

# Investigation of the relationship between smartphone addiction and overweight on university students

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## Abstract

**Aim:** Smartphone addiction and overweight are among the most important public health problems that are increasing day by day. However, to the best of our knowledge, there is no study investigating the relationship between these two health problems. The aim of this study was to investigate the relationship between smartphone addiction and overweight among university students.

**Material and Methods:** The sample of this cross-sectional study consisted of 325 volunteers, 185 female and 140 male students. After the Smartphone Addiction Scale-Short Form (SAS-SF) and sociodemographic data form were applied to the volunteers, their height and weight were measured with the same device. Body Mass Index (BMI) was calculated and the sample was divided into normal weight ( $24.5 \text{ kg/m}^2 \leq \text{BMI} \leq 24.9 \text{ kg/m}^2$ ) and overweight ( $\text{BMI} \geq 25 \text{ kg/m}^2$ ).

**Results:** The mean age of the volunteers included in the study was  $22.38 \pm 3.15$  years and 56.9% ( $n = 185$ ) of them were females. SAS-SF scores of the participants were found to be statistically different between normal and overweight groups ( $t = -2.524, p = 0.012$ ). According to the logistic regression analysis model used to determine the predictors of being overweight, being a smartphone addict increases the risk of being overweight twice.

**Conclusion:** The study suggests that there is a relationship between smartphone use and being overweight. The results of our study are important since it is the first study that shows that smartphone addiction increases the risk of being overweight. In order to explain the relationship between these two important health problems, studies including other reasons of being overweight are needed.

**Keywords:** Smartphone addiction; obesity; overweight; body mass index; university student.

## INTRODUCTION

Obesity has become one of the most important health problems that concern all segments of the society in our country as well as all over the world (1,2). Obesity, which is defined by the World Health Organization (WHO) as abnormal or excessive fat accumulation that poses a risk to health, is considered as one of the ten most risky diseases (3). Obesity is one of the most important risk factors for many diseases such as diabetes mellitus, cardiovascular diseases, chronic obstructive pulmonary disease, chronic kidney diseases, psychiatric disorders and cancer associated with mortality and morbidity, as well as being often caused by the imbalance between calories taken and energy consumed (4-6). Although awareness-raising programs are organized to struggle with obesity at

various levels, it is not possible to say that the results are satisfactory (7,8). It should be born in mind that the struggle against obesity should be multi-sided at all levels (9,10). It should be noted that both the psychiatric conditions causing obesity and the psychiatric conditions that obesity may cause should be taken into consideration (6,11,12).

Because of their versatility and ease of use, smartphones have become indispensable today. Taking into account the convenience they have brought in all areas of life, the most important problem in relation to the excessive use of smartphones is smartphone addiction (13,14). Researches on smartphone addiction, which is a behavioral addiction, are increasing (15-17). The relationship between multiple mental symptoms such as sleep quality, stress, anxiety, depression, personality,

**Received:** 02.08.2019 **Accepted:** 23.08.2019 **Available online:** 21.10.2019

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loneliness and smartphone addiction was investigated. (15,18,19). However, the number of studies investigating physical symptoms that may be associated with smartphone addiction is limited (16, 20). And these studies mostly focus on upper extremity, neck and shoulder pain associated with excessive use of the smartphone (20-22).

There is no study in the literature investigating smartphone addiction and overweight, as far as we know. In this study, it is aimed to investigate the relationship between smartphone addiction and overweight with the assumption that smartphone may cause decreased physical activity and irregular nutrition. Another aim of the study was to determine whether smartphone use is a risk factor for obesity.

## MATERIAL and METHODS

### Subjects

The sample of this cross-sectional study consisted of a total of 325 volunteers (185 females and 140 males) who were students in various faculties of two different universities (Haliç University and Istanbul University) currently in Istanbul. The criteria for participation were defined as volunteering, being a student, being aged 18-39, having a smartphone for at least one year, and performing the necessary activities for the study. Exclusion criteria were being overweight due to a physical cause and not volunteering.

### Study Procedure

All volunteers invited to the study were informed about the study by the researchers. Participants who agreed to be included in the study were asked to complete an anonymous, standard form including a sociodemographic data form and a Short Form of the Smartphone Addiction Scale. Subsequently, the height and weight of the volunteers were measured properly with the same device. After scoring in accordance with the instructions, the forms were recorded in the data set and statistical process performed. Sixteen students with a BMI of less than 18.4 were excluded from the study.

### Data Collection Tools

**Sosyodemografik Veri Formu;** was developed by the researchers in accordance with the literature for the purpose of the study. The information of the volunteers such as age, gender, department and place of residence was questioned.

