

Original Article

DOI: 10.4274/cjms.2021.2021-89

The Effect of Problematic Internet Use and Social Appearance Anxiety on the Smartphone Addiction of Adolescents

Şensoy and Ayar. Internet Addiction and Smartphone Addiction

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Received: 01.04.2021

Accepted: 07.06.2021

Cite this article as: Şensoy Ö, Ayar D. The Effect of Problematic Internet Use and Social Appearance Anxiety on the Smartphone Addiction of Adolescents. Cyprus J Med Sci.

ABSTRACT

BACKGROUND/AIMS: According to the World Health Organization, the use of technological tools, such as the internet, computers, and smartphones, is increasing every day all over the world. The widespread use of the Internet and technological devices among children today shows the risk that children carry in terms of problematic internet use and smartphone addiction. This study examined the effect of problematic internet use and social appearance anxiety on the smartphone addiction of adolescents.

MATERIALS AND METHODS: The study was designed to collect descriptive, correlational, predictive, and cross-sectional data on 700 adolescents. Data were collected using the Problematic Internet Use Scale, the Social-Appearance Anxiety Scale, and the Smartphone Addiction Scale. Numbers, percentage analysis, and correlation and regression analyses were employed to evaluate the data.

RESULTS: A strong positive relationship was found between adolescents' problematic internet use and their smartphone addiction ($r=0.651$, $p<0.001$), while a moderate positive relationship was observed between social-appearance anxiety and smartphone addiction. ($r=0.454$, $p<0.001$). Of variables identifying smartphone addiction, 48% were associated with problematic internet use and social-appearance anxiety.

CONCLUSION: This study determined that adolescents with high problematic internet use and high social-appearance anxiety were more likely to have a smartphone addiction. This study found that 48% of smartphone addiction was explained by problematic internet use and social-appearance anxiety.

Keywords: Pediatric nursing, adolescents, problematic internet use, social-appearance anxiety, smartphone addiction

INTRODUCTION

According to the World Health Organization (WHO, 2016), the use of technological tools, such as the internet, computers, and smartphones, is increasing every day all over the world (1). Household Use of Information Technology Survey (2019) (2) conducted in Turkey revealed that the rate of computer and internet use among individuals in the 16-year-old age group was 81.8%, with 87.9% of households having internet access and 96.8% of the population were determined to have a mobile phone or smartphone (3). The widespread use of the Internet and technological devices among children today shows the risk that children carry in terms of problematic internet use (4,5). Problematic internet use, which is handled as a social problem throughout the world, is defined as the use of the Internet to the extent that it affects daily life adversely and the individual's inability to control the use of the Internet (6). Although problematic internet use can be seen at any age, adolescents are among the most important risk groups (7). Adolescents are also accepted as a group that promptly adopts new technologies and the social media tools that these technologies introduce, yet being more vulnerable to potential adverse effects. In adolescence, when physical and psychological changes occur, the emergence of behaviors such as problematic internet use will adversely affect the development of adolescents (8). Problematic internet use affects the development and social life of adolescents negatively, as well as their psychological health. This situation may harm both school life and family life of adolescents, therefore, revealing and preventing the problematic internet-use related factors in adolescents is emphasized to be important to the individual and society. Adolescents tend to meet their socialization needs especially on the Internet (9). Studies emphasize that adolescents, who especially have social appearance anxiety, make use of the Internet for socialization in this period when peer interaction and making friends are important (10,11). Studies in the literature emphasize that there is a significant relationship between problematic internet use and social appearance anxiety (12-14). Interest in, liking, and attention to the sharing of adolescents who have high social appearance anxiety lead to increased popularity among friends, which, in turn, escalates the internet use of adolescents every other day, resulting in problematic internet use (15). Social appearance anxiety is the tension and anxiety experienced by the individual when their physical appearance is evaluated by others (16). In their meta-analysis study on social appearance anxiety and internet use in adolescents, Prizant-Passal et al. (2016) (17) found that adolescents with high social appearance anxiety used the Internet because they felt comfortable and secure in the internet environment and that the Internet allowed the privacy of identity. As the social appearance anxiety increases in adolescents, the use of the Internet gradually increases and this causes problematic internet use, and the use of the Internet via smartphones today also causes an increase in smartphone addiction. There is limited research in the literature investigating the effect of internet addiction and social-appearance anxiety on smartphone addiction (18). For this reason, this study examined the effect of problematic internet use and social appearance anxiety on the smartphone addiction of adolescents.

