

## Original Research Article

# Evaluation of smartphone addiction and related factors among university students

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**Received:** 19 April 2018

**Accepted:** 22 May 2018

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### ABSTRACT

**Background:** The purpose of this study is to investigate the level of smartphone addiction of university students and determine the related factors.

**Methods:** This cross-sectional study was conducted among first and third-class students of the 2016 fall semester in Eskişehir Osmangazi University with 1492 students. In this study, risk of smartphone addiction was evaluated by using Short Version of Smartphone Addiction Scale (SAS-SV). In data analysis, Mann Whitney U, Kruskal Wallis and hierarchical multi linear regression analysis were executed.

**Results:** 772 (51.7 %) of 1492 students in the study group was female. SAS-SV median score of the students was 26. In this study; gender, socio-economic level, perceived health status and mostly used smartphone function were specified as factors influencing smartphone addiction. While, using smartphone for functions such as social media, gaming, online messaging and video watching was assigned to be positively related with smartphone addiction; using smartphone for telephone calls, e-mail and news reading was assigned to be negatively related. 71.2% of students (n:1063) declared to have health problems related with using smartphones. Insomnia was revealed as the most common (23.6 %) health complaint related to smartphone use.

**Conclusions:** Social contact and applications with entertaining contents in smartphone enhance addiction. There is need for more studies and researches for exerting smartphone addiction, related factors and applying necessary protective and therapeutic interventions.

**Keywords:** Health complaints, Smartphone addiction, Smartphone function, University students

### INTRODUCTION

In recent years, with increasing use of mobile phones which facilitate communication; functions of telephones had widened and transformed into smartphones. Smartphones have taken places of computers with functions they provide other than telephone communication such as social media access and various applications. In addition mobile character of smartphones enable individuals easy access and they become objects

that people cannot easily take their eyes from. According to 2015 data of Turkey Statistics Institution, 96.8% of households have smartphones.<sup>1</sup> Moreover, according to results of Deloitte Global Mobile Consumer Survey, groups aged 18-25 used telephone two times more during time with family than groups aged 45-50.<sup>2</sup> Besides the benefits of smartphones in daily life, excessive usage was informed to cause health hazards such as decrease in academic success and social participation in real life, headaches, neck pain, fatigue, sleep disturbances,

memory loss, hearing loss and decrease in concentration.<sup>3-6</sup> Repetitive behaviours of individuals creates need for evaluating the situation in terms of addiction in case they influence functionality in daily life and social relations.<sup>7,8</sup> Addiction behaviors are more common among young people than adults since adolescents have weaker self control mechanisms. In addition, initial period of many additional behaviour of adults are formed during adolescence.<sup>9</sup>

Fifth edition of Diagnostic and Statistical Manual of Mental Disorders (DSM-5) does not give place to smartphone addiction. There is need for more studies in order to evaluate smartphone addiction in context of DSM and determination of symptoms, risk factors and diagnosis criteria. Similar characteristics seen in disorders related to DSM-5 such as compulsive behaviour, functional disorder, deprivation and tolerance development are also encountered in smartphone addiction. In DSM-5 there is only 'gambling disorder' under non-substance related disorder category. On the other hand, it is stated that online gambling addiction could be evaluated as separate diagnosis category in result of future clinical studies.<sup>10-12</sup> The purpose of this study is to determine smartphone addiction level of university students and related factors.

## METHODS

This cross-sectional study was conducted among first and third class students of the 2016 fall semester in Eskişehir Osmangazi University. Required administrative and ethical permissions for the study were obtained. In this study, by accepting smartphone addiction frequency as 20%, margin of error as 3% and confidence interval as 95%, sample size was taken as 683 for each class and calculated as 1400 in total.<sup>2</sup> Sample size to be taken from each faculty and class was determined in according to quato weight of faculties and classes within university population. Selected classes from faculties were determined by lot method. Objective of the survey was told to students in classes and volunteer students were asked to answer the survey. It took approximately 15 minutes to conduct the survey under observation. A questionnaire form was prepared by benefiting from the literature appropriate to the objective of the study.<sup>6,13-16</sup> The questionnaire was investigating socio-demographic characteristics (age, gender, family type, place for accommodation and socio-economic level), perceived health condition, habits (cigarette, alcohol), the most used smartphone function, health complaints related to smartphone use and if they evaluate themselves as smartphone addict or not.

