Karabük Üniversitesi İktisadi ve İdari Bilimler Fakültesi (UNIKA Toplum ve Bilim) Dergisi, Y.2023 C.3, S.1, s.31-42.
Makale Geliş Tarihi: 28.04.2023 Makale Türü: Araştırma
Makale Kabul Tarihi: 08.06.2023

EXAMINATION OF THE RELATIONSHIP BETWEEN EATING ADDICTION, APPETITE STATUS AND SMARTPHONE ADDICTION

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Abstract

Addiction is defined as the inability to stop using a substance or control any behaviour. This study aims to reveal the relationships between food addiction, appetite status and smartphone addiction, which are very common today. 425 university students including 306 females and 119 males, with a mean age of 21.83±9.43 (years) were included in the study. Within the scope of the study, a questionnaire including personal information, nutritional status and habits, general health status and physical activity records was applied to the participants by the researchers. In addition, Simplified Nutrition Evaluation Questionnaire (SNAQ), Yale Eating Addiction Scale and Smartphone Addiction Scale were applied. One of the important findings obtained within the scope of the study is that there is a statistically significant difference between Yale Eating Addiction Scale and Smartphone Addiction Scale scores (t=4.871; p=0.000). Based on this finding, the phone addiction scale scores of individuals with food addiction are significantly higher than those without food addiction. In this direction, the authors suggest that the concept of addiction should be considered without separating it into independent sub-categories such as alcohol or drug addiction or behavioural addictions such as gambling addiction and smartphone addiction, and that addiction should be addressed from a holistic biopsychosocial perspective.

Key Words: Food addiction, Smartphone addiction, Appetite status.

YEME BAĞIMLILIĞI, İŞTAH DURUMU VE AKILLI TELEFON BAĞIMLILIĞI ARASINDAKİ İLİŞKİNİN İNCELENMESİ

Öz

Bağımlılık, bir maddeyi kullanmayı bırakamama veya herhangi davranışı kontrol edememe olarak tanımlanmaktadır. Bu çalışma günümüzde oldukça yaygın bir biçimde karşılaşılan yeme bağımlılığı, iştah durumu ve akıllı telefon bağımlılığı arasındaki ilişkileri ortaya koymayı amaçlamaktadır. Çalışmaya yaş ortalaması 21.83±9.43 (yıl) olan 306 kadın, 119 erkek olmak üzere toplam 425 üniversite öğrencisi dahil edildi. Araştırma kapsamında katılımcılara araştırmacılar tarafından kişisel bilgiler, beslenme durumu ve alışkanlıkları, genel sağlık durumu ve fiziksel aktivite kayıtlarını içeren bir anket uygulandı. Bunun yanında Basitleştirilmiş Beslenme Değerlendirme Anketi (SNAQ), Yale Yeme Bağımlılığı Ölçeği ve Akıllı Telefon Bağımlılığı Ölçeği uygulandı. Çalışma kapsamında elde edilen önemli bulgulardan biri; Yale Yeme Bağımlılığı Ölçeği ve Akıllı Telefon Bağımlılığı Ölçeği puanları arasında istatistiksel olarak anlamlı bir farkın bulunmasıdır (t=4,871; p=0,000). Bu bulguya göre yeme bağımlılığı olan bireylerin akıllı telefon bağımlılığı ölçek puanları yeme bağımlılığı olmayanlara göre anlamlı bir şekilde daha yüksektir. Bu doğrultuda yazarlar bağımlılık kavramının alkol ya da uyuşturucu madde bağımlılığı ya da kumar bağımlılığı ve akıllı telefon bağımlılığı gibi davranışsal bağımlılıklar şeklinde bir birinden bağımsız alt kategorilere ayrılmadan bir bütün olarak ele alınması ve bağımlılıkla biyopsikososyal açıdan bütüncül bir bakış açısıyla mücadele edilmesini önermektedir.

Anahtar Kelimeler: Yeme bağımlılığı, Akıllı telefon bağımlılığı, İştah durumu.

1. Introduction

Addiction is defined as the inability to stop using or control a substance or behaviour. Addiction is a wide spectrum, and any object can lead to addiction for individuals (Blüher, 2019; Pineda et al., 2018). Individuals can be addicted to many substances such as cigarettes, alcohol, drugs. They may also develop addictions to behaviours such as eating, gaming, sex, computer, smartphone, television, shopping, and internet addiction, which are considered behavioural addictions (Chu et al., 2018; Rohde et al., 2019). Studies have reported that individuals with internet addiction, social media addiction, smartphone addiction, and food addiction show similar symptoms to individuals with other behavioural addictions or chemical addictions. These individuals commonly exhibit features such as not being able to control their behaviour or actions and the continuity of their behaviour or actions despite negative consequences (Rohde et al., 2019; Qi et al., 2012; Leigh et al., 2018). Addictions have been observed to be related to each other and are related to the dependent personality trait (Leigh

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Bu Yayına Atıfta Bulunmak İçin: Zengin O. Ilgaz, A. ve Doğan Güney, H. (2023). Examination of the Relationship Between Eating Addiction, Appetite Status and Smartphone Addiction. *UNIKA Toplum ve Bilim Dergisi*, 3(1), 31-42.

et al., 2018; Ziauddeen et al., 2015; Schulte et al., 2017). From this point of view, this study aims to reveal the relationship between food addiction and smartphone addiction.