MATERIALS AND METHODS

Participants and Procedures

This study used a descriptive, correlational, predictive, and cross-sectional study of high school students. The study was conducted between January 2019 and June 2019 on students

attending 9th, 10th, and 11th grades in three high schools selected using the simple random-sampling method among high schools affiliated to Fatih District National Education Directorate of Istanbul Provincial Directorate of National Education. The sample size of the study was calculated as 615 adolescents on GPOWER 3.0.1 statistical software package based on regression analysis using Type 1 error 0.01, Type 2 error 0.01 (99% power), and moderate effect size (0.15). However, to better understand the relationship between variables, 730 adolescents who accepted to participate in the study, who had parental consent, and who met the inclusion criteria were included in the study. However, 700 adolescents were included in the study because the data forms of 30 adolescents were missing during the data collection process. **Inclusion criteria.** a) adolescents between 14 and 18 years of age; b) they or their parents have a smartphone; c) they have internet access at home or at school; and d) they agreed to participate voluntarily in the study, and their parents were willing to give written consent. **Exclusion criteria.** a) they do not have access to the internet from home or school; b) they do not use a smartphone; c) they have special learning difficulties; d) they wished to withdraw from the study at any stage; and e) they could not obtain parental consent. Table 1 provides information about demographic variables.

The data were collected during classes at the high schools. Participants were asked to fill out the survey forms anonymously after informed consent was obtained from the researchers. Volunteer participants took part in the study, and they were free not to participate. The data were collected from each class in a separate lesson (each lesson was 40 minutes). The scales were administered by the researcher in the classroom during a lesson permitted by the teacher.

Instruments

The Descriptive Information Form was designed by the researchers in accordance with the literature (10). It consisted of items requesting socio-demographic information about the participants-age, gender, grade, parents' education level, monthly income level, and internet and smartphone use.

The Problematic Internet Use Scale–Adolescent Form (PIUS–A)

The Problematic Internet Use Scale–Adolescent Form (PIUS–A) was developed by Ceyhan & Ceyhan (2014) (19) to assess the problematic internet use of high school students. The scale consists of 27 items to be scored as "not appropriate at all" (1 point), "barely appropriate" (2 points), "slightly appropriate" (3 points), "quite appropriate" (4 points), and "fully appropriate" (5 points). The possible scores range from 27 to 135. Higher scores obtained on the scale indicate excessive and unhealthy problematic internet use. The overall internal consistency coefficient of the scale was reported to be 0.93 (19), and Cronbach's alpha value of the scale was determined as 0.92, thus, **the scale was judged to be a valid and reliable instrument to identify problematic internet use of high school students in the Turkish sample. In this study, the Cronbach alpha value of the scale was determined as 0.920.**

The Social-Appearance Anxiety Scale (SAAS)

The Social-Appearance Anxiety Scale (SAAS) was developed by Hart et al. (2008) (20) to measure the social-appearance anxiety of individuals. The validity and reliability of the scale were conducted by Doğan (2011) (21). It consists of 16 items and only one sub-dimension. Each item on the scale is scored as 1 = not appropriate at all, 2 = inappropriate, 3 = slightly appropriate, 4 = appropriate, and 5 = fully appropriate. Higher scores obtained from the scale indicate more pronounced social-appearance anxiety. SAAS is a self-reporting scale developed to measure emotional, cognitive, and behavioral concerns that individuals experience about their appearance. KMO value of the scale was reported to be 0.94. The factor loadings of the scale varied from 0.34 to 0.78. The fit indices were RMSEA = 0.066;

CFI = 0.95; IFI = 0.95, NFI = 0.93, and GFI = 0.93 ($\chi^2 = 311.89$, $p < 0.001$) (21). Cronbach's alpha coefficient of the scale was 0.91. The scale was judged to be a valid and reliable scale for use in adolescents. Cronbach's alpha value of the scale in this study was determined as 0.940.

The Smartphone Addiction Scale (SAS)

The Smartphone Addiction Scale was developed by Sar, Ayas & Horzum (2015) (22) to determine the level of smartphone addiction among adolescents. It consists of 30 items and four sub-dimensions. It has a 5-point Likert-type structure scored as "strongly agree" (5 points), "agree" (4 points), "neutral" (3 points), "disagree" (2 points), and "strongly disagree" (1 point). The factor loadings of the scale varied between 0.44 and 0.81. KMO value of the scale was 0.947, $\chi^2 = 4,919.85$, and $p = 0.000$. Cronbach's alpha value of the scale was 0.96. Model fit indices of the scale were RMSEA = 0.075, CFI = 0.97, NFI = 0.96, and NNFI = 0.97. As a result of the analysis, the scale was concluded to be a valid and reliable scale (22). In this study, Cronbach's alpha value of the scale was found to be 0.942.

