



## Original Article

# Food addiction and associated factors among high school students in Turkey

Hatice Dayılar Candan, Leyla Küçük

<sup>1</sup>Department of General Surgery, İzmir Katip Çelebi University Atatürk Training and Research Hospital, İzmir, Turkey

<sup>2</sup>Department of Mental Health and Psychiatric Nursing, Istanbul University Florence Nightingale Faculty of Nursing, Istanbul, Turkey

### Abstract

**Objectives:** Adolescence is a crucial transitional period of life with rapid growth and development. This study aims to examine food addiction and the factors effecting food addiction in high school students.

**Methods:** This study was conducted between March 2014 and June 2014. The sampling consisted of 612 students meeting study inclusion criteria. Data was collected by a questionnaire form and the Yale Food Addiction scale.

**Results:** The average age of the adolescents was  $16\pm 0.85$  with 52.5% male and 68.1% at normal weight. The study found that 12.4% of adolescents have food addictions. Girls were found to have a higher food addiction score than boys, which was statistically significant ( $p=0.002$ ).

**Conclusion:** Food addiction plays a major role in the increase in obesity prevalence which is a critical global problem. Plans for young people are vital for future generations.

**Keywords:** Adolescence; eating disorders; emotion; food addiction; mental health.

#### What is known about the subject?

- Girls have higher food addiction rates than boys.

#### What does this paper add to our knowledge?

- There is a correlation between mood and eating and this ratio increases in the group with food addiction.

#### How does the paper contribute to practice?

- Food addiction plays a role in the increase in the prevalence of obesity which is a significant problem in the world. It is important to create action plans about obesity and food addiction issues for young people for their future.

Adolescence is a crucial period of life with rapid growth and development which transitions childhood into adulthood.<sup>[1]</sup> Along with physical changes, there are also changes in eating habits and food choices during this period. Typical characteristics for food habits in this group include patterns of irregular eating and snacking between meals, eating away from home and eating fast-food.<sup>[2]</sup>

Before the emergence of the concept of food addiction, early clinical research on excessive cravings especially chocolate, sugar and food rich in carbohydrates had begun.<sup>[3]</sup> Making the assumption that consuming excessive food is food addiction, it was determined that food addiction resembles drug addiction in neurobiological and behavioral terms.<sup>[4]</sup> Eating disorders are defined as excessive discomfort in thoughts and behaviors of individuals regarding eating, weight and body appearance. Pathological eating disorder is losing control and eating frequently in excessive amounts despite having obsessions about body shape and weight.<sup>[1-3,5,6]</sup> Individuals with this disorder are often caught up in eating attacks to manage stress, emotions and mental status. Development of all eating disorders has similar reasons. An eating disorder cycle starts with negative feelings such as distress, dissatisfaction, anger, irritation or sadness etc. These negative feelings usually result from depression, personality disorders, stressful and sad events in people's life, and other psychological problems.

**Address for correspondence:** Hatice Dayılar Candan, İzmir Katip Çelebi Üniversitesi Atatürk Eğitim ve Araştırma Hastanesi, İzmir, Turkey

**Phone:** +90 232 244 44 44 / 2760 **E-mail:** h.dayilar@gmail.com **ORCID:** 0000-0003-0728-8783

**Submitted Date:** February 20, 2018 **Accepted Date:** October 19, 2018 **Available Online Date:** February 12, 2019

©Copyright 2019 by Journal of Psychiatric Nursing - Available online at [www.phdergi.org](http://www.phdergi.org)



Over time, obsessive eating behaviors begin affecting the mental and physical health of individuals and their ability to have a normal, healthy life.<sup>[6]</sup> Eating and sex; instincts that are essential for survival and wellbeing, are also called natural rewards. Dopamine, a reward neurotransmitter, regulates pleasurable and motivating responses to food intake. Repeated stimulation of these reward pathways, as in substance abuse, weakens control over food intake and causes compulsive food consumption.<sup>[7]</sup> Some researchers argue that food addiction should be classified as abuse in the Diagnostic and Statistical Manual of Mental Disorders V (DSM V).<sup>[5,8]</sup> Healthcare providers familiar with food addiction and individuals who consider themselves to be food addicts meet all the food addiction criteria in binge-eating disorders and exhibit unrelenting characteristics of binge-eating disorders. The definition of food and food addiction in DSM V compares food addiction with drug addiction due to cravings and compulsive use in some individuals. This comparison is highly significant. This approach causes clinicians to see the issue as either a psychosocial eating disorder or a biochemical food addiction.<sup>[9]</sup>

The role of food addiction increasingly draws attention as the increase in the prevalence of obesity has reached a global epidemic level. However, food addiction in humans is still being researched.<sup>[10]</sup> According to a research conducted in Turkey, eating attitudes in adolescents have been significantly examined in the literature and it has been revealed that adolescents represent a high-risk group for eating disorders.<sup>[1,2,11]</sup> However, there are limited studies regarding food addiction and the factors affecting food addiction in adolescents.