In this study, risk of smartphone addiction was assessed by using Short Version of Smartphone Addiction Scale (SAS-SV). SAS-SV was developed by Kwon et al.<sup>17</sup> Turkish validity and reliability study of the scale was executed by Noyan et al, in 2015.<sup>8</sup> This scale consists of 10 items with sixfold Likert types. Each item was scored

from 1 to 6. Score than could be taken from the scale ranged from 10 to 60. It was accepted that smart phone addiction increases as the score of the scale increases.<sup>8</sup> Students smoking at least one cigarette a day were evaluated as 'smokers'.<sup>18</sup> Those who never drunk alcohol were evaluated as not using alcohol. Socio-economic level of the students were assessed in according to their own perceptions as 'low', 'moderate' and 'high'. In additoin, health conditions of the students were also evaluated in according to their own perceptions as 'good' and 'moderate'.

Data gathered from the study were computerized and IBM SPSS (version 15.0) was utilized for assessment. Score taken from SAS-SV scale was assesed by using Kolmogorov-Smirnov test (Lilliefors modification) if it was appropriate to normal distribution. Analysis of data inappropriate to normal distribution was conducted by using Mann Whitney U, Kruskal Wallis analysis. Hierarchical multilinear regression analysis was executed by taking the log of the scale score in order to determine the independent variables affecting SAS-SV score.

## RESULTS

A 720 (48.3 %) of 1492 students in the study group was men and 772 (51.7%) of them were women. Their ages were varied between 18 to 24 and the mean was 20.4±1.7 years. SAS-SV score of students were varied between 10 to 60 and mean value was 26. SAS-SV median score of students whose age were between 18 to 24 and socio-economic level was high; who were women, stayed in dorms, were non-smoker and aserted health status as moderate was higher than others. Assessment of SAS-SV median score of students in according to their socio-demographic characteristics were demonstrated in Table 1.

When students were asked to assess themselves if they were smartphone addicted or not, 42.2% (n=629) of them told that they were not addicted, 3.4% (n=50) of them told that they did not know and 54.5% (n:813) of them declared that they were addicted. SAS-SV median score of students evaluating themselves as smartphone addicted (31) and students who did not make any announcement about their addiction (28) were higher than students who announced about not being addicted (20) (p<0.001). When students were asked about their mostly used smartphone function; social media was the most popular function with 62.2%; and gaming (13.8%) was declared least within defined reasons. SAS-SV median score of those whose mostly used smartphone function was social media, gaming, online messaging and video watching were higher than those whose mostly used smartphone function was not these defined functions. On the other hand, SAS-SV median score of those whose mostly used function were telephone calls, e-mail and news reading were found to be lower. Assessment of SAS-SV median score of students in according to their mostly used smartphone function was presented in Table 2.

**Table 1: Assessment of students SAS-SV scores in according to socio-demographic characteristics.**

Variables	n (%)	SAS-SV median (Min-max)	Statistical analysis z/KW
<b>Age</b>			
18-20	794 (53.2)	27 (10-60)	2.616; 0.009
21-24	698 (46.8)	25 (10-60)	
<b>Gender</b>			
Female	720 (48.3)	28 (10-60)	8.228; <0.001
Male	772 (51.7)	24 (10-60)	
<b>Family type</b>			
Large	171 (11.5)	25 (10-54)	0.707; 0.702
Nuclear family	1269 (85.1)	26 (10-60)	
Fragmented	52 (3.5)	26 (10-50)	
<b>Socio-economic level</b>			
Low	64 (4.3)	23.5 (10-52)	8.574; 0.014
Moderate	1359 (91.1)	26 (10-60)	
High	69 (4.6)	29 (10-54)	
<b>Accommodation</b>			
With family	293 (19.6)	26 (10-57)	14.721; 0.001
Dorm	523 (35.1)	27 (10-60)	
House	676 (45.3)	25 (10-60)	
<b>Smoking</b>			
Non smoker	1134 (76.0)	26 (10-60)	2.134; 0.033
Smoker	358 (24.0)	25 (10-54)	
<b>Alcohol</b>			
No	1209 (81.0)	26 (10-60)	1.432; 0.152
Yes	283 (19.0)	25 (10-57)	
<b>Health status assessment</b>			
Good	908 (60.9)	24 (10-60)	5.009; <0.001
Moderate	584 (39.1)	28 (10-60)	

