

## ORIGINAL ARTICLE

# Does Smartphone Addiction Cause Depression? A Cross-Sectional Study

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## Main Points

- The importance of the subject can be concluded from the fact that almost one-third of participants had smartphone addiction, and almost half of them had depressive symptoms.
- The risk of smartphone addiction is high for those aged 35 and under, female gender, single, students, monthly income of less than 1000 TL, those who use the internet at home, those who use social media, those who use social media for a long time and change their smartphones frequently, and those who use a smartphone for 5 hours or more per day.
- The risk of depression is higher in those who use social media for 1 – 2 hours a day and those who use a smartphone for 5 hours or more per day.
- Income status (1000 – 1999 TL), presence of a computer at home, addiction status (except smoking), and smartphone addiction significantly affect the development of depressive symptoms.
- Necessary lifestyle changes (such as limiting the use of smartphones and social media) should be made in people diagnosed with smartphone addiction and/or depression, and depression treatment should be planned.

## Abstract

The present study aims to evaluate the relationship between smartphone addiction and depression in primary care. Three hundred fifty-two people who participated in our research, designed as a cross-sectional study, filled out the Short Version of the Smartphone Addiction scale and Beck's Depression Inventory. Among the participants, 28.9% were found to have smartphone addiction and 52.3% were found to have depressive symptoms. The mean score of participants in the Smartphone Addiction Scale was  $24.32 \pm 11.24$  points ( $n = 352$ ). The mean score in Beck's Depression Inventory was  $10.80 \pm 7.94$  points. A positive significant relationship was found between depression frequency and social media usage duration (1 – 2 hours/day) and length of social media usage ( $\geq 5$  hours/day). A weak but positive and significant correlation was found between Smartphone Addiction Scale and Beck's Depression Inventory ( $r = 0.147$ ;  $p = .006$ ). In the regression analysis, it was determined that having an income between 1000 and 1999 TL, having a computer at home, having other addictions other than smoking, and being addicted to a smartphone increase the risk of depression development. The relationship between smartphone addiction and depression should be given attention. The factors influencing smartphone addiction should be considered. Especially the social media and smartphone usage should be limited.

**Keywords:** Depression, primary care, smartphone addiction, social media

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## Introduction

Smartphones are not only devices that are used for communication purposes, but they are today's popular devices combining many functions such as the Internet, mobile applications, games, camera, video-voice recording, navigation, and music player (Kucuk et al., 2020). Besides providing many conveniences to our daily life, smartphones may also have various negative results by influencing interpersonal relationships, physical and mental health, and general functionality (Kuyucu, 2017; Kucuk et al., 2020). The use of smartphones significantly increased in recent years, and this increase also causes various problems such as smartphone addiction and problematic use of smartphones (Kuyucu, 2017).

According to the data of Statista, smartphone sales increased from 680 million in 2012 to 1.52 billion in 2019. As of the year 2019, more than 19% of individuals worldwide have smartphones (Statista). In our country, the use of the Internet by the years was 42.9% in 2011, 49% in 2013, and 67% in 2020, whereas the rates of mobile Internet usage on a smartphone increased from 4% in 2011 to 16% in 2013 and 62% in 2020 (Akin et al., 2014; MOBİSAD). In TUIK 2022 Household Information Technology Usage Survey, the rate of possessing a mobile phone was 99.2% in Türkiye. In the same study, the number of cellphone subscribers was reported to be 80,790,877, and the number of Internet subscribers were found to be 76,639,695 (Turkish Statistical Institute [TUIK] Hanehalkı 2019).

The gradual increase in the use of smartphones also caused an increase in smartphone addiction in recent years (Demirci, Akgönül & Akpınar, 2015). In our country, 77% of smartphone users use smartphones (Mobile Communication Tools and Information Technologies Businessmen Association).

According to *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition (*DSM-V*) diagnosis criteria, smartphone addiction has similarities with gambling addiction and/or Internet gaming disorder (*DSM-V*).

Although negative emotions such as depression, social anxiety, and boredom are important precursors of smartphone addiction, their relationship has been tested in many previous studies. Depression is conceptualized as a common mental disorder that affects people's feelings, thinking, and behavior and disrupts individuals' social and occupational functions. Researchers have suggested that depression is a positive predictor of smartphone addiction and that individuals experiencing symptoms of depression tend to use smartphones excessively to relieve their psychological distress. Empirical studies have shown longitudinal and bidirectional relationships between smartphone addiction and depressive symptoms (Yue et al., 2021). In a systematic review, smartphone addiction was associated with mental health problems, and anxiety and depression were reported as precursors of these mental health problems (Ratan et al., 2021). In another systematic review, depression severity was significantly associated with problematic or general smartphone use in 9 of the 10 studies examined on a bivariate and multivariate basis. However, problematic and general smartphone use is often associated with mental disorders such as depression, anxiety, and stress. It was concluded that it occurred (Elhai et al., 2017). Depression is

one of the essential psychological results of smartphone addiction (Alhassan et al., 2018). Even though depression may slightly affect an individual's daily life, it may also course in a broad clinical scale that might reach the level of suicide (*DSM-V*). For this reason, early determination and treatment of depression due to smartphone addiction is crucial for public health.