This study aimed to examine food addiction and the factors affecting food addiction in high school students.

## Materials and Method

### Aim and Design

This is a descriptive cross-sectional research conducted to determine food addiction and the factors affecting food addiction among high school students.

### Research Questions

1. What is the food addiction level in high school students?
2. What are the factors affecting food addiction in high school students?

### Setting and Time

This research was carried out with students attending high schools affiliated with the Izmir Provincial Directorate of National Education between March 2014 and June 2014.

### Sample

The population consisted of high school students in Konak, Izmir, Turkey. Three high schools affiliated with the Konak

District Directorate of National Education were selected by random sampling method when forming the sample group. The sample group was composed of 612 students with 96% confidence level and 4% margin of error (Response rate: 98.40%).

### Inclusion Criteria

The following criteria was used when selecting the research group; volunteering to participate in the research, enrolled in high school, being open to communication, and no hearing or comprehension problems.

### Instruments

#### Questionnaire Form

A Personal Information Form based on literature and expert opinions was prepared for the research. The form consisted of 46 questions used to determine sociocultural structures, family characteristics and the eating habits of students. BMI (body mass index) was calculated as weight (kg)/height (m<sup>2</sup>).

#### Food Addiction Scale

The Yale Food Addiction Scale, developed by Gearhardt et al. in 2009 and adapted to Turkish by Bayraktar et al. in 2012, consisting of 27 questions was used for data collection.<sup>[12]</sup>

The items in the scale are as follows:

- Food consumption in excessive amounts and for prolonged durations (Items 1, 2, 3)
- Desire to quit and unsuccessful attempts to quit (Items 4, 22, 24, 25)
- Recovery, time spent accessing and using the substance, and whether it fulfills the need (Items 5, 6, 7)
- Reduced or disappearing social or business life and spare time activities (Items 8, 9, 10, 11)
- Consistent use although aware of negative effects and consequences (Item 9)
- Tolerance (increase in amount and decrease in effect); (Items 20, 21)
- Withdrawal symptoms and continued use to mitigate withdrawal symptoms (Items 12, 13, 14)
- Clinical disorders (Items 15, 16)
- For purposes of evaluation of the scale, questions numbered 17, 18 and 23 were not scored. These were preparative questions for other questions.
- Questions numbered 26 and 27 provided information on the foods the participants cannot stop eating.

The questions addressed all addiction criteria (tolerance, withdrawal, clinical symptoms etc.). If the score is equal to or above 1, it is considered that respective criterion has been experienced and the score is taken as 1. If the score is 0, it means that respective criterion has not been experienced.

For the availability of diagnosis criteria, a score of equal to 1 for purposes of calculating clinical disorders and symptoms must be higher than 3. Such scores must be either 0 or 1. If the score is equal to 1, a food addiction exists.

### Ethical Considerations

The İzmir Provincial Directorate of National Education research, competition and social activity committee gave ethical approval (dated 07.03.2012 and numbered B.08.0.YET.00.20.00.0/3616). The students voluntarily participated in the research and gave written consent.

### Data Analysis

Data obtained was evaluated using IBM SPSS Statics Version 22 software for the specified purposes. For comparison of variables among groups, Pearson Chi-Square, Fisher's Exact test and Chi-Square trend statistical analyses was used.  $P < 0.05$  was considered 'statistically significant'.

### Results

A total of 612 adolescents (52.5%  $n=321$  male and 47.5%  $n=291$  female) aged 13–19 years ( $16 \pm 0.85$ ) were included in this study. Table 1 shows the socio-demographic characteristics of the students.

**Table 1. Demographic characteristics of adolescents**

	n	%
Age, Mean $\pm$ SD (Min.-Max.)	16 $\pm$ 0.85 (13–19)	
Gender		
Female	291	47.5
Male	321	52.5
Body mass index		
Thin	126	20.6
Normal	417	68.1
Overweight	69	11.3
Grade		
1	204	33.3
2	308	50.3
3	100	16.3
Smoking		
Yes	54	8.8
No	558	91.2
Alcohol		
Yes	88	14.4
No	524	85.6
Substance use		
Yes	11	1.8
No	601	98.2

SD: Standard deviation; Min.: Minimum; Max.: Maximum.

