions and habits without judgment (19). Therefore, intervention studies to increase mindful eating in obese individuals are promising. A meta-analysis study reported that food addiction is associated with high BMI (3). Misuse of drugs and excessive food consumption similarly affect dopamine and opiate systems and cause individuals to lose control. In addition to drug, cigarette, and alcohol dependence, symptoms of addiction to certain foods have been reported (32). Similar to other types of addiction, individuals with food addiction has been found to engage in more eating acts with craving, desire and urge to eat, especially against specific foods (fatty, sugary, high salt content) (33). In this study, addiction-like eating behavior total score, Appetite drive score, and Low dietary control scores were positively associated with BMI. This situation can be interpreted as obese individuals may lose their diet control with appetite drive. At the same time, individuals who smoke have higher ALEBS scores. This result shows that smoking may be a factor associated with food addiction.

This study determined that mindful eating scores were negatively related to addiction-like eating behavior scores. Studies examining mindful eating and food addiction in the literature are very limited (4). A study conducted with university students determined that the mindful eating was significantly lower in people diagnosed with food addiction. It has also been reported that students with low mindful eating scores have a five times greater risk of food addiction (4). Food addiction is associated with the individual's loss of control. As a result, it is anticipated that individuals with high food addiction have a low mindful eating (32).

Some limitations should be considered when evaluating study data. Firstly, the research is cross-sectional study in Erzurum/Turkey (one of the metropolitan cities in the east of Turkey), which could not establish a cause-effect relationship but was used to evaluate the relationship between the measured variables. Secondly, the participant's body weight and height information were taken based on the self-reports. The strengths of the study are as follows: large sample size; it is one of the first studies in which the relationship between addiction-like eating behaviors, mindful eating, and obesity and the factors affecting them is evaluated.

Conclusion

In conclusion, this study supports that mindful eating and addiction-like eating behaviors may affect body weight. At the same time, smoking may be a factor that can affect food addiction. Therefore, early intervention studies are important in preventing and treating obesity. In this direction, it is thought that mindfulness intervention studies will be effective in obese individuals in order to increase eating awareness and reduce food addiction.

Conflict of Interests

The author has no funding or conflicts of interest to disclose.

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