Accordingly, depression is an important variable in smartphone addiction research. Smartphone addiction causes problems in individuals, such as depression, physical pain, daytime sleepiness, low self-esteem, risk of early cognitive decline, negativities in peer and family relationships, and lower well-being and life satisfaction (Yue et al., 2021).

Based on this problem, this study aims to examine the relationship between smartphone addiction and depression in primary care and the sociodemographic factors affecting this relationship, and our hypothesis is that smartphone addiction increases depressive symptoms.

## Material and Methods

### Design and Participants

The present study is a cross-sectional and descriptive study and was carried out on 352 participants (160 men and 192 women) filling out an online survey on the web between May and July 2019. With the random sampling method, considering that each family physician surveys 5 patients a day, taking into account the questionnaires and scales, the population size was calculated as 3000 and the sample size as 341 with a 5% margin of error and a 95% confidence interval.

### Inclusion and Exclusion Criteria

The participants include individuals aged 18+ years who applied to Family Health Centers of the researchers (Ankara, Antalya, Uşak) for any reason and accepted to participate. Patients with a previous diagnosis of depression, using antidepressants, and patients who did not use mobile phones were excluded.

### Ethical consideration

Before the study, the ethics committee approval was obtained from Kahramanmaraş Sütçü İmam University's Medical Faculty, Clinical Research Ethics Committee (decision no. 03, date March 4, 2019, meeting no. 2019/06).

### Details of Scale

After obtaining their written consent, the participants filled out a questionnaire consisting of 19 items and collected data on sociodemographic characteristics and smartphone use, the Short Version of the Smartphone Addiction Scale (SAS-SV) (10 items), and Beck's Depression Inventory (BDI) (21 items) on the web. Written informed consent was obtained from the patients who agreed to take part in the study.

The SAS-SV was developed in 2013 (Kwon et al., 2013). Turkish reliability and validity were tested in 2015 by Noyan et al. In this scale consisting of 10 items and having 6-point Likert type scoring, each item is scored between 1 and six, and the total score ranges between 10 and 60. As the score obtained from the test increases, the risk for smartphone addiction increases, and the

cutoff score of the test in the Korean sample is 31 for men and 33 for women (Chun et al., 2012). On the other hand, it was reported that in the Turkish validity and reliability study of the scale, no cutoff score was determined because no clinical interviews were conducted with the participants regarding smartphone addiction (Noyan et al., 2015). While the Cronbach alpha internal consistency coefficient is 0.91 in the original scale, it is 0.86 in the Turkish scale (Noyan et al., 2015). Beck's depression inventory is a self-assessment scale comprising 21 items that measure the physical, emotional, and cognitive symptoms of depression. Each item is scored between 0 and 3, and the highest score to be obtained from the scale is 63 (Beck, 1961). In the validity and reliability study conducted by Hisli et al. in our country, the internal consistency coefficient was found to be 0.74, and the cutoff score was determined as 17 (Hisli, 1989).

### Statistical Analysis

Statistical analysis was performed using the SPSS 22.0 for Windows (IBM SPSS Corp.; Armonk, NY, USA) package program. Descriptive values are stated as number (*n*), percentage (%), mean (mean), standard deviation (SD), and median (median). Pearson chi-square and Fisher tests were used to compare categorical variables. According to the normality assessment made with Kolmogorov – Smirnov and Shapiro – Wilk tests, continuous variables are used with parametric tests (paired sample *t*-test and *t*-test in independent groups) where they comply with normal distribution, and nonparametric tests (Mann – Whitney *U* and Kruskal – Wallis test) where they do not comply with normal distribution. The effects of variables determined by pairwise comparisons ( $p < .25$ ) in predicting the presence of depression were evaluated by logistic regression analysis. The independent variables of gender, income, presence of a computer at home, frequency of social media use, average time spent on smart mobile phones per day, smartphone addiction status, age, and addiction status were added to the model. The Hosmer – Lemeshow test was used to evaluate model fit. The statistical significance level was accepted as  $p < .05$ .

### Results

The mean age of participants was calculated to be  $40.05 \pm 10.65$  years (mean: 41.0, min: 18 – max: 73), and 54.5% ( $n = 192$ ) of the participants were female. When grouped by age, 34.1% ( $n = 120$ ) of participants were aged  $\leq 35$  years and younger, 31.3% were aged between 36 and 45 years, and 34.4% were aged  $>45$  years. The sociodemographic characteristics, daily activities, and their characteristics regarding social media/internet/smartphone of the participants are shown in Table 1.

Information on how long the smartphone has been used is given in Figure 1.