When the ideas of adolescents and friends were examined about their own self-image, the study showed that they expressed the following in the physical evaluation; I have characteristics which are not beautiful/handsome (45.1%) and I have many friends (84.3%), I am also content with my weight (49.0%). When the students were asked "How much do you worry about gaining weight?" the majority answered not at all (31.4%) while 15.8% said that it worries them a lot. In the responses to the question "How much do you worry about losing weight?", the majority of respondents replied not at all (55.4%) while 9.3% replied it worries them a lot. When the adolescents were asked their thoughts regarding eating and weight loss, it was shown that the majority answered not at all (49.0%) to the question "Do you have any eating problems or excessive eating", and 51.6% responded they had a binge-eating problem to the question "If you had eating problems, what is it". The majority of adolescents do not vomit willingly (95.3%), have not tried to lose weight before now (62.3%) or within the last one year (56.4%), and perform sports and exercise to lose weight (52.9%). When the eating habits of the adolescents were examined, it revealed the majority had irregular eating habits (52.5%), eat the most during evening meals (37.6%), consume their food within 15-30 minutes (55.1%) and drink 501–1000 ml water daily (35.6%). Most of the students were calm (45.3 %) when consuming meals. When they were sad/tired (36.1%) and happy/excited (55.1%) there was no change in eating habits, however, they thought there was a correlation between mood and eating (59.8%). In response to the question "Do you feel unhappy or combative if you do not eat", 31.2% noted "sometimes". With the question "Do you lose control when you get angry" 34.3% answered "sometimes".

When the relationship between adolescents, their families and guidance counseling is examined, results show that most of them (75.3%) have not consulted a guidance counselor. The ones who consulted a guidance counselor got help for their personal problems (44.4%) and 93.5% said "there is no psychiatric patients in the family". Additional data showed 96.1% stated "they do not have any physiological problems", "they do not have any physical diseases" (94.6%), "they do not have any disease which may affect their nutrition" (95.8%) and "they do not exercise regularly" (57.4%).

The food resulting in excessive eating habits is ranked as follows: chocolate/wafer (46.9%), chips (44.6%), coke/soda (42.0%), pizza/lahmacun (a type of Turkish pizza) /döner (39.9%) and ice cream (38.6%).

When the Yale Food Addiction scale scores of adolescents were examined, it showed the adolescents continued to eat although they were aware of the negative consequences (60.1%), there was an increase in tolerance (increase in amount, decrease in effect) (78.3%), characteristic withdrawal symptoms did not occur (81.4%), and significant clinical conditions caused by eating habits were not seen (87.4%) (Table 2).

**Table 2. Criterion Comparison Ratios based on the Yale Food Addiction Scale Scores of Adolescents**

	Criterion met		Criterion not met	
	n	%	n	%
Eating more and for a longer period than necessary	171	27.9	441	72.1
Constant food craving or repeated unsuccessful attempts to quit	577	94.3	35	5.7
Spending too much time/activity to obtain or consume food	171	27.9	441	72.1
Quitting or reducing important social, educational or other activities	128	20.9	484	79.1
Continuing to eat although aware of negative consequences	368	60.1	244	39.9
Tolerance development (increase in amount, decrease in effect)	479	78.3	133	21.7
Characteristic withdrawal symptoms	114	18.6	498	81.4
Important clinical disorders caused by eating	77	12.6	535	87.4

The study showed that 12.4% of the adolescents in the sample group (n=612) had food addiction while 87.6% did not have food addiction (Fig. 1).

When variables affecting food addiction of adolescents were examined, it was found that girls exhibit a statistically significant greater food addiction compared to boys (p<0.005). However, those who are successful at school and those who do not smoke or use alcohol have greater food addiction scores than others; the difference between them was not found to be statistically significant (Table 3).

Groups that noted “they have characteristics which are not beautiful/handsome”, “have many friends”, “want to be thinner”, consider their eating problems as mild. Those wanting to eat excessively based on their self-perception have food addiction problems. When the variables of food addiction rates are examined, the difference between the groups were found to have statistically significant difference (p<0.05). In adolescents who have irregular eating habits, consume a meal within 15–30 minutes, and feel happier while eating, it was found that food addiction was greater than other groups but the difference between them was not statistically significant (p>0.05) (Table 3).