1.1. Eating Addiction

Over the past half-century, there has been a notable rise in the prevalence of obesity globally, which can be attributed to changes in eating patterns and more inactive ways of life (Schulte et al., 2017). The World Health Organization (WHO) defines excessive weight gain and obesity as the accumulation of fat that jeopardizes one's health (Meule et al., 2014). Projections suggest that if this trend persists, almost 38% of the world's adult population could be overweight and 20% could be obese by 2030 (Gordon et al., 2018). In addition to behavioural and genetic risk factors, a sedentary lifestyle and irregular eating habits can lead to weight gain (Gordon et al., 2018; Burrows et al., 2018; Pursey et al., 2014). Overweight and obesity have been linked to various health conditions such as dyslipidaemia, type 2 diabetes, hypertension, certain types of cancer, and reproductive disorders (Pursey et al., 2014). Although both genetic and non-genetic factors are associated with weight gain, non-genetic factors like eating behaviour can affect genetic susceptibility to obesity via epigenetic mechanisms (Pursey et al., 2014; Hauck et al., 2017; Bradbury et al., 2019).

Today's people are not biologically hungry for many foods; they consume them because of emotional or sensory hunger. Even when not hungry, environmental factors, advertising campaigns, or satisfying experiences can lead to higher consumption of certain foods (Kenney et al., 2017). This urge to overeat certain foods causes an eating style that focuses on tasty foods and is defined as food addiction. This pleasure associated with eating affects reward circuits in the same way as other addictive substances such as alcohol or opioids. There is some debate about the exact name of the disorder because only certain foods, not any type of food, cause this addiction (Wasa et al., 2019). In a survey conducted by the North American Health Organization with more than 5000 members, 66% of individuals believe that certain foods are addictive, and this belief is common among those who are overweight and have a high tendency to eat. Foods high in fat, salt, and sugar have the greatest addiction potential. Addiction to these foods is thought to be the underlying cause of many obesity cases (Odgers et al., 2020; Eunice Kennedy Shriver National Institute of Childhood Health and Human Development, 2019).

In the latest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), food addiction and many other types of addiction are not addressed (Eunice Kennedy Shriver National Institute of Childhood Health and Human Development, 2019). Discussions about the inclusion of food addiction are on the agenda, and scientific articles examining this disorder have increased in recent years (Kwon et al., 2013). Most studies evaluating food addiction have primarily focused on evaluating patients with overweight/obesity or other mental disorders (Kwon et al., 2013; Kuss & Griffiths, 2011). It has been observed that young people are affected by external factors at a higher rate in the non-clinical population and food addiction is more common in the 18-29 age group (Hwang et al., 2012). Health professionals who can provide treatment to these individuals include dietitians, psychologists or psychiatrists, and these specialists should thoroughly investigate the clinical picture underlying the addictive eating disorder (Kim et al., 2014).

1.2. Smartphone Addiction

The use of mobile phones has surpassed watching television, with the emergence of smartphones (Griffiths, 2005). Similar to internet addiction, the increasing use of smartphones and the many features of these phones have brought smartphone addiction to the agenda (American Psychiatric Association,2013). About half of parents in the United States report that their children are addicted to mobile devices (Henderson, 2009). Smartphone addiction is not yet a diagnosis in official diagnostic systems, but many addiction features have been reported (Schulte et al., 2020). When the smartphone is used excessively; it can cause maladaptive behavioural problems and mental problems such as problems in school, business life, decrease in social interaction, decrease in academic

achievement, and disorders in relationships (Lee et al., 2013). Excessive smartphone use can cause maladaptive behavioural and mental problems, including depression and trait anxiety (Günüç et al., 2010). Impulsivity and depressive symptoms were found to be higher in individuals considered at risk for addiction (Süler, 2016). Increased screen time has been associated with physical health outcomes such as obesity and less sleep, and limited research has examined the relationship between smartphone use and obesity risk (Süler,2016; Lin et al., 2012; Minaz & Çetinkaya Bozkurt, 2017). Considering the concerns about smartphone addiction, it is discussed whether this situation can cause problematic eating behaviour and obesity in individuals. The gradual increase in addictive food consumption and smartphone usage habits suggests the relationship between these two types of addiction.

In summary; although many studies have examined the relationship between smartphone use and mental health, studies examining smartphone use and obesity risk are limited (Kutlu et al., 2016). The World Health Organization Strategic Plan prioritizes examining whether addictive smartphone use increases the risk of obesity (Kim et al., 2012). The aim of this study is to analyse the relationship between food addiction and smartphone addiction and to evaluate whether this relationship is related to individuals' body mass index, physical activity level, dietary styles, smoking habits, alcohol consumption, and health status.

2. Method

2.1. Study Design and Population

A total of 425 students from Karabük University, including 306 females and 119 males, with a mean age of 21.83±9.43 (years) were included in the study. Within the scope of the research, a questionnaire containing personal information, nutritional status and habits, general health status and physical activity records was applied to the participants by the researchers. Except for the sociodemographic characteristics and eating habits questionnaire; to assess appetite status, SNAQ (Simplified Nutrition Appetite Questionnaire), to question the eating habits of the past year; Yale Eating Addiction Scale; The Smartphone Addiction Scale was applied to the participants to inquire about smartphone usage. Reliability analyses of the scales are given in Table 1.