The average smartphone addiction score of participants was  $24.32 \pm 11.24$  ( $n = 352$ ). By gender, the mean smartphone addiction score of women was  $25.35 \pm 11.54$  ( $n = 192$ ), whereas that of men was  $23.08 \pm 10.77$  ( $n = 160$ ). Although there was no statistically significant difference, the average smartphone addiction score of women was higher than men ( $p = .068$ ).

The mean scores of participants in BDI were found to be  $10.80 \pm 7.94$  ( $n = 352$ ). By gender, the mean scores of participants in BDI were  $10.99 \pm 7.32$  ( $n = 192$ ) for women and  $10.56 \pm 8.65$  ( $n = 160$ )

**Table 1.**  
*Sociodemographic Characteristics and the Daily Activities of the Participants and Their Characteristics Regarding Social Media/Internet/Smartphone*

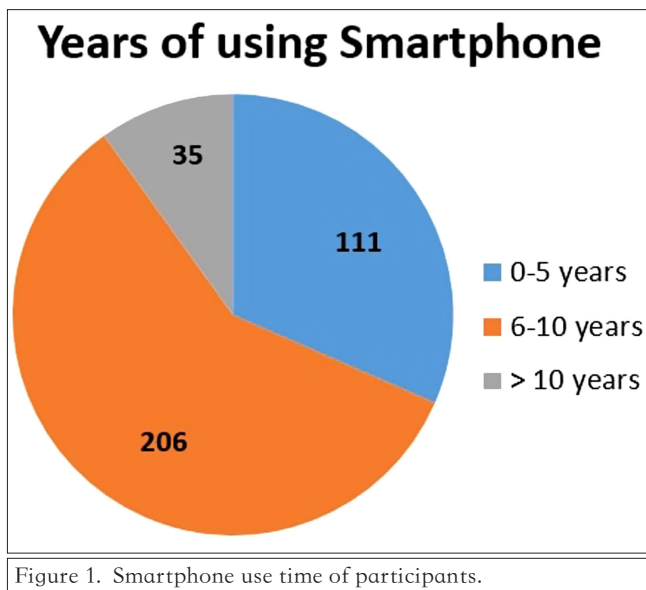
Characteristics		Number	Percentage
Age	35 years and under	120	34.1
	36 – 45 years	110	31.3
	Over 45 years old	121	34.4
Gender	Female	192	45.5
	Male	160	54.5
Marital status	Married	228	64.8
	Single	80	22.7
	Divorced/widowed	44	12.5
Educational level	Primary education	7	2.0
	High school	36	10.2
	University	309	87.8
Income level	up to 1000 TL	27	7.7
	1000 – 2000 TL	19	5.4
	2000 – 3000 TL	39	11.1
	over 3000 TL	267	75.9
Occupation	Public servant	174	49.4
	Worker	24	6.8
	Self-employment	37	10.5
	Retired	12	3.4
	Housewife	10	2.8
	Student	23	6.5
	Other	72	20.5
Status of people living with	Spouse	42	11.9
	Spouse and children	181	51.4
	Alone	42	11.9
	Parents	50	14.2
	Extended family	13	3.7
	With children	10	2.8
	Housemate	8	2.3
	Other	6	1.7
Addiction status of the participants*	None	259	73.6
	Cigarette	74	21.0
	Alcohol	6	1.7
	Substance	1	0.3
	Cigarette and alcohol	12	3.4
Leisure time*	Reading the book	199	56.5
	Go to the cinema/theater	105	29.8
	Do sports	148	42.0
	Listen to music	139	39.5
	Spending time outside	226	64.2
	Spending time on the internet	221	62.8
	Other	14	4.0

(Continued)

**Table 1.**  
*Sociodemographic Characteristics and the Daily Activities of the Participants and Their Characteristics Regarding Social Media/Internet/Smartphone (Continued)*

Characteristics		Number	Percentage
Having a computer at home	Yes	299	84.9
	No	53	15.1
Where internet use is more preferred*	Home	179	50.9
	Workplace	159	45.2
	Internet cafe	2	0.6
	Other	12	3.4
Status of using social media	Yes	321	91.2
	No	31	8.8
Frequency of using social media	Less than 1 hour per day	92	26.1
	1 – 2 hours a day	141	40.1
	3 – 4 hours a day	89	25.3
	5 hours or more per day	30	8.5
Status of being a member of social networking sites*	Facebook	257	73.0
	Twitter	162	46.0
	Instagram	270	76.7
	Pinterest	65	18.5
	Other	35	9.9
Smartphone usage (years)	0 – 5 years	111	31.5
	6 – 10 years	206	58.5
	More than 10 years	35	9.9
Frequency of mobile phone replacement	1 – 2 years	21	6.0
	2 – 3 years	109	31.0
	3 – 4 years	104	29.5
	4 years or more	118	33.5
Used telephone line	Postpaid	336	95.5
	Prepaid	16	4.5
Purpose of using mobile phone*	Speaking	311	88.4
	SMS	71	20.2
	E-mail	116	33.0
	Social media	209	59.4
	Taking photo	164	46.6
	Surfing the Internet	180	51.1
	Other	5	1.4
Spending time with a smart phone	Less than 1 hour per day	44	12.5
	1 – 2 hours a day	120	34.1
	3 – 4 hours a day	117	33.2
	5 hours or more per day	71	20.2
Total		352	100.0