The study showed that students who state there is a correla-

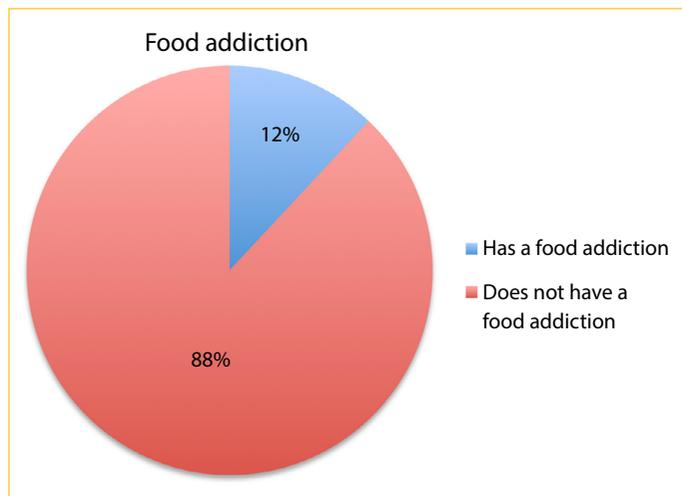
tion between mood and eating and those who sometimes become “anxious/unhappy” when they do not eat demonstrate food addiction problems (p<0.05). Although adolescents who state they have a psychiatric or physical condition have greater food addiction rates, the difference between them was not found to be statistically significant (p>0.05) (Table 3).

**Discussion**

Food addiction is a serious problem where individuals cannot stop themselves from eating certain foods. Food addiction is a newly defined yet controversial condition that has important etiological, developmental, treatment, prevention, and social policy implications.<sup>[13–15]</sup>

In this research examining food addiction in high-school adolescents, it was noted that 12.4% of the adolescents (n=76) have food addictions. Eating disorders are psychiatric conditions that usually start during adolescence and early adulthood.<sup>[1,16]</sup> Kaye<sup>[17]</sup> states in his study that frequency and prevalence of eating disorders are higher during adolescence and among young girls. Eating disorder ratio is estimated to be 0.2–1% in the literature.<sup>[16]</sup> A study which compiles epidemiological research states that eating disorder prevalence ranges between 1 and 20% in women.<sup>[18]</sup> In a research conducted in Turkey with female and male high school students aged 14–19, it was revealed that 4% of the group has eating disorders.<sup>[11]</sup> Rosenvinge et al.<sup>[19]</sup> has determined 3% of 15-year-old girls have eating disorders in their research, however, eating disorder criteria has not been observed in any of the 214 males in the study. In line with the literature, 64.5% (n=49) of adolescents showing food addiction were female while 35.5% (n=27) were male. Considering the increase in issues of being thin, beautiful and diet magnified in media in recent years, it is considered a normal consequence that eating disorders are more prevalent in females than males.

Increase in income can create a risk for eating disorders. An improvement in economic situation can lead to increased consumption of high-calorie food and inactivity. Ramachandran et al.<sup>[20]</sup> determined that obesity is more prevalent at higher economic levels. In this research, it was found that only the