Table 1. Examining the reliability coefficient of the scales

Scale	Number of items	Cronbach -α coefficient
SNAQ	4	0.694
YALE Food Addiction Scale	13	0.870
Smartphone Addiction Scale	33	0.948

2.2. Data collection tools

2.2.1. SNAQ

SNAQ is a questionnaire consisting of 4 questions in total and 5 options in each question, and the total score range in the evaluation is 4-25. In line with the answers given by the individual, it is shown that individuals with a total score of 14 and below have a risk of losing 5% of their body weight within six months, and there is no risk if it is above 14 points (Wilson et al., 2005).

2.2.2. Yale Eating Addiction Scale

In 2016, Gearhardt et al. developed the LLL version 2.0. This scale, which consists of 35 items in total, includes the 11-item use disorder criterion in DSM 5 and its clinical significance (Rice ve Dolgin, 2002). Schulte et al. (2020) developed Modified LLL Version 2.0, which is a shorter version of LLL Version 2.0. This scale consists of a total of 13 items, including 11 substance use disorder criteria in DSM 5 and 2 statements reflecting clinical deterioration plus tension. The validity and reliability study of the modified YYBÖ 2.0 scale was conducted in our country in 2018 (Tok, 2018).

2.2.3. Smartphone Addiction Scale

The Smartphone Addiction Scale, developed by Kwon et al., is a 6-point Likert-type scale consisting of 33 questions. In the scale consisting of all plain items, each item was rated as "1=Absolutely No", "2=No", "3=Partly No", "4=Partly Yes", "5=Yes", "6=Absolutely Yes" (Kwon et al., 2013). The Turkish adaptation was made by Demirci, Orhan, Demirdaş, Akpınar and Sert in 2014. The lowest score that can be obtained from the scale is 33, and the highest score is 198. The cut-off score was not specified in the original form of the scale. As the score obtained increases, the risk of smartphone addiction also increases. The scale has a total of seven subgroups.

2.3. Ethical considerations

After the participants were given general information about the study, their declarations that they accepted the study on a voluntary basis were obtained with the "Informed Consent Form for Study for Research Purposes". Ethics committee approval also was obtained for the study with the decision of Karabük University Social and Human Sciences Research Ethics Committee dated 18/01/2022 and numbered 2022/01-19.

2.4. Data analysis

The data was interpreted using descriptive statistics and frequency tables. For measurement values that followed a normal distribution, parametric methods were used. The "Independent Sample-t" test (t-table value) was used to compare the measurement values of two independent groups, and the "ANOVA" test (F-table value) was used to compare the measurement values of three or more independent groups. For measurement values that did not follow a normal distribution, non-parametric methods were used. The "Mann-Whitney U" test (Z-table value) was used to compare the measured values of two independent groups. To examine the relationships between two qualitative variables, Pearson-χ 2 cross tables were used. To determine the factors that influence the risk status of food addiction (YALE), Binary Logistic Regression: Backward LR model was used.

3. Results

It was determined that the mean age of the subjects in the study was 21.83±9.43 (years) and 300 (70.6%) were in the 20-24 age group. It was determined that 306 people (72%) were women, 402 (94.6%) were single, 418 (98.4%) were at higher education level and 307 (72.2%) were at medium economic level. 293 people (68.9%) were in normal BMI class, 256 people (39.8%) thought they did not have adequate/balanced nutrition, 221 (52%) skipped meals, and 220 (51.8%) total number of meals was 3- It has been determined that 4. According to the SNAQ scoring, it was determined that 264 people (62.1%) were at serious risk for weight loss, 225 (52.9%) were not addicted to food, and 98 (49%) were addicted to eating disorders (Table 2).

Table 2. Sociodemographics and Eating Habits

Variable (N=425)	**n**	**%**
Gender		
Woman	306	72.0
Male	119	28.0
Age classes ($\bar{X} \pm$ S.S.→21,83±9,43 (yıl))		
<20	92	21.6
20-24	300	70.6
≥25	33	7.8
Marital status		
Married	23	5.4
Single	402	94.6
Level of education		
High school and equivalent	7	1.6
College and above	418	98.4
Economic level		
High	67	15.8
Moderate	307	72.2

Low	51	12.0
BMI classes ($\bar{X} \pm$ S.S.→21,92±3,62 (kg/m²))		
Weak	66	15.6
Normal	293	68.9
Overweight	54	12.7
Obese	12	2.8
Working status		
Yes	48	11.3
No	377	88.7
Smoking		
Yes	108	25.4
No	265	62.4
Sometimes	52	12.2
Drinking alcohol		
Yes	35	8.2
No	326	76.7
Sometimes	64	15.1
Thinking that you have an adequate and balanced diet	169	39.8
Yes	256	60.2
No		
Meal skipping status		
Yes	221	52.0
No	50	11.8
Sometimes	154	36.2
Skipped meal		
Morning	130	33.1
Noon	171	43.5
Evening	21	5.3
Snack	71	18.1
Reason for skipping meals		
Not wanting to	169	43.0
Lack of time	118	30.0
Other	106	27.0
Total number of meals		
1-2 meals	165	38.8
3-4 meals	220	51.8
≥5 meals	40	9.4
SNAQ category		
Has serious risk for weight loss	264	62.1
No risk for weight loss	161	37.9
YALE food addiction category		
There is addiction	200	47.1
No addiction	225	52.9
YALE food addiction severity		
Light	38	19.0
Middle	64	32.0
Serious	98	49.0