Compliance with ethical standards

Approval of the authors who developed the scales used in this study was obtained by e-mail. At the outset, the Ethics Committee approval was obtained from the Non-Interventional Research Ethics Committee (date: 01.11.2018, protocol no: 4293-GOA, issue: 2018 / 28-17). Following approval by the Ethics Committee, permission for the research was granted by the Provincial Directorate of National Education of Istanbul Governorship. Before the study, parents were informed about the study content in a meeting at the school. Informative forms about the study aim and content were mailed to parents who did not attend the meeting. Only the students whose parents gave written consent were included in the study.

Evaluation of data

The research data were analyzed using **IBM SPSS Statistics version 24 ((IBM SPSS Corp;Armonk, NY, USA)**). Numbers, percentages, and mean values were used to evaluate the descriptive information of adolescents. Shapiro-Wilk test was used to confirm that the scale data fit the normal distribution. The relationship between problematic internet use and smartphone addiction, and the relationship between social-appearance anxiety and smartphone addiction were evaluated using a Pearson's correlation analysis. The effect of problematic internet use and social-appearance anxiety on smartphone addiction was evaluated with a multiple regression analysis. The multicollinearity test was employed to determine whether variables would be included in the model. In multicollinearity tests, VIF value should be less than 10, tolerance value should be greater than 0.2, and the condition index value should be less than 15. The variables in this study were included in the model as they were found to meet the desired criteria. The significance level was accepted as $p < 0.001$.

RESULTS

Table 1 reports the sample characteristics. As a result of the correlation analysis conducted in this study, a significant, strong, and positive correlation was determined between the means of total PIUS-A scores of adolescents and the means of total smartphone addiction scores ($r = 0.651$, $p < 0.001$). On the other hand, there was a moderately significant positive correlation between the means of total SAAS-A scores of adolescents and the means of total smartphone addiction score ($r = 0.454$, $p < 0.001$) (Table 2).

Three models were established considering the relationship between study variables and smartphone addiction. Multiple regression analysis was used to evaluate the models.

In Model 1, the PIUS-A was identified as explaining 45% of smartphone addiction ($p<0.001$). A strong positive relationship was found between problematic internet use and smartphone addiction ($\beta = 0.669$, $p<0.001$).

In Model 2, the mean total scores obtained from the SAAS-A were determined to explain 21% of smartphone addiction ($p<0.001$). A moderate positive relationship was identified between social-appearance anxiety and smartphone addiction ($\beta = 0.454$, $p<0.001$).

In Model 3, the mean total scores obtained from the scales relating to PIUS-A and SAAS-A were included in the model. Taken together, these variables explained 48% of smartphone addiction. According to this model, the variables that affected the smartphone addiction of adolescents mostly were determined to be problematic internet use of adolescents ($\beta = 0.581$) and social appearance anxiety ($\beta = 0.204$), respectively ($p<0.001$) (Table 3).

DISCUSSION

The findings of this study indicated the effect of adolescents' problematic internet use and social-appearance anxiety on smartphone addiction. Three models were created to explore the relationship between the study variables and smartphone addiction.

Model 1 showed that problematic internet use in adolescents explained 47% of smartphone addiction. The use of smartphones is highly preferred among adolescents, because it provides easy access to the internet at any time and place with a portable device (23-25). The fact that internet and smartphone use allow social interaction also effects adolescents to use it frequently (26). Similar to our study there are studies in the literature showing a significant relationship between problematic internet use and smartphone addiction (10, 27,28). In a study conducted in Japan (Ministry of Internal Affairs and Communications) on the internet use of 38,630 adolescents, 59.7% of adolescents were found to access the Internet via their smartphones and that they preferred smartphones especially because they allowed internet access whenever and wherever they wanted (29). Studies in the literature supported the finding determined in Model 1 in our study that adolescents with a high level of problematic internet use explained the smartphone addiction at a high level (18, 27,29).

Model 2 indicated that the increase in the mean SAAS-A score of adolescents increased smartphone addiction by 0.454 times and that the means of total SAAS-A scores explained 21% of total smartphone addiction. Similar to our study, Doğan and Tosun (2016) (11) determined that as the level of social anxiety increased in high school students, smartphone addiction increased, as well. In the study of Wang et al. (2015) (30), individuals who were concerned about establishing a face-to-face relationship were determined to use smartphones as an avoidance behavior. In a study on 443 adolescents aged between 14-