**Figure 1.** Ratio of food addiction in adolescents.

**Table 3. Factors affecting food addiction**

	Food addiction				Total		p
	Yes		No		n	%	
	n	%	n	%			
Gender							
Female	49	64.5	242	45.1	291	47.5	0.002
Male	27	35.5	294	54.9	321	52.5	
Self-perception							
I am kind of beautiful/handsome	25	32.9	243	45.3	268	43.8	0.004
I have properties which are not beautiful/handsome	35	46.1	241	45.0	276	45.1	
I am ugly	16	21.1	52	9.7	68	11.1	
Self-description							
I have many friends	56	73.7	460	85.8	516	84.3	0.007
Yes, but I would like to have more	15	19.7	60	11.2	75	12.3	
I have no friends	5	6.6	16	3.0	21	3.4	
Self-evaluation							
I would like to be thinner	42	55.3	180	33.6	222	36.3	0.000
I would like to be heavier	13	17.1	76	14.4	90	14.7	
I am content with my weight	21	27.6	279	52.1	300	49.0	
Eating problem							
Not at all	17	22.4	283	52.8	300	49.0	0.000
A little	16	21.1	128	23.9	144	23.5	
Mild	22	28.9	83	15.5	105	17.2	
Strong	7	9.2	29	5.4	36	5.9	
Severe	14	18.4	13	2.4	27	4.4	
What kind of problem							
Excessive eating	34	57.6	127	50.2	161	51.6	0.002
Eating and vomiting	2	63.4	4	1.6	6	1.9	
Too little or limited eating	9	15.3	94	37.2	103	33.0	
Excessive thinness	7	11.9	19	7.5	26	8.3	
Obesity	7	11.9	9	3.5	16	5.1	
Your general mood while consuming your meals							
Happy	30	39.5	217	40.5	247	40.3	0.017
Unhappy	4	5.3	16	3.0	20	3.3	
Nervous	5	6.6	20	3.7	25	4.1	
Stressed	11	14.5	32	6.0	43	7.1	
Calm	26	34.2	251	46.8	277	45.2	
Correlation between mood and eating							
Yes	58	76.3	308	57.5	366	59.8	0.002
No	18	23.7	228	42.5	246	40.2	
Do you feel unhappy/irritable when you do not eat?							
Very often	18	23.7	91	17.0	109	17.8	0.005
Sometimes	31	40.8	160	29.9	191	31	
Rarely	16	21.1	147	27.4	163	26.6	
Never	11	14.5	138	25.7	149	24.6	
Food definition							
Regular	23	30.3	228	42.5	251	41.0	0.190
Irregular	48	63.2	273	50.9	321	52.5	
Only fastfood	1	1.3	10	1.9	1	1.8	
Other	4	5.3	25	4.7	29	4.7	
Total	76	12.4	536	87.6	612	100	
Eating time							
Less than 15 minutes	22	28.9	195	36.4	217	35.5	0.071
15–30 minutes	41	53.9	296	55.2	337	55.1	
30–60 minutes	12	15.8	32	6.0	44	7.2	
More than 60 minutes	1	1.3	13	2.4	14	2.3	
Total	76	12.4	536	87.6	612	100	

fathers of adolescents were employed and the economic status of the majority of participants was at a moderate level. The groups with higher levels of food addiction were adolescents with moderate economic status. An association exists with eating problems at an addictive level in moderate income status unlike the literature which identifies other psychological factors in the dynamics of addiction. Based on findings, economic status has an effect on available “pocket money” and the snacking habits of students.

Considering that smoking habits starts during adolescence and leads to regular smoking in adulthood, the smoking rate of 8.8% (n=54) found in this study is promising. When the literature is examined, parallelisms and simultaneity between eating disorders and alcohol and substance use is noted. According to the study where Schuckit et al.<sup>[21]</sup> examined the correlation between alcoholism and eating disorders, anorexia and bulimia rates in alcoholic women was found to be 1.41% and 6.17% respectively while the bulimia rate was found to be 1.35% in males. No anorexia was seen in this group. In this study, it was found that alcohol usage rate was 14.4% (n=88) in adolescents while food addiction scores are higher in those who do not smoke or use alcohol.

The research conducted by Köse<sup>[22]</sup> determined that snacking habits of students are 59.7%. The study carried out by Sormaz et al.<sup>[23]</sup> reported that all students participating in the research consume fast-food during and between meals while the research made by Türk et al.<sup>[24]</sup> reported that 50% of students consume such food. When the balanced diet of adolescents was examined in the research, it was found that 52.5% of adolescents have irregular eating habits, ate evening meals more frequently and finished their meal within 15–30 minutes. When compared with food addiction criteria, it was observed that food addiction rates in adolescents who have irregular eating habits was 63.2% while food addiction prevalence rate was 53.9% in adolescents who finished their meal within 15–30 minutes. Food addiction was more prevalent among those adolescents who eat rapidly and on an irregular schedule.

When addiction rates based on eating problems were evaluated, it was seen that the group with mild eating problems and excessive desire for food had food addiction. Imperatori et al.<sup>[25]</sup> similarly reports that food addiction is more prevalent in the group with excessive food cravings.

Before the concept of food addiction, clinical research had started evaluating excessive craving for chocolate, sugar and food rich in carbohydrates. Nasser et al.<sup>[26]</sup> showed in a clinical research that excessive chocolate consumption has a directly measurable psychoactive effect. The cacao and sugar content had a direct impact on such cravings. The study conducted by Avena et al.<sup>[27]</sup> emphasized that all food does not lead to addictive-like behaviors but such effects are more apparent in food containing salt, fat, sugar and additives. When adolescents in this research were asked about which food caused excessive cravings, 46.9% answered chocolate/wafers while 44.6% answered chips, these results are parallel with the literature.