According to Table 3, there is no statistically significant relationship between food addiction status and age classes, education level, economic level, employment status, smoking and alcohol use ($p>0.05$). However, a statistically significant relationship was found between food addiction status and gender ($\chi^2=4.685$; $p<0.030$). It was determined that 154 people (77%) who were addicted to food were women, and 73 people (32.4%) who were not addicted to food were men. A statistically significant relationship was found between food addiction status and marital status ($\chi^2=4.944$; $p<0.026$). It was determined that 16 people (8%) with food addiction were married, and 218 people (96.9%) who were not addicted to food were single. A statistically significant relationship was found between food addiction status and BMI classes ($\chi^2=12,600$; $p<0.006$). It was determined that 34 people with food addiction (17%) were overweight, and 160 people who were not addicted to food

(71.1%) were in the normal BMI class. A statistically significant relationship was found between food addiction status and regular drug use (χ^2 =4.639; p<0.031). It was determined that 37 (18.5%) people who were food addicts used drugs regularly, and 200 people who were not addicted to food (88.9%) did not use drugs regularly.

Table 3. Examination of the Relationships between Food Addiction and Some Characteristics

YALE	Addiction (+) (n=200)		Dependency (-) (n=225)		Statistical analysis*
Variable	**n**	**%**	**n**	**%**	**Possibility**
Gender					
Woman	154	77.0	152	67.6	χ^2 =4.685
Male	46	23.0	73	32.4	**p = 0.030**
Age classes					
<20	40	20.0	52	23.1	χ^2 =2,923
20-24	140	70.0	160	71.1	p =0.232
≥25	20	10.0	13	5.8	
Marital status					
Married	16	8.0	7	3.1	χ^2 =4.944
Single	184	92.0	218	96.9	**p = 0.026**
Level of education					
High school and	5	2,5	2	0.9	χ^2 = 1.697
equivalent	195	97.5	223	99.1	p = 0.193
College and above					
Economic level					
High	29	14.5	38	16.9	χ^2 = 0.966
Moderate	149	74.5	158	70.2	p = 0.617
Low	22	11.0	29	12.9	
BMI classes					
Weak	24	12.0	42	18.7	
Normal	133	66.5	160	71.1	χ^2 =12,600
Overweight	34	17.0	20	8.9	**p =0.006**
Obese	9	4.5	3	1.3	
Working status					
Yes	27	13.5	21	9.3	χ^2 =1,835
No	173	86.5	204	90.7	p = 0.176
smoking					
Yes	53	26.5	55	24.4	χ^2 =0.649
No	125	62.5	140	62.2	p = 0.723
Sometimes	22	11.0	30	13.4	
Drinking alcohol					
Yes	16	8.0	19	8.4	χ^2 =0.076
No	153	76.5	173	76.9	p = 0.963
Sometimes	31	15.5	33	14.7	
Regular medication					
Yes	37	18.5	25	11.1	χ^2 =4.639
No	163	81.5	200	88.9	**p = 0.031**
Adequate nutrition					
Yes	60	30.0	109	48.4	χ^2 =15,039
No	140	70.0	116	51.6	**p = 0.000**
Skip meals					
Yes	115	57.5	106	47.1	χ^2 =4.723
No	22	11.0	28	12.5	p = 0.094
Sometimes	63	31.5	91	40.4	
Skipped meal					
Morning	62	33.0	68	33.2	
Noon	81	43.1	90	43.8	χ^2 =0.077
Evening	10	5.3	11th	5.4	p = 0.994
Snack	35	18.6	36	17.6	
Reason for skipping meals	81	42.6	88	43.3	χ^2 =0.165

Not wanting to	56	29.5	62	30.5	p = 0.921
Lack of time	53	27.9	53	26.2	
Other					
Total number of meals					
1-2 meals	80	40.0	85	37.8	χ^2 =1,641
3-4 meals	105	52.5	115	51.1	p =0.440
≥5 meals	15	7.5	25	11.1	

A statistically significant relationship was found between food addiction status and adequate/balanced nutrition status (χ^2 =15,039; p<0,000). It was determined that 140 people (70%) who were addicted to food did not have an adequate/balanced diet, and 109 people (48.4%) who were not addicted to food had an adequate/balanced diet. It was determined that those who did not have an adequate/balanced diet were predominantly addicted to food, while those who had an adequate/balanced diet were not predominantly addicted to food (Table 3).