\*Options are multiple choice and arranged to allow marking more than one option.



for men. Women’s scores are higher in BDI scores, as in smartphone addiction, but this is not statistically significant ( $p = .300$ ). No significant relationship was determined between participants’ depression status and ages ( $p = .217$ ). Depression levels of the participants according to BDI are shown in Table 2.

As seen in Table 3, there was a weak but significant positive significant correlation between participants’ scores in SAS-SV and BDI ( $r = .147$ ;  $p = .006$ ).

**Table 2.**  
*Status of the Participants According to the Beck Depression Scale*

Characteristics	Number	Percentage
Normal	168	47.7
Mild depressive symptoms	117	33.2
Moderate depressive symptoms	57	16.2
Severe depressive symptoms	10	2.8
Total	352	100

**Table 3.**  
*The Relationship Between the Participants’ Short Version of Smartphone Addiction Scale Scores and Beck’s Depression Inventory Scores*

		BDI Total Scores	SAS-SV Total Scores
BDI total scores	Correlation coefficient	1.000	.147**
	Sig. (2-tailed)	.	.006
	N	352	352
SAS-SV total scores	Correlation coefficient	.147**	1.000
	Sig. (2-tailed)	.006	.
	N	352	352

Note: BDI = Beck’s Depression Inventory; SAS-SV = Short Version of Smartphone Addiction Scale.

Table 4 shows the SAS-SV score status according to the participants' sociodemographic, daily activities and social media/internet/smartphone-related characteristics. Statistically, a significant difference was found in smartphone addiction among individuals aged 35 years and young, men, earning less than 1000 TL, and students because of the higher frequency of using a smartphone. On the other hand, there was a statistically significant difference in terms of smartphone addiction among participants who were married and living with their spouses and children (Table 4). Statistically, a significant difference was found in smartphone addiction status in terms of using the Internet at home, using social media, social media usage frequency (all groups), frequency of changing the smartphone (in all groups except for between "1 – 2 years" and "2 – 3 years" and between "3 – 4 years" and ">4 years"), and those using the smartphone for 5 hours/day or longer.

Those who spend 3 – 4 hours daily on social media ( $p = .005$ ), and those who spend more than 5 hours daily on their smartphones ( $p = .043$ ) have a significantly higher BDI score than the others.

Table 5 includes the evaluation of the effects of independent variables in predicting the presence of depression using logistic regression analysis. According to this, income status, presence of a computer at home, addiction status, and smartphone addiction significantly affect the development of depression ( $p < .05$ ). Those with an income of 1000 – 1999 TL are 3.974 times more likely than those with an income of less than 1000 TL ( $p = .05$ ), those with a computer at home are 1.911 times more likely than those without ( $p = .046$ ), those with other addictions other than smoking are 3.192 times more likely than those without ( $p = .042$ ), and those with smartphone addiction increase the risk of developing depression by 2.092 times ( $p = .011$ ) compared to those without.

## Discussion

The relationship between smartphone usage and depression was examined in various studies. It was emphasized that the severity of depression was related to smartphone addiction, and this effect was at a moderate level at a minimum (Elhai et al., 2017). In another study carried out by Alhassan et al., it was reported that there was a positive linear relationship between smartphone addiction and depression. It was determined that smartphone addiction was observed more in the young age group (Alhassan et al., 2018). In another study, it was observed that on the contrary with other studies, depression and anger were protective against smartphone addiction (Choi et al., 2015). In a study conducted in Korea with 2509 participants using the Smartphone Excessive Use Screening Questionnaire, similar to our study, excessive smartphone use was found to be associated with depression and anxiety disorders (Jo et al., 2021). In the present study, in parallel with the literature, a weak but significant positive relationship was found between participants' scores in SAS-SV and BDI ( $r = .147$ ,  $p = .006$ ). In our regression analysis, our findings supported our hypothesis, and it was concluded that smartphone addiction increases depressive symptoms. Considering that smartphone addiction causes negative situations in peer and family relationships, it can be expected that such individuals will become more introverted and establish a relationship only with the virtual world, resulting in the emergence of depressive symptoms or exacerbation of existing symptoms. Therefore, it is

important to identify individuals at risk early, to raise awareness of these people through health education about the negative effects of smartphones, and to provide consultancy services (El-Sayed Desouky & Abu-Zaid, 2020).