**Table 2: Assessment of SAS-SV scores of students in according to their mostly used smartphone function.**

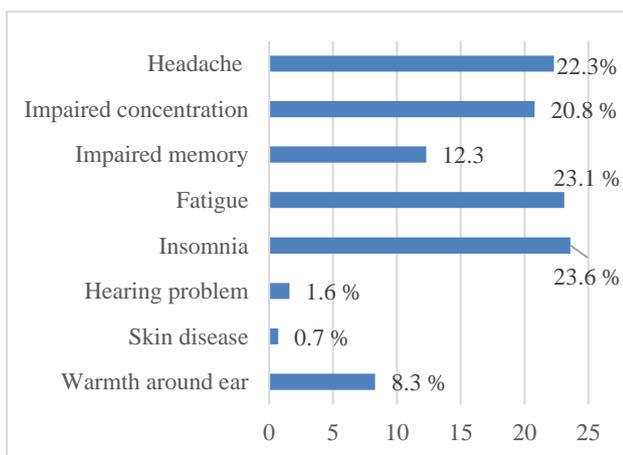
Mostly used smartphone function	n (%)	SAS-SV Median (min-max)	Statistical Analysis Z; p
<b>Social media</b>			
Yes	928 (62.2)	28 (10-60)	9.821; <0.001
No	564 (37.8)	22 (10-60)	
<b>Telephone calls</b>			
Yes	572 (38.3)	24 (10-60)	4.161; <0.001
No	920 (61.7)	27 (10-60)	
<b>Gaming</b>			
Yes	206 (13.8)	28 (10-60)	2.427; 0.015
No	1286 (86.2)	26 (10-60)	
<b>Online messaging</b>			
Yes	597 (40.0)	27 (10-60)	2.200; 0.028
No	895 (60.0)	25 (10-60)	
<b>E-mail</b>			
Yes	220 (14.7)	23 (10-60)	3.348; 0.001
No	1272 (85.3)	26 (10-60)	
<b>Video watching</b>			
Yes	365 (24.5)	27 (10-60)	2.551; 0.011
No	1127 (75.5)	25 (10-60)	
<b>News reading</b>			
Yes	367 (24.6)	24 (10-60)	2.570; 0.010
No	1125 (75.4)	26 (10-60)	

**Table 3: Results of hierarchical multi linear regression analysis demonstrating factors related with SAS-SV scores of students.**

	Model 1 B (95% CI)	Model 2 B (95% CI)	Model 3 B (95% CI)
Age	-0.019* (-0.036; -0.001)	-0.017 (-0.034; 0.001)	
Gender	-0.70*** (-0.088; -0.052)	-0.066*** (-0.084; -0.049)	-0.068*** (-0.085; -0.052)
Family type	-0.006 (-0.029; 0.017)		
Socio-economic level	0.042** (0.013; 0.071)	0.044** (0.015; 0.073)	0.036* (0.008; 0.063)
Accommodation	-0.002 (-0.014; 0.010)		
Smoking		-0.010 (0.015; 0.073)	
Health status		0.040*** (0.022; 0.058)	0.037*** (0.020; 0.054)
Mostly used smartphone function			
Social media			0.092*** (0.074; 0.109)
Telephone calls			-0.062*** (-0.083; -0.042)
Gaming			0.045*** (0.019; 0.071)
Online messaging			0.027** (0.008; 0.046)
E-mail			-0.055*** (-0.083; -0.027)
Video watching			0.038*** (0.015; 0.060)
News reading			-0.027* (-0.051; 0.004)
R <sup>2</sup>	0.052	0.064	0.172
F	16.196***	20.292***	30.754***

\*p≤0.05, \*\*p≤0.01; \*\*\*p≤0.001

In this study, gender, socio-economic level, perceived health status and variety of mostly used smartphone function were ascertained to be factors influencing smartphone addiction. Using smartphone more for its functions such as social media, gaming, online messaging and video watching were determined to be positively related with smartphone addiction. While, using smartphone for its functions such as telephone calls, email and news reading were stated to be negatively related. Results of hierarchical multi linear regression analysis demonstrating factors related with SAS-SV scores of students were indicated in Table 3.



**Figure 1: Percentages of student's health complaints related to smartphone use.**

A 71.2 % (n=1063) of students declared that they had health problems related with smartphone using. Insomnia (23.6%) was the most declared health problem students

complained about. Percentages of student complaints about smartphone using were demonstrated in Figure 1.

## DISCUSSION

In recent years, smartphone use has increased due to technological developments and time passed using telephone have extended. Increasing wasted time passed and other effects of smartphone addiction on social life and health condition cause this addiction to become a growing problem.

Considering that technological addictions are behavioral addictions involving interaction between individual and machine, examination the effects of smartphone functions beside individual characteristics of smartphone addiction increases the importance of this study.<sup>19</sup>

SAS-SV median score of students aged 18-20 was found to be higher than those aged 21-24 years. The study conducted by Sut et al, reported a similar result as smartphone addiction level of individuals aged 18-20 was higher than those aged 21-24.<sup>14</sup> The reason for level of smartphone addiction at younger ages may be that they are close to the adolescent age group where the addictive behaviours are encountered more frequently. In addition besides they newly started university education, students moving away from their families need to strive for orientation and socialization and these may also be a reason to this condition.