Table 4. Examination of the Relationships between Smartphone Addiction and Some Characteristics

Variable (N=425)	**n**	**Smartphone addiction scale**		**Statistical analysis* Possibility**
		$\bar{X} \pm S.S.$	**Median (IQR)**	
Gender				
Woman	306	101.41±28.81	101.0 (38.0)	Z=-2.243
Male	119	94.03±29.44	93.0 (41.0)	**p = 0.025**
Age classes				
<20 (1)	92	107.76±27.65	108.5 (31,3)	F=11.556
20-24 (2)	300	98.87±28.87	98.0 (40.0)	**p = 0.000**
≥25 (3)	33	80.18±26.61	77.0 (41.5)	**(1-2,3) (2-3)**
Marital status				
Married	23	78.74±22.08	74.0 (38.0)	t = -3.533
Single	402	100.52±29.08	100.0 (41.0)	**p = 0.000**
Level of education				
High school and equivalent	7	104.14±26.62	110.0 (43.0)	t = 0.439
College and above	418	99.26±29.21	100.0 (40.0)	p = 0.661
Economic level				
High	67	96.31±30.47	98.0 (34.0)	F=0.718
Moderate	307	100.38±29.04	100.0 (39.0)	p = 0.489
Low	51	97.04±28.16	100.0 (47.0)	
BMI classes				
Weak	66	98.58±28.54	96.5 (36,3)	
Normal	293	99.19±29.15	100.0 (43.0)	F=0.270
Overweight	54	102.07±31.23	98.5 (46,3)	p = 0.847
Obese	12	94.83±24.59	85.5 (35.0)	
Working status				
Yes	48	90.35±29.92	83.5 (46.5)	Z=-2.292
No	377	100.48±28.89	100.0 (40.5)	**p = 0.022**
smoking				
Yes	108	97.74±31.26	92.5 (40.8)	F=0.280
No	265	99.63±28.23	100.0 (40.0)	p = 0.756
Sometimes	52	101.19±29.63	103.0 (42,3)	
Drinking alcohol				
Yes	35	93.60±32.06	91.0 (45.0)	F=0.819
No	326	99.59±29.15	100.0 (40.5)	p = 0.441
Sometimes	64	101.19±27.50	98.0 (35.0)	
Adequate nutrition				
Yes	169	92.08±28.46	92.0 (38.0)	t = -4,260
No	256	104.14±28.64	104.5 (38,8)	**p = 0.000**
Meal skipping status				
Yes	221	101.79±28.58	104.0 (43.0)	F=2.246
No	50	92.74±31.98	95.5 (49.3)	p =0.107

Sometimes	154	97.97±28.76	97.5 (36,3)	
Skipped meal				
Morning	130	100.14±28.89	100.0 (40.5)	
Noon	171	100.75±27.95	100.0 (37.0)	F=0.070
Evening	21	97.76±34.57	100.0 (58.5)	p = 0.976
Snack	71	100.18±28.84	105.0 (45.0)	
Reason for skipping meals				
Not wanting to	169	101.01±30.21	100.0 (43.0)	F=0.271
Lack of time	118	101.13±29.84	101.5 (44,3)	p = 0.763
Other	106	98.65±24.98	100.5 (34,3)	
Total number of meals				
1-2 meals (1)	165	100.78±28.50	102.0 (40.5)	F=3,590
3-4 meals (2)	220	100.39±29.19	99.0 (39.5)	**p = 0.028**
≥5 meals (3)	40	87.68±29.62	82.0 (38.5)	**(1,2-3)**
SNAQ category				
Carries serious risk	264	98.58±28.13	100.0 (40.0)	Z=-0.107
No risk	161	100.60±30.79	99.0 (42.0)	p = 0.915
YALE addiction				
There is addiction	200	106.46±28.42	107.0 (40.8)	t = 4.871
No addiction	225	93.01±28.37	92.0 (38.0)	**p = 0.000**

According to Table 4, there is no statistically significant difference in smartphone addiction scale scores according to education level, economic status, BMI classes, smoking, alcohol and regular drug use ($p>0.05$). A statistically significant difference was found in terms of smartphone addiction scale scores according to gender ($Z=-2.243$; $p<0.025$). Smartphone addiction scale scores of women are significantly higher than men. A statistically significant difference was found in terms of smartphone addiction scale scores according to age classes ($F=11.556$; $p<0.000$). As a result of the Tukey pairwise comparisons made by considering the homogeneity of the variances in order to determine from which group the significant difference originated; a significant difference was found between those in the <20 age group and those in the 20-24 and ≥25 age group. Smartphone addiction scale scores of those in the <20 age group are significantly higher than those in the 20-24 and ≥25 age group. Likewise, a significant difference was found between those in the 20-24 age group and those in the ≥25 age group. The smartphone addiction scale scores of those in the 20-24 age group are significantly higher than those in the ≥25 age group. A statistically significant difference was found in terms of smartphone addiction scale scores according to marital status ($t=3.533$; $p<0.000$). The smartphone addiction scale scores of the singles are significantly higher than those of the married ones. A statistically significant difference was found in terms of smartphone addiction scale scores according to employment status ($Z=-2.292$; $p<0.022$). The smartphone addiction scale scores of those who do not work are significantly higher than those who work.

There was no statistically significant difference in smartphone addiction scale scores according to meal skipping status, skipped meal, reason for skipping meals, and SNAQ classes ($p>0.05$). A statistically significant difference was found in terms of smartphone addiction scale scores according to adequate/balanced nutrition status ($t=-4.260$; $p<0.000$). Smartphone addiction scale scores of those who do not think they have an adequate/balanced diet are significantly higher than those who think they have an adequate/balanced diet. A statistically significant difference was found in terms of smartphone addiction scale scores according to total meal number classes ($F=3.590$; $p<0.028$).