Considering the relationship between gender and smartphone addiction, in their study on medical faculty students, Chen et al. reported the rate of smartphone addiction to be 29.8% (30.3% in men and 29.3% in women) (Chen et al., 2017). The studies on this subject were carried out generally on medical faculty and medical science students, and the smartphone addiction rates were reported to vary between 36.8% and 46.1%, which is a high level (Karki et al., 2020; Awasthi et al., 2020; Dharmadhikari, Harshe & Bhide, 2019). In the present study, similar to the study carried out by Chen et al. (Chen et al., 2017), the smartphone addiction percentage was 28.9%, and this value is lower than those reported in other studies in the literature. This might be because the present study was carried out on the general population rather than on the students.

Although seen at any age, smartphone addiction is more frequently seen among adolescents and young individuals (Ayar et al., 2017; Aker et al., 2017). In parallel with the literature, it was also determined in the present study that the mean score of smartphone addiction was higher among the individuals aged 35 years and younger (18 – 35 years) when compared to the other age groups ( $p < .001$ ), but no statistically significant relationship was found between depression and age ( $p = .217$ ). Our results are compatible with the literature, and other studies have shown that although there is no relationship between depression and age, smartphone addiction is more common in young people (Choi et al., 2019).

A study carried out in Türkiye reported that smartphone addiction was observed in women more frequently than in men (Demirci, Akgönül & Akpınar, 2015). A study conducted in Iran also stated that being a woman is a risk factor for smartphone addiction (El-Sayed Desouky & Abu-Zaid, 2020). Although there was no statistically significant difference between the genders ( $p = .068$ ) in our study, the addiction ratio among women was different from the studies in the literature (Chen et al., 2017; Karki et al., 2020; Awasthi et al., 2020) but similar to the study carried out by Demirci et al. (23.7% among men and 33.3% among women) (Demirci, Akgönül & Akpınar, 2015). The reason why addiction is higher in women may be because the number of women in the study was higher, and they have more free time than men, and they want to fill this time with smartphones.

Considering the relationship between marital status and smartphone, it was determined in a study carried out by Luk et al. in China using SAS-SV that the smartphone addictions of "single" or "widow" individuals were found to be higher than those of "married/cohabiting" and "divorced/separated (when compared to non-married)" individuals (Luk et al., 2018).

There is an inverse relationship between satisfaction with the relationship and problematic use of social media (Spencer et al., 2017). Consistent with literature, when examining the marital status of participants, it was determined that the mean scores of smartphone addiction and smartphone addictions of "Single" individuals were found to be higher than "Married" or

**Table 4.**

*Short Version of Smartphone Addiction Scale Score Status According to the Sociodemographic, Daily Activities, and Social Media/Internet/Smartphone-Related Characteristics of the Participants*

Characteristics	n	%	Median	Interquartile Range	$\chi^{2**}/U^*$	p
<b>Age</b>						
35 years and under	120	34.1	28.5	19.00	34.254**	<.001
36-45 years	110	31.3	20.0	12.50		
Over 45 years old	121	34.4	20.0	11.00		
<b>Gender</b>						
Female	192	45.5	22.00	16.00	13.626.0*	.068
Male	160	54.5	20.00	13.75		
<b>Marital status</b>						
Married	228	64.8	20.00	12.00	37.503**	<.001
Single	80	22.7	31.00	22.00		
Divorced/widowed	44	12.5	20.00	19.75		
<b>Education level</b>						
Primary education	7	2.0	14.00	13.00	4.121**	.127
High school	36	10.2	20.00	18.00		
University	309	87.8	21.00	15.00		
<b>Income level</b>						
Up to 1000 TL	27	7.7	30.00	22.00	4.581**	.205
1000-2000 TL	19	5.4	22.00	15.00		
2000-3000 TL	39	11.1	24.00	21.00		
Over 3000 TL	267	75.9	20.00	15.00		
<b>Occupation</b>						
Public servant	174	49.4	21.00	16.00	29.637**	<.001
Worker	24	6.8	25.00	19.25		
Self-employment	37	10.5	20.00	12.50		
Retired	12	3.4	22.00	19.50		
Housewife	10	2.8	12.00	10.00		
Student	23	6.5	34.00	16.00		
Others	72	20.5	20.00	10.75		
<b>Status of people living With</b>						
Spouse	42	11.9	22.50	13.25	38.149**	<.001
Spouse and children	181	51.4	20.00	9.00		
Alone	42	11.9	24.00	24.00		
Parents	50	14.2	30.50	21.75		
Extended family	13	3.7	20.00	28.50		
With children	10	2.8	24.50	20.00		
Housemate	8	2.3	30.50	19.25		
Others	6	1.7	33.00	17.75		
<b>Addiction status of the participants</b>						
None	259	73.6	21.00	15.00	0.940**	.919
Cigarette	74	21.0	20.00	16.25		
Alcohol	6	1.7	30.00	22.00		
Substance	1	0.3	25.00	0		
Cigarette and alcohol	12	3.4	21.00	16.00		