**Smartphone Addiction Scale-Short Form (SAS-SF);** was developed by Kwon et al. in 2013 to assess the risk of smartphone addiction (13). The scale, which is a 6-point Likert type and self-report type, consists of 10 items. The score that can be obtained from the scale varies between 10 and 60. The risk of addiction increases when the score is higher. According to the Korean sample, the cut-off score was 31 for men and 33 for women. The Turkish validity and reliability study of the scale was conducted by Noyan et al. (23).

**Body Mass Index;** the volunteers who agreed to participate

in the study were measured with the same device immediately after filling out the forms. Measurements were made with bare feet and daily clothes. Height measurement was determined during inspiration (24). Body Mass Index (BMI) was calculated by dividing the weight in square meters (height / weight<sup>2</sup>, kg/m<sup>2</sup>) with the data obtained from height and weight measurement. According to the recommendations, those with BMI values between 18.5-24.9 are classified as normal weight and those with 25 and above were classified as overweight (24).

### Statistical Analysis

All statistical analyzes of the study were performed with SPSS 20.0. Descriptive statistics were shown as numbers and percentages for discrete variables and as mean±standard deviation for continuous variables. Numerical variables providing parametric standards between two groups were analyzed using Student's T test and categorical variables were analyzed using Chi-square test. Predictive factors for overweight were determined by logistic regression analysis. The cut-off p value for the study was 0.05.

## RESULTS

The mean age of the volunteers included in the study was 22.38±3.15. 56.9% (n=185) of the participants were female and 43.1% (n=140) were male. The mean height of the volunteers included in the study was 170.67±10.42 cm, the mean weight was 67.13±14.28 kg and the mean BMI was 22.87±3.36. After categorization according to BMI index, 78.2% (n=254) were considered as normal weight and 21.8% (n=71) were overweight. The mean SAS-SF score of the volunteers was 32.32±9.80. Identifying informations of the participants are shown in Table 1.

Statistically significant difference was found in the comparison of the mean BMI (21.51±1.79 & 27.72±3.20) of the normal weight and overweight participants (t=-15.642, p<0.001) Likewise, a statistically significant difference was found in the comparison of weight (62.55±10.39 & 83.53±14.30) and height (169.96±10.28 & 173.22±10.61) between the two groups. (t=-11.540, p<0.001; t=-2.348, p=0.019). SAS-SF scores of the participants (31.60±9.89&34.90±9.10) were statistically different between the two groups (t=-2.524, p=0.012). (Figure 1) The comparison of BMI, weight, height, SAS-SF score and smartphone addiction status of the volunteers between normal and overweight groups is shown in Table 2.

Predictors of overweight were analyzed by logistic regression analysis in Table 3. Logistic regression model was  $\chi^2=34.164$ ; df 4; p<0.001 when the age, gender, school year and SAS-SF were evaluated together, and the percentage of total correct classification of the model was 78.2% (p<0.001). According to the model, gender, age and smartphone addiction in volunteers were found to be predictor for being overweight. However, the school year did not have a meaningful result as a predictor. According

to the model being a smartphone addict increases the risk of being overweight twice. Likewise, being a woman increases the risk of being overweight 2.7 times. Each additional year of age brings a 1.18-fold increase in risk.

**Table 2. Comparison variable between obese and normal weight**

Variable	Normal Weight Student (n=254)	Overweight Student (n=71)	t/X <sup>2</sup> value	p value
Body Mass Index (kg/m <sup>2</sup> )	21.51±1.79	27.72±3.20	-15.642 <sup>a</sup>	<0.001 <sup>**</sup>
Weight (kg)	62.55±10.39	83.53±14.30	-11.540 <sup>a</sup>	<0.001 <sup>**</sup>
Height (cm)	169.96±10.28	173.22±10.61	-2.348 <sup>a</sup>	0.019 <sup>*</sup>
SAS-SV Score	31.60±9.89	34.90±9.10	-2.524 <sup>a</sup>	0.012 <sup>*</sup>
<b>Smartphone Addiction</b>				
Yes	134 (52.8%)	47 (66.2%)	7.979 <sup>b</sup>	0.005 <sup>**</sup>
No	120 (47.2%)	24 (33.8%)		

<sup>a</sup>: Student T test, <sup>b</sup>: Chi-square test, \*: p≤0.05, \*\*: p≤0.01, SAS-SV: Smartphone Addiction Scale-Short Version.