As a result of the Tukey pairwise comparisons made by considering the homogeneity of the variances in order to determine from which group the significant difference originated; there was a significant difference between the total number of meals 1-2 and 3-4 and ≥5 meals. Those with 1-2 and 3-4 have significantly higher smartphone addiction scale scores than those with ≥5. A statistically significant difference was found in terms of smartphone addiction scale scores according to food addiction status ($t=4.871$; $p<0.000$).

4. Discussion and Conclusion

Prevention of obesity is a critical concern for public health. Numerous studies have investigated the relationship between smartphone use and mental health. The primary objective of this study is to investigate the association between addictive smartphone use and individuals' eating behaviours, which are consistently linked to obesity risk, and which has not been studied extensively in the literature, particularly in Turkey. The majority of participants in the study were female, single, between the ages of 20-24, had a higher education level, and were at a middle socioeconomic level.

The findings of this study are consistent with previous research on non-mobile media (e.g., TV, computer, gaming) (Wilson et al., 2005; Rice et al., 2002). Similarly, addictive smartphone use has been found to be associated with several obesogenic risk factors, such as disordered eating, food addiction, and body fat percentage. The internet, particularly mobile phones, has become an essential tool for communication, lifestyle, and access to media. While most research on addictive smartphone use has been conducted among college students and other adult populations (Wilson et al., 2005; Rice et al., 2002), only a limited number of studies have examined addictive smartphone use among adolescents in Europe, Asia, and the United States (Mathias et al., 2018). The study by Boutelle et al. demonstrated that addictive smartphone use can lead to severe sleep problems, behavioural issues, and other addictions. Findings from studies conducted in Turkey support these results (Schiestl et al., 2018; Grant et al., 2019).

Age is a potential factor that influences ready-to-eat food intake. Generally, as people age, their level of education, experience, and knowledge increases, and they become more health-conscious, resulting in a decrease in the rate of weight gain (Kim et al., 2014; Griffiths et al., 2005). Consistent with previous studies, this study found that ready-to-eat food intake decreases significantly in both sexes with age. As individuals become older, their level of education and nutritional knowledge tends to increase (Kutlu et al., 2016; Kim et al., 2012). In this study, younger participants reported that they did not eat enough or have balanced meals and frequently skipped meals. In contrast, older participants reported the opposite. The majority of participants consumed 3-4 meals per day, with lunch being the most frequently skipped meal. Participants do not have a high rate of food addiction, but participants who are addicted to food seem to have a serious eating disorder.

Limited research that considers smartphone use and health risks examines total time spent on smartphones. However, it is not just smartphone use that is addictive; considering the smartphone usage rates and concerns about smartphone addiction, it is necessary to evaluate whether addictive smartphone use contributes to problematic eating behaviours and obesity in individuals (Lee et al., 2013). In this study; on all estimated parameters that may have an impact; gender, BMI value, regular drug use, adequate/balanced nutritional status are important parameters affecting the risk of food addiction. It has been determined that the smartphone use addiction scale is an important parameter that affects the risk of food addiction. Smartphone addiction scale scores of those who do not think that they have a sufficient/balanced diet are significantly higher. Smartphone addiction scale scores of those who skip meals and those who are addicted to food are significantly higher.

Watching TV for extended periods has been linked to negative health outcomes such as obesity and insufficient sleep in children and teenagers. However, there are still significant knowledge gaps regarding the effects of excessive smartphone use on young people's physical health (Boutelle et al., 2018; Miller et al., 2018), as research has not yet thoroughly examined the relationship between addictive smartphone use and health issues like problematic eating behaviours, food addiction, and lubrication. While interrupted sleep and shorter sleep duration are commonly associated with smartphone use, there is limited research on the connection between addictive smartphone use and these other health concerns. In the study conducted by Eirini et al., it was observed that female individuals who skip meals are more likely to become addicted to phone, and the degree of food addiction increases as the duration of smartphone use increases (Eunice Kennedy Shriver National Institute of Childhood Health and Human Development, 2019). Studies conducted in Turkey are also limited (Kwon et al., 2013; Tatsi et al., 2019). In this study, there is a relationship between SNAQ

category and adequate/balanced nutrition status, skipping meals, and total number of meals. It has been observed that individuals who spend a lot of time in front of the smartphone do not have an adequate/balanced diet and skip meals. There is a relationship between food addiction status and gender, marital status, BMI classes and regular drug use. Those who are addicted to food mainly; women, married, overweight and obese.

Consistent with previous research; women have higher rates of addictive smartphone use (Tatsi et al., 2019; Kenney et al., 2017). Considering the social features of several popular smartphone apps (for example, social media, messaging or communication apps), women's greater use of social media, and the prominence of peer relationships in women during adolescence, more social media and excessive phone calls by girls are due to their higher use of these apps. It is understandable that smartphone use is also at high risk for smartphone use-related dysfunction (Ashton et al., 2020). Similar findings have emerged in individuals from other Western countries when previous research has examined problematic smartphone use (Ashton et al., 2020; Rideout et al., 2015; Lopez-Fernandez et al., 2015).

4.1. Limitations of the study

Future research should address some limitations of this study. One of the limitations is the relatively small sample size, which could be expanded in order to conduct more precise analyses on how demographic factors such as race, ethnicity, and gender influence different types of addictions. Moreover, future studies should aim to replicate the current findings in larger and more representative samples. Another limitation of the current study is that it was cross-sectional, which precludes drawing definitive conclusions regarding temporal priority and direction of effects. However, given that this is one of the first studies to explore the links and underlying mechanisms between addictive smartphone use and obesity, conducting a longitudinal design would be premature. This study can provide a basis for future research on the biopsychosocial health correlates of addictive smartphone use, which should incorporate a longitudinal design.