(Continued)

**Table 4.**

*Short Version of Smartphone Addiction Scale Score Status According to the Sociodemographic, Daily Activities, and Social Media/Internet/Smartphone-Related Characteristics of the Participants (Continued)*

Characteristics	<i>n</i>	%	Median	Interquartile Range	$\chi^{2**}/U^*$	<i>p</i>
Having a computer at home						
Yes	299	84.9	21.00	15.00	7913.0	.988
No	53	15.1	20.00	14.50		
Where it is more preferred to use the Internet						
Home	179	50.9	24.00	16.00	16.746	<.001
Workplace	159	45.2	20.00	13.00		
Others	14	4.0	20.00	17.75		
Social media usage status						
Yes	321	91.2	22.00	15.00	2763.0	<.001
No	31	8.8	16.00	10.00		
Frequency of social media use						
Less than 1 hour per day	92	26.1	17.50	11.50	76.325	<.001
1 – 2 hours per day	141	40.1	20.00	13.00		
3 – 4 hours per day	89	25.3	29.00	18.50		
5 hours or more per day	30	8.5	39.00	17.75		
Smartphone usage status (years)						
0 – 5 years	111	31.5	20.00	15.00	6.768	.034
6 – 10 years	206	58.5	20.00	16.00		
More than 10 years	35	9.9	28.00	18.00		
Frequency of changing smartphones						
1 – 2 years	21	6.0	26.00	21.00	3.965	.138
2 – 3 years	109	31.0	23.00	18.00		
3 – 4 years	104	29.5	21.00	13.00		
More than 4 years	118	33.5	20.00	15.00		
Phone line used						
Postpaid	336	95.5	21.00	15.00	2376.0	.432
Prepaid	16	4.5	24.00	14.25		
Spending time with smart mobile phone						
Less than 1 hour per day	44	12.5	14.00	10.00	61.853	<.001
1 – 2 hours per day	120	34.1	20.00	11.75		
3 – 4 hours per day	117	33.2	22.00	11.00		
5 hours or more per day	71	20.2	32.00	20.00		

Note: Bold values indicate statistical significance.

\*Mann – Whitney *U*-test analysis was performed.

\*\*Kruskal – Wallis analysis of variance was performed.

“Divorced/Widowed” individuals ( $p < .001$ ). It is thought that this is because single individuals have fewer responsibilities in Turkish society, and they have more time for using social media and similar applications.

Considering the smartphone addiction by the education and occupations, it was found that high school and university students’ addiction levels were reported to be higher in the literature. In a study carried out by Şar in 2013 on high school

students, it was determined that the adolescents had problems with smartphone addiction and problematic use of mobile phones (Şar, 2013). Considering the occupation groups, it was found that smartphone addiction scores were low among “housewives” and high among “students.” From occupations, there was a statistically significant difference between smartphone addiction scores and smartphone addictions ( $p < .001$ ). In parallel with the literature, it was determined in the present study that, when compared to the other occupations, the smartphone addiction level

**Table 5.**  
*Evaluation of the Effects of Independent Variables in Predicting the Development of Depression Using Logistic Regression Analysis*

	<i>B</i>	<i>Wald</i>	<i>p</i>	<i>OR</i>	<i>95% CI</i>	
					<i>Lower</i>	<i>Upper</i>
Gender						
Female (ref. = male)	0.138	0.344	.557	1.148	0.723	1.824
Income status						
1000-1999 TL (ref. = <1000 TL)	1.380	3.829	.050	3.974	0.998	15.826
Presence of a computer at home						
Yes (ref. = No)	0.648	3.991	.046	1.911	1.012	3.609
Addiction status						
smoking (ref. = No)	0.194	0.472	.492	1.214	0.698	2.109
Others (ref. = No)	1.161	4.155	.042	3.192	1.046	9.742
Smartphone addiction status						
Yes (ref. = No)	0.738	6.443	.011	2.092	1.183	3.703

Note: Hosmer – Lemeshow ( $p = .296$ ,  $r^2 = .121$ ).  
OR = Odds ratio; CI = Confidence interval.

was higher among the students ( $p < .001$ ). It is thought that smartphone addiction increases because students are younger than others, and they spend more time on social media and other applications. Although sociodemographic characteristics appear to affect smartphone addiction, it has been observed that they do not affect depression.

A study carried out in Türkiye determined that the youngsters with moderate – low familial incomes had lower levels of smartphone addiction than those with a high level of household income. This result is asserted because their smartphones have worse performance and thus enjoy less (Kuyucu, 2017). In the present study, on the contrary with the literature, smartphone addiction was found to be at a higher level among those having a low level of income (<1000 TL) ( $p = .041$ ), and this is thought to be because almost any of today's smartphones can run almost all of the frequently used applications.