There are several studies examining the correlation between eating problems and physical activity and participation in sports.<sup>[28,30]</sup> There are opinions arguing that exercise might have both positive and negative effects on physical and mental development.<sup>[29]</sup> Cook and Hausenblas<sup>[31]</sup> stated that exercise addiction is an intermediary between physical activity and eating disorders. Imperatori et al.<sup>[25]</sup> highlighted that exercise is an important factor in preventing food addiction whereas exercise addiction has the opposite effect. Another study reported that physical activity is an important factor against food addiction however obesity leads to highly restrictive physical activity.<sup>[32]</sup> Shroff et al.<sup>[33]</sup> reported in their study that excessive physical activity is a common phenomenon in more than 80% of patients with eating disorders.

In patients with clinical and scientific eating disorders, weight, shape and appearance are the primary reasons for exercising.<sup>[33]</sup> Another study focused on the importance of reducing negative effects of exercise in patients with an eating disorder.<sup>[30]</sup> Other studies on gender differences found gender difference significant in exercise addiction.<sup>[34]</sup> The research along with literature has found that 55.3% of the group with food addiction are overweight and state they “would like to be thinner”. Additionally, 42.6% of the adolescents participating in the research exercise regularly while only 35.5% of the group with food addiction exercise regularly unlike findings in the literature. Food addiction is based on a different pathophysiology than eating disorders. The exercise rate in this group with eating problems at addiction level is at an expected level.

When the correlation between mood and eating is examined, Ünal et al.<sup>[13]</sup> asserts that some individuals consume more food when they are stressed while others react in an opposite way. Attention is drawn to the emotional regulation which plays an important role in addiction behavior and is also observed in certain eating behaviors and disorders. Conversely, he notes that the higher prevalence of depression and anxiety among people with binge-eating disorder leads to frequent experiencing of negative moods. Such negative processes might be an important trigger for binge-eating behavior.<sup>[35]</sup> In another research, mood was found to have an effect on food intake. Normal or low-weight individuals eat less during negative moods while overweight people eat more during such moods.<sup>[36,37]</sup> In a research carried out with a group of obese women with binge-eating behaviors, it was determined that they eat more (chocolate etc.) in the state of negative moods (while watching a sad movie).<sup>[37]</sup> Another study reported that depressive symptoms have a positive correlation with emotional eating while there is a negative correlation with physical activity.<sup>[38]</sup> This research questioned how psychological states affected eating behaviors. Accordingly, of the individuals in the study group, 38.5% state they eat less than usual when stressed, 38.5% when experiencing sadness, and 46.2% while angry, and 46.2% state they eat slightly more than usual when they experience happiness. Of the adolescents participating in the study 59.8% expressed a correlation between mood and eating and this ratio increased up to 76.3% in the group with food

addiction. Consequently, emotional expression should also be reviewed in the said group.

Based on recent studies researchers support that several factors play a role in the etiology of eating disorders.<sup>[30,32]</sup> Biological and psychological disposition, family status and interaction of social conditions are considered to be risk factors in eating disorders.<sup>[37]</sup> In addition to these, risk factors including previous psychological trauma with a negative effect on life, habits such as smoking and alcohol use in adolescents, and genetic predisposition etc. are also connected with food addiction.<sup>[27,34]</sup> It was shown that adolescents who exhibit eating disorder behaviors have major depression or anxiety disorders as well.<sup>[33]</sup> Unlike the literature, this research determined that psychiatric problems and physical condition in adolescents with food addiction are lower than the group without food addiction. In daily life, many people describe themselves as happy when they eat.<sup>[38]</sup>

Research has found that individuals who think eating results in positive emotions have an anomaly in their reward system which is stimulated by eating. In a clinical research supporting this observation, it was found that adolescents who think eating reduces negative emotions and leads to positive emotions develop binge-eating behaviors more than those who do not within the 3-year observation period.<sup>[40]</sup> In a similar research, it was determined that the expectation that eating increases positive emotions played a significant role in persist binge-eating behavior in a 96-year old woman diagnosed with bulimia nervosa during the 1-year monitoring period.<sup>[34]</sup> Conversely, it was found that the existence of negative emotions such as depression or anxiety in young people who are overweight and seek treatment leads to loss of control over eating behaviors. Eating appears to be an emotion regulator and depression rates are also higher in such people.<sup>[25]</sup>

School-based primary action programs aims to enable individuals to define their dissatisfaction about their body and thus improve their self-esteem and personal confidence.<sup>[39]</sup> This is not a female adolescent specific problem. Males who are preoccupied with their body image and weight might also develop eating disorders.<sup>[40]</sup> Research carried out by the US Centers for Disease Control and Prevention in 2001 found that 46% of the 9<sup>th</sup>-12<sup>th</sup> grade students had tried to lose weight within the previous month.<sup>[40]</sup> Similar to the literature, this research showed that 47.3% of the adolescents with food addiction stated they "have properties which are not beautiful/handsome" while 55.3% stated they "would like to be thinner".