SAS-SV median score of females were found to be higher than males. Although there are studies presenting similar results,<sup>13,14,20,21</sup> the study conducted by Chen et al, indicated no difference between smartphone addiction of

males and females.<sup>22</sup> Studies demonstrate that females use smartphones for social contact more than men and using smartphones for social purposes may cause addictive behaviours more.<sup>23,24</sup> In the light of these results, the study group is in university period where social interaction is higher, this may cause higher addiction scores for females.

Income is a critical factor for smartphone use. Mobile machines with wireless technologies has become more sophisticated and high correlation of using expensive applications and increasing income is an expected situation.<sup>25</sup> In this study, SAS-SV median score of students who declared their socio-economic level as 'high' were found to be higher than those who declared their condition as 'low'. Sut et al, stated a similar result as well.<sup>14</sup> A study executed in Malaysia stated that students of families with higher income level were paying more money and time for cell phones.<sup>26</sup> In a study conducted by Brown et al, among adolescents indicated that usage of mobile phones for internet was found to be higher in participants with higher income families than participants with lower income families. This result was related with the case that students with lower income were more lack of access to information technologies such as computer and tablets than students with higher income.<sup>27</sup> Smartphones are more expensive than other mobile devices since they have more sophisticated features. In this study, smartphone addiction level of those with higher socio-economic level were found to be higher and this could be because of that they had more chance to buy more equipped smartphones.

In this study, SAS-SV median score of those who announced themselves as smartphone addict and those who did not make any declaration was found to be higher than median score of those who assessed themselves as non-addicted. Study executed by Demirci et al, suggests a similar result.<sup>28</sup> Kwon et al, also stated that smartphone addiction was more who assessed themselves as smartphone addict and this result was perceived as reflection of severity of smartphone addiction on awareness.<sup>29</sup>

In this study, factors related with smartphone addiction were determined to be gender, socio-economic level, perceived health condition and smartphone function. Using smartphones more for social media, gaming, online messaging and video watching were found to be positively related with smartphone addiction. On the other hand, using smartphones for functions such as telephone calling e-mail and news reading were monitored to be negatively related with smartphone addiction. In a study realized by Jeong et al, functions such as social media, music listening and video watching were asserted to be determinants for smartphone addiction contrarily to studying.<sup>30</sup>

People using smartphones with social purposes were suggested to develop smartphone habits more rapidly and

it is proposed that this could be reason for addictive smartphone behaviours.<sup>24</sup> Besides social relationships, perceived social support and psychological wellbeing were indicated as motivating in smartphone using.<sup>31</sup> In this study, applications providing social contact and entertainment such as social media, online messaging, gaming and video watching were determined to be effective in smartphone addictions. Studies state that time passed in mobile social network has influence on addiction.<sup>32,33</sup> In addition, there are studies demonstrating that an online messaging service named 'Whatsapp' consists of 20 % of daily smartphone usage and gaming on smartphones are related with smartphone addiction.<sup>34,35</sup> Including negative relationships of telephone calling, e-mail and news reading with smartphone addiction, it is observed that virtual social relations and entertainment becomes addictive functions rather than communication.

Smartphone addiction influences home and business life and decreases academic performance.<sup>36,37</sup> With excessive use of smartphones physical and psychological health problems such as depression, anxiety, sleeping disorders, neck and shoulder pains were found to be related.<sup>21,38,39</sup> SAS-SV median score of students who perceived their health conditions as 'moderate' were found to be higher than those with good health perception. Reason for higher smartphone addiction of participants declaring their health condition as 'moderate' could be newly emerging health problems linked with addiction. As a matter of fact, most of the students in the study (70.1%) stated health problems related to smartphone use. Insomnia and fatigue are the most frequently reported complaints.

The study executed by Khan suggested that frequently encountered health problems related with smartphone using were memory disturbance, sleeplessness and hearing problems.<sup>6</sup> 35%-40% of smartphone users use their smartphones 5 minutes before they sleep and within 5 minutes after they wake up.<sup>40</sup> It is not surprising that these people experience sleep disturbance and as a result they feel fatigue and experience loss of concentration. Since this study is cross sectional, there are limitations in explaining cause and result relations.

## CONCLUSION

With emerging technologies, the addition of fun-filled functions that make mobile phones as smartphones make people bound to their telephones. Individuals tend to relate to virtual relationships rather than social relationships, and excessive use leads to negative health and social outcomes. This situation becomes even more important for young people who need more socialization, integrate technology much more easily and whose personal development is very important before business breakthroughs. Today, technology has no limits and considering developing features of smartphones it is obvious that the addiction will increase. There is need for more study to be done in order to exert smartphone

addiction and effecting factors and to establish necessary protective and therapeutic interventions.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Zencirci SA, Aygar H, Göktaş S, Önsüz MF, Alaiye M, Metintaş S. Evaluation of smartphone addiction and related factors among university students. *Int J Res Med Sci* 2018;6:2210-6.