Considering the participants, there were statistically significant differences between smartphone addiction scores and smartphone addictions ( $p < .001$ ). The smartphone addiction scores and smartphone addictions of those “living with spouse and children” and those cohabiting were lower when compared to the other groups. It is thought that this is because of two reasons. First, the individuals living in a family have less time for the smartphone because of their responsibilities. Second, positive intra-familial communication has a preventive effect on addiction.

Is there a relationship between other addiction types and smartphone addiction? Both options were argued in various studies. For instance, in a study carried out by Luk et al., it was determined that individuals using cigarettes and alcohol and being physically inactive have a higher level of problematic use of smartphones (Luk et al., 2018). On the other hand, in a study carried out by Haug et al., no relationship was found between alcohol and cigarette and smartphone addiction (Haug et al., 2015). In the present study, similar to the study carried out by Haug et al., no statistically significant difference was found ( $p < .05$ ). Although smartphone addiction is generally associated with alcohol use in

studies, we think that the reason why this result was not achieved in our study is that alcohol use rates were at very low levels.

In literature, studies are reporting that the use of smartphones increased Internet addiction regardless of the place of use (Kawabe et al., 2016; Barrault et al., 2019). In the present study, the places that the participants connected to the Internet at most were house (50.9%), business place (45.2%), and Internet café (0.6%). It was determined that the participants connecting to the Internet at the house had higher smartphone addiction scores and addictions when compared to others ( $p < .001$ ,  $p = .009$  respectively). The reason for this difference may be that the home is a comfortable environment for spending time on the internet and that the internet can be accessed for longer periods of time at home.

As the rates of having a smartphone increase, the use of smartphones also increases. It was found that having a smartphone is related to smartphone addiction, loneliness, and depression among young adults (Lapierre, Zhao & Custer, 2019). The present study determined that smartphone addiction rates increased with a long time of having a smartphone. However, no statistically significant difference was found ( $p = .114$ ). This might be because the addiction effect arises regardless of the time since the smartphone has been a part of our lives for a long time.

In a study carried out between 7 and 15 April 2016 by DORinsight with the participation of 9519 individuals, the interval of changing a mobile phone in Türkiye was found to be 2.5 years (DORinsight). In the present study, it was observed that most of the participants (41.1%) changed their smartphones every 2 – 3 years, and the smartphone addiction increased with the increasing frequency of changing the smartphones ( $p = .005$ ). This result in the present study is essential since it indicates the perception and value attributed to smartphones in Türkiye. Social platforms and advertisements followed via smartphones may sometimes direct the individual into purchasing. This might be the reason participants frequently change the smartphones when they are properly functioning.



Regarding the character of phone lines, no significant relationship was found between smartphone addiction and the character of line (prepaid or postpaid) ( $p = .414$ ). Due to today's market competition, telecommunication companies offer various campaigns for consumers, especially for students. This result might be because using prepaid or postpaid lines does not affect the duration of using a smartphone.

The increase in the use of social media in recent years has also increased the rates of smartphone addiction. According to our findings, those who use social media "3 – 4 hours a day" show significantly more depressive features than those who use "1 – 2 hours a day," and a statistically significant difference was found between the frequency of social media use and BDI scores ( $p = .005$ ). A study carried out on students in India found that 24.0% of participants were using social networking sites occasionally, and 2.0% had significant problems due to excessive use (Meena, Mittal & Solanki, 2012). Compared to those not using, the social media users were found to have statistically significantly higher smartphone addiction scores and addictions ( $p < .001$ ,  $p = .012$ , respectively). With the increase in the duration of using social media, smartphone addiction also increases. Social media is currently the most used in the world and one of the most important places where people spend their free time, and smartphones are also mostly used for social media applications. Based on this, it is an expected result that social media users have high smartphone addiction.

Moreover, in a community study carried out on young adults, it was determined in a 1-year follow-up that, even when the participants having mental health problems at the beginning were excluded, excessive use of the mobile phone was found to be related to stress, sleep difficulties, and depression (Thomé et al., 2011). There are pieces of evidence indicating that there is a bilateral relationship. Thus, it can be stated that smartphone problems cause psychopathology, and psychopathology further increases problematic use (van den Eijnden et al., 2008; Yen et al., 2012). For instance, a depressive individual may want to excessively use his/her smartphone to avoid the negative depressive feeling. Besides that, due to this excessive use of smartphones, the individual stays awake till the late hours, and thus, it causes higher levels of depression, anger, and stress. For this reason, the use of smartphones may cause a vicious cycle with psychopathology (Kim et al., 2015a).