In conclusion, it was seen that 12.4% of the adolescents had food addiction while 87.6% did not have food addiction. Girls had higher food addiction rates than boys. Research strongly supports that adopting correct eating habits is important for students to maintain health in their future life. Additionally, deficiencies in eating information and habits must be addressed by family, school and healthcare professionals (nurse, physician etc.)

## Acknowledgements

We would like to thank all the participating adolescents for sharing information.

**Conflict of interest:** There are no relevant conflicts of interest to disclose.

**Peer-review:** Externally peer-reviewed.

**Authorship contributions:** Concept – H.D., L.K.; Design – H.D., L.K.; Supervision – H.D., L.K.; Fundings - H.D., L.K.; Materials – H.D.; Data collection &/or processing – H.D.; Analysis and/or interpretation – H.D.; Literature search – H.D., L.K.; Writing – H.D.; Critical review – H.D., L.K.

## References

- Demirezen E, Coşansu G. Evaluating Dietary Pattern in Adolescence. *Sted* 2005;8:174–8.
- Pekcan H. Okul Sağlığı. Halk Sağlığı Temel Bilgiler. 3. Baskı. Ankara: Güneş Kitabevi: 1997. pp. 210–34.
- Michener W, Rozin P. Pharmacological versus sensory factors in the satiation of chocolate craving. *Physiol Behav* 1994;56:419–22.
- Davis CA, Levitan RD, Reid C, Carter JC, et al. Dopamine for "wanting" and opioids for "liking": a comparison of obese adults with and without binge eating. *Obesity (Silver Spring)* 2009;17:1220–5.
- Chua JL, Touyz S, Hill AJ. Negative mood-induced overeating in obese binge eaters: an experimental study. *Int J Obes Relat Metab Disord* 2004;28:606–10.
- Taylor VH, Curtis CM, Davis C. The obesity epidemic: the role of addiction. *CMAJ* 2010;182:327–8.
- Meseri R, Bilge A, Küçükerdönmez Ö, Altıntoprak E. Food Addiction and Obesity. *Journal of Neurological Sciences* 2016;33:392–400.
- Volkow N, O'Brien C. Issues for DSM-V: should obesity be included as a brain disorder? *Am J Psychiatry* 2007;164:708–10.
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. American Psychiatric Association 2013. p. 350–2.
- Pedram P, Wadden D, Amini P, Gulliver W, et al. Food Addiction: Its Prevalence and Significant Association with Obesity in the General Population. *PlosOne* 2013;8:e74832.
- Alpaslan AH, Koçak U, Avcı K, Uzel Taş H. The association between internet addiction and disordered eating attitudes among Turkish high school students. *Eat Weight Disord* 2015;20:441–8.
- Bayraktar F, Erkman F, Kurtuluş E. Adaptation study of Yale Food Addiction Scale. *Bulletin of Clinical Psychopharmacology* 2012;22:538.
- Ünal E, Aydın R, Gökler ME, Ünsal A. Eating disorders and anxiety among high school students in Western area of Turkey. *International Journal of Research in Medical Sciences* 2017;4:3513–20.
- Brewerton TD. Food addiction as a Proxy for eating disorder and obesity severity, trauma history, PTSD symptoms and comorbidity. *Eat Weight Disord* 2017;22:1–7.