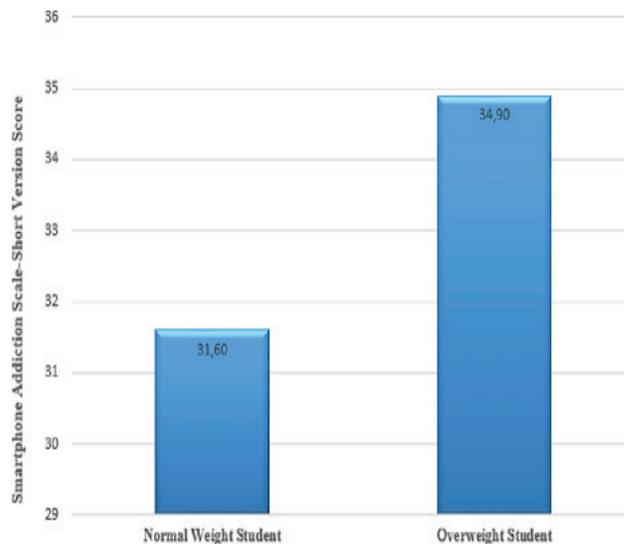


Figure 1. Comparison Smartphone Addiction Scale-Short Version score between overweight and normal weight

**Table 3. Logistic regression model of variables that can predict the overweight**

	B	Wald	df	p value	Exp (B)	95% C.I. for EXP(B)	
						Lower	Upper
Age	0.166	11,090	1	0.001	1.181	1.071	1.303
Gender (Male)	-1.018	12,198	1	0.000	2.766	1.563	4.897
Years of school	-0.087	0.774	1	0.379	0.917	0.755	1.113
Smartphone Addiction (Yes)	0.693	5,577	1	0.018	2.000	1.125	3.555

**DISCUSSION**

The smartphone addiction levels of normal and overweight university students were examined in this study. The most important finding of the study; university students with smartphone addiction is more likely to be overweight. In addition, the presence of smartphone addiction increases the risk of obesity twice. Another finding of the study is that overweight individuals use smartphones more than normal ones. To the best of our knowledge, our results are the first in the literature.

There is an addiction to a behavior, if the behavior causes satisfaction or relief, or moves the person out from a negative situation such as tension, and the person continuous this attitude (16,25,26). In this respect, it would be appropriate to evaluate smartphone addiction as a behavioral addiction. As with all addictions, smartphone addiction can be expected to cause negative social, psychological and physiological consequences in the individual (16,27-29). In this context, research has shown that social relations are avoided in smartphone addiction, smartphone addiction increases preference of loneliness and causes an increase in social anxiety (30,31). It has also been shown that smartphone use has negative effects on anxiety, depression, sleep quality and interpersonal

relationships (15,32,33). In addition, it has been shown to cause head-neck-shoulder and upper extremity pain and is associated with less physical activity. (20-22). In our study, the relationship between smartphone addiction and being overweight was revealed. As the most likely reason for this relationship; it may be thought that the smartphone may cause an imbalance between the calories taken and the energy consumed because it affects physical activity. It should be considered that upper extremity pain may also cause a decrease in physical activity. Another reason may be a tendency to eat to relax and avoid mental factors such as stress, anxiety, and depression associated with smartphone addiction. From another perspective, the person who sees the smartphone as a source of relief or an avoiding mental distress will disrupt the diet and gain weight. Likewise, alienation from social communication and loneliness associated with smartphone addiction may lead to increased eating. Further studies are needed to explain the relationship between smartphone and overweight. Another important finding of our study is that smartphone addiction increases the risk of being overweight twice. This information is important because it contributes to the literature.

The results of the study should be evaluated with some limitations. The first is that the volunteers included in the

study are university students, which may not represent the entire population. Studies with volunteers of different educational backgrounds and ages will eliminate this limitation. Another limitation is that the scale used is a self-report type, which may lead to the manipulation of the participants. In addition, the cross-sectional design of the study is a limitation of making causal inferences. On the other hand, while trying to be neutral in the determination of the BMI of the participants, day-to-day weight changes of individuals may affect the results. In addition, the conditions that may cause weight gain in participants may not be completely excluded.

## CONCLUSION

In this study, the relationship between smartphone addiction and being overweight, which are important public health problems, was revealed among a group of university students. According to our findings, smartphone addiction was found to be a predictor for overweight. In order to explain the relationship revealed in our study between smartphone addiction and being overweight, there is a need for studies evaluating all factors that cause overweight. Prevention and intervention plans/projects based on multi-component strategies are needed to prevent overweight and smartphone addiction, which are important health problems.

*Competing interests: The authors declare that they have no competing interest.*

*Financial Disclosure: There are no financial supports.*

*Ethical approval: This study was approved by the Institutional Ethics Committee and conducted in compliance with the ethical principles according to the Declaration of Helsinki.*

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