References

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders (DSM-5).* Arlington: American Psychiatric Publishing.

Ashton, L. M., Sharkey, T., Whatnall, M. C., Haslam, R. L., Bezzina, A., Aguiar, E. J. & Hutchesson, M. J. (2020). Which behaviour change techniques within interventions to prevent weight gain and/or initiate weight loss improve adiposity outcomes in young adults? A systematic review and meta-analysis of randomized controlled trials. *Obesity Reviews,* 21(6), 1-19.

Boutelle, K. N., Braden, A., Knatz-Peck, S., Anderson, L. K. & Rhee, K. E. (2018). An open trial targeting emotional eating among adolescents with overweight or obesity. *Eating Disorders,* 26(1), 79-91.

Blüher, M. (2019). Obesity: global epidemiology and pathogenesis. *Nature Reviews Endocrinology,* 15(5), 288-298.

Bradbury, K. M., Turel, O. & Morrison, K. M. (2019). Electronic device use and beverage related sugar and caffeine intake in US adolescents. *PloS One,* 14(10), e0223912.

Burrows, T., Kay-Lambkin, F., Pursey, K., Skinner, J. & Dayas, C. (2018). Food addiction and associations with mental health symptoms: A systematic review with meta-analysis. *Journal of Human Nutrition and Dietetics,* 31(4), 544-572.

Chu, D. T., Nguyet, N. T. M., Dinh, T. C., Lien, N. V. T., Nguyen, K. H., Ngoc, V. T. N. & Pham, V. H. (2018). An update on physical health and economic consequences of overweight and obesity. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews,* 12(6), 1095-1100.

Eunice Kennedy Shriver National Institute of Childhood Health and Human Development (2019). *NICHD Strategic Plan 2020.* Government Printing Office: Washington, DC, USA.

Grant, J. E., Lust, K. & Chamberlain, S. R. (2019). Problematic smartphone use associated with greater alcohol consumption, mental health issues, poorer academic performance, and impulsivity. *Journal of Behavioral Addictions,* 8(2), 335-342.

Griffiths, M. (2005). A 'components' model of addiction within a biopsychosocial framework. *Journal of Substance Use,* 10(4), 191-197.

Gordon, E. L., Ariel-Donges, A. H., Bauman, V. & Merlo, L. J. (2018). What is the evidence for "food addiction?" A systematic review. *Nutrients,* 10(4), 477-507.

Günüç, S. & Kayrı, M. (2010). The profile of internet dependency in Turkey and development of internet addiction scale study of validity & reliability. *Hacettepe University Journal of Education Faculty*, 39, 220-232.

Hauck, C., Weiß, A., Schulte, E. M., Meule, A. & Ellrott, T. (2017). Prevalence of 'food addiction'as measured with the Yale Food Addiction Scale 2.0 in a representative German sample and its association with sex, age and weight categories. *Obesity Facts,* 10(1), 12-24.

Henderson, E. C. (2009). *Understanding addiction.* Univ. Press of Mississippi.

Hwang, K. H., Yoo, Y. S. & Cho, O. H. (2012). Smartphone overuse and upper extremity pain, anxiety, depression, and interpersonal relationships among college students. *The Journal of the Korea Contents Association,* 12(10), 365-375.

Kenney, E. L. & Gortmaker, S. L. (2017). United States adolescents' television, computer, videogame, smartphone, and tablet use: Associations with sugary drinks, sleep, physical activity, and obesity. *The Journal of Pediatrics,* 182, 144-149.

Kim, S. M., Huh, H. J., Cho, H., Kwon, M., Choi, J. H., Ahn, H. J. & Kim, Y. J. (2014). The effect of depression, impulsivity, and resilience on smartphone addiction in university students. *Journal of Korean Neuropsychiatric Association,* 53(4), 214-220.

Kim, D. I., Lee, Y. H., Lee, J. Y., Kim, M. C., Keum, C. M., et al. (2012). New patterns in media addiction: Is smartphone a substitute or a complement to the Internet?. *The Korea Journal of Youth Counseling,* 20(1), 71-88.

Kuss, D. J. & Griffiths, M. D. (2011). Online social networking and addiction—A review of the psychological literature. *International Journal of Environmental Research and Public Health,* 8(9), 3528-3552.

Kutlu, M., Savci, M., Demir, Y. & Aysan, F. (2016). Turkish adaptation of Young's Internet Addiction Test-Short Form: A reliability and validity study on university students and adolescents. *Anatolian Journal of Psychiatry*, 17(1), 69-77.

Kwon, M., Lee, J. Y., Won, W. Y., Park, J. W., Min, J. A., Hahn, C. & Kim, D. J. (2013). Development and validation of a smartphone addiction scale (SAS). *PloS One,* 8(2), e56936.

Lee, N. M., Lucke, J., Hall, W. D., Meurk, C., Boyle, F. M. & Carter, A. (2013). Public views on food addiction and obesity: implications for policy and treatment. *PloS One,* 8(9), e74836.

Leigh, S. J. & Morris, M. J. (2018). The role of reward circuitry and food addiction in the obesity epidemic: An update. *Biological Psychology,* 131, 31-42.

Lin, Y. H. & Chen, C. Y. (2012). Adolescents' impulse buying susceptibility to interpersonal influence and fear of negative evaluation. *Social Behavior and Personality,* 40(3), 353-358.

Lopez-Fernandez, O., Losada-Lopez, J. L. & Honrubia-Serrano, M. L. (2015). *Predictors of problematic Internet and mobile phone usage in adolescents.* Aloma: Revista de Psicologia, Ciències de l'Educació i de l'Esport, 33(2), 49-58.

Lee, S. Y., Lee, D., Nam, C. R., Kim, D. Y., Park, S., Kwon, J. G. & Choi, J. S. (2018). Distinct patterns of internet and smartphone-related problems among adolescents by gender: Latent class analysis. *Journal of Behavioural Addictions,* 7(2), 454-465.

Mathias, C. W., Stanford, M. S., Liang, Y., Goros, M., Charles, N. E., Sheftall, A. H. & Dougherty, D. M. (2018). A test of the psychometric characteristics of the BIS-Brief among three groups of youth. *Psychological Assessment*, 30(7), 847-856.

Meule, A. & Gearhardt, A. N. (2014). Food addiction in the light of DSM-5. *Nutrients*, 6(9), 3653-3671.

Miller, A. L., Gearhardt, A. N., Fredericks, E. M., Katz, B., Shapiro, L. F., Holden, K. & Lumeng, J. C. (2018). Targeting self-regulation to promote health behaviors in children. *Behaviour Research and Therapy*, 101, 71-81.

Minaz, A. & Çetinkaya Bozkurt, O. (2017). Examining the smartphone addiction levels and usage purposes of university students in terms of different variables, *Mehmet Akif Ersoy University Journal of Social Sciences*, 9(21), 266-286.

Odgers, C. L. & Jensen, M. R. (2020). Annual research review: Adolescent mental health in the digital age: Facts, fears, and future directions. *Journal of Child Psychology and Psychiatry*, 61(3), 336-348.

Pineda, E., Sanchez-Romero, L. M., Brown, M., Jaccard, A., Jewell, J., Galea, G. & Breda, J. (2018). Forecasting future trends in obesity across Europe: the value of improving surveillance. *Obesity Facts*, 11(5), 360-371.

Pursey, K. M., Stanwell, P., Gearhardt, A. N., Collins, C. E. & Burrows, T. L. (2014). The prevalence of food addiction as assessed by the Yale Food Addiction Scale: a systematic review. *Nutrients*, 6(10), 4552-4590.

Rice, F. P. & Dolgin, K. G. (2002). *The adolescent: Development, relationships, and culture*. Allyn & Bacon.

Rideout, V. J. (2015). *The common sense census: Media use by tweens and teens.* San Francisco, CA: Common Sense Media.

Rohde, K., Keller, M., la Cour Poulsen, L., Blüher, M., Kovacs, P. & Böttcher, Y. (2019). Genetics and epigenetics in obesity. *Metabolism*, 92, 37-50.

Schiestl, E. T. & Gearhardt, A. N. (2018). Preliminary validation of the Yale Food Addiction Scale for Children 2.0: A dimensional approach to scoring. *European Eating Disorders Review*, 26(6), 605-617.

Schulte, E. M., Potenza, M. N. & Gearhardt, A. N. (2017). A commentary on the "eating addiction" versus "food addiction" perspectives on addictive-like food consumption. *Appetite*, 115, 9-15.

Süler, M. (2016). *Investigation of the effect of smartphone addiction on subjective happiness level in terms of various variables.* Master dissertation, Sakarya University. YÖKTEZ. https://tez.yok.gov.tr.

Tatsi, E., Kamal, A., Turvill, A. & Regina, H. (2019). Emotion dysregulation and loneliness as predictors of food addiction. *Journal of Health and Social Sciences*, 4(1), 43–58.

Tok, Ş. (2018). *The validity and reliability study of the adaptation of modified Yale food addiction scale version 2.0 to Turkish*. Unpublished Expertise Thesis, Sakarya University.

Qi, Q., Chu, A. Y., Kang, J. H., Jensen, M. K., Curhan, G. C., Pasquale, L. R. & Qi, L. (2012). Sugar-sweetened beverages and genetic risk of obesity. *New England Journal of Medicine*, 367(15), 1387-1396.

Wada, K., Yamakawa, M., Konishi, K., Goto, Y., Mizuta, F., Koda, S. & Nagata, C. (2019). Associations of cell phone use and screen viewing with overweight in children. *Childhood Obesity*, 15(7), 417-425.

Wilson, M. M. G., Thomas, D. R., Rubenstein, L. Z., Chibnall, J. T., Anderson, S., Baxi, A., et al. (2005). Appetite assessment: Simple appetite questionnaire predicts weight loss in community-dwelling adults and nursing home residents. *The American Journal of Clinical Nutrition*, 82(5), 1074-1081.

Ziauddeen, H., Alonso-Alonso, M., Hill, J. O., Kelley, M. & Khan, N. A. (2015). Obesity and the neurocognitive basis of food reward and the control of intake. *Advances in Nutrition*, 6(4), 474-486.