15. Wiss DA, Brewerton TD. Incorporating food addiction into disordered eating: the disordered eating food addiction nutrition guide (DEFANG). *Eat Weight Disord* 2017;22:45–59.
16. Hoek HW, van Hoeken D. Review of the prevalence and incidence of eating disorders. *Int J Eat Disord* 2003;34:383–96.
17. Kaye W. Neurobiology of anorexia and bulimia nervosa. *Physiol Behav* 2008;94:121–35.
18. Wilson GT. Eating disorders, obesity and addiction. *Eur Eat Disord Rev* 2010;18:341–51.
19. Rosenvinge JH, Sundgot-Borgen J, Børresen R. The prevalence and psychological correlates of anorexia nervosa, bulimia nervosa and binge eating among 15-year-old students: a controlled epidemiological study. *European Eating Disorders Review* 1999;7:382–91.
20. Ramachandran A, Snehalatha C, Vinitha R, Thayyil M, et al. Prevalence of overweight in urban Indian adolescent school children. *Diabetes Res Clin Pract* 2002;57:185–90.
21. Schuckit MA, Tipp JE, Anthenelli RM, Bucholz KK, Hesselbrock VM, Nurnberger, Jr. Anorexia nervosa and bulimia nervosa in alcohol-dependent men and women and their relatives. *The American Journal of Psychiatry* 1996;153:74–82.
22. Köse A. Zonguldak il merkezinde 15-17 yaş grubu genel lise öğrencilerinde öğün dışı yeme alışkanlığının incelenmesi. [Yüksek Lisans Tezi] Zonguldak: Zonguldak Karaelmas Üniversitesi Sağlık Bilimleri Enstitüsü; 2005.
23. Sormaz Ü, Sürücüoğlu MS, Akan LS. Beslenme kültüründeki eğilim: Fastfood yemek tercihleri. *ICANAS Maddi Kültür Kitabı* 3. Cilt. 2005. p. 1211–31.
24. Türk M, Gürsoy ŞT, Ergin I. Kentsel Bölgede lise birinci sınıf öğrencilerinin beslenme alışkanlıkları. *Genel Tıp Dergisi* 2007;17:81–7.
25. Imperatori C, Innamorati M, Contardi A, Continisio M, et al. The association among food addiction, binge eating severity and psychopathology in obese and overweight patients attending low-energy-diet therapy. *Compr Psychiatry* 2014;55:1358–62.
26. Nasser JA, Bradley LE, Leitzsch JB, Chohan O, et al. Psychoactive effects of tasting chocolate and desire for more chocolate. *Physiol Behav* 2001;104:117–21.
27. Avena NM, Rada P, Hoebel BG. Evidence for sugar addiction: behavioral and neurochemical effects of intermittent, excessive sugar intake. *Neurosci Biobehav Rev* 2008;32:20–39.
28. Strober M, Freeman R, Morrell W. The long-term course of severe anorexia nervosa in adolescents: Survival analysis of recovery, relapse, and outcome predictors over 10–15 years in a prospective study. *Int J Eat Disord* 1997;22:339–60.
29. Mond JM, Calogero RM. Excessive exercise in eating disorder patients and in healthy women. *Aust N Z J Psychiatry* 2009;43:227–34.
30. Dallegrove R, Calugi S, Marchesini G. Compulsive exercise to control shape or weight in eating disorders: prevalence, associated features, and treatment outcome. *Compr Psychiatry* 2008;49:346–52.
31. Cook BJ, Hausenblas HA. The role of exercise dependence for the relationship between exercise behavior and eating pathology: Mediator or moderator? *J Health Psychol* 2008;13:495–502.
32. Davis, C, Carter JC. Compulsive overeating as an addiction disorder. A review of theory and evidence. *Appetite* 2009;53:1–8.
33. Shroff H, Reba L, Thornton LM, Tozzi F, et al. Features associated with excessive exercise in women with eating disorders. *Int J Eat Disord* 2006;39:454–61.
34. Hausenblas HA, Downs SD. Relationship among sex, imagery, and exercise dependence symptoms. *Psychology of Addictive Behaviors* 2002;16:169–72.
35. Wetter DW, Kenford SL, Welsch SK, Smith SS, et al. Prevalence and predictors of transitions in smoking behavior among college students. *Health Psychol* 2004;23:168–77.
36. Stice E, Spoor S, Ng J, Zald DH. Relation of obesity to consummatory and anticipatory food reward. *Physiol Behav* 2009;97:551–60.
37. Womble LG, Williamson DA, Martin CK, Zucker NL, et al. Psychosocial variable associated with binge eating in obese males and females. *Int J Eat Disord* 2001;30:217–21.
38. Konttinen H, Silventoinen K, Sarlio-Lanteenkorva S, Mannisto S, et al. Emotional eating and physical activity self-efficacy as pathways in the association between depressive symptoms and adiposity indicators. *Am J Clin Nutr* 2010;92:1031–9.
39. Fairburn CG, Harrison PJ. Eating disorders. *Lancet* 2003;361:407–16.
40. Godart NT, Flament MF, Perdereau F, Jeammet P. Comorbidity between eating disorders and anxiety disorders: a review. *Int J Eat Disord* 2002;32:253–70.