Sociodemographic characteristics were compared to the depression status, but no statistically significant difference was found. Although more than half of the patients had depressive symptoms according to the BDI, it was observed that both the SAS-SV and BDI scores of women were higher than those of men, but this was not statistically significant. This may be because our study group was not homogeneous and there were many confounding factors that could affect depression. In the regression analysis, low-income level was found to be associated with depressive features. In a study conducted in Ukraine in 2023, the financial status was determined to be one of the important predictors of depression (Fel et al., 2023), and in another study conducted with Chinese university students, the income level of the family was found to be a determinant in the development of depressive symptoms (Chen et al., 2013). In another study conducted with 9010

medical students from 33 universities in China, it was observed that low-income level played a determining role in depressive symptoms (Pan et al., 2016). However, in a review of 12 studies in Ethiopia, factors such as age, gender, marital status, violence, migration, and substance use were found to be associated with depression. It was found that economic factors were not related (Bitew, 2014).

Using social media for a longer time daily and spending a long time with smartphones come to the forefront as the factors triggering depression. In a study carried out by Thomee et al., in parallel with the present study, using a smartphone for a long time was related to depressive symptoms (Chen et al., 2017; Thomée et al., 2011). In a study carried out by Lin et al., it was found that using social media for long durations increased the risk of depression (Adjusted Odds Ratio [AOR] = 1.66, 95% CI = 1.14 – 2.42) (Lin et al., 2016). In a study examining problematic social media use in young adults, increased frequency of social media use was significantly associated with increased depressive symptoms, but the duration of social media use was not found to be associated (Shensa et al., 2017). Compared to the other applications used on smartphones, social media applications were found to negatively affect mental health the most (Beard et al., 2019). Although there is evidence indicating that psychopathologies such as depression and anxiety may cause technology addiction, it was also observed that the individuals having chronic stress had used online video games as a coping mechanism to reduce their stress levels (even if it typically is not a successful stress-relieving mechanism) (Snodgrass et al., 2014).

The present study determined that the prevalence of depression was significantly higher among the individuals spending a long time (5 hours/day or higher) compared to those who do not ( $p = .043$ ). As the time spent with smartphones on the Internet increased, the problematic use of the Internet and compulsive purchasing behavior increased (Jiang & Shi, 2016). In a study carried out by Karki et al., it was found that addiction increased with prolonging smartphone use (Karki et al., 2020). It was determined that smartphone addiction increased as the duration of using smartphones increased, especially when using smartphones for 5 hours/day and more ( $p < .001$ ). Although our study concluded that BDI scores increase as the time spent with a smartphone increases, it is not clear whether people show depressive symptoms due to smartphone addiction or whether people with depressive symptoms turn to smartphones to shut themselves off. More detailed studies must be conducted on this subject, excluding all confounding factors.

In our study, it was found that income level, presence of a computer at home, addiction status, and smartphone addiction significantly affected the development of depression ( $p < .05$ ). Those with an income of 1000 – 1999 TL are 3.974 times more likely than those with an income of less than 1000 TL ( $p = .05$ ), those with a computer at home are 1.911 times more likely than those without ( $p = .046$ ), those with other addictions other than smoking are 3.192 times more likely than those without ( $p = .05$ ), and those with smartphone addiction increase the risk of developing depression by 2.092 times ( $p = .011$ ) compared to those without. In a study conducted with medical students during the pandemic, a weak positive correlation was observed between smartphone

addiction and depressive symptoms, in parallel with the results of our study, and no relationship was found in the corrected analysis. Considering that these factors actually affect smartphone addiction, the depression – smartphone addiction relationship will be seen more clearly.

#### Limitations and Directions/Suggestions for Future Research

Examining the limitations of the present study, it can be stated that the chronic diseases of participants were asked. However, the related laboratory parameters (vitamin D, vitamin B12, thyroid hormones, etc.) that might affect the depression status were not examined. This is a limitation of the present study.

The importance of the subject can be concluded from the fact that almost one-third of participants had smartphone addiction, and almost half of them had depressive symptoms. Especially those with a high risk of smartphone addiction ( $\leq 35$  years of age, female gender, single, student, monthly income of  $< 1000$  TL, using the Internet at home, using social media, using social media for long durations, frequently changing the smartphone, smartphone usage duration of  $\geq 5$  hours/day) and depression risk (social media usage duration of 1 – 2 hours/day and smartphone usage duration of  $\geq 5$  hours/day), the smartphone addiction risk should be scanned in primary care by using SAS-SV and BDI. Our findings supported our hypothesis and concluded that smartphone addiction increases depressive symptoms. In addition, having an income between 1000 and 1999 TL, having a computer at home, having other addictions other than smoking, and being addicted to a smartphone increases the risk of developing depression. In conclusion, for those diagnosed with smartphone addiction and/or depression, required lifestyle changes (such as limiting the duration of using smartphones and social media) should be made, and depression treatment should be planned. Further studies might diagnose depression by making use of psychiatric clinical interviews besides the laboratory parameters.

**Ethics Committee Approval:** This study was approved by the Ethics Committee of Kahramanmaraş Sütçü İmam University Clinical Research Ethics Committee (approval number: 03; date: March 4, 2019, meeting no. 2019/06).

**Informed Consent:** Written informed consent was obtained from all individual participants included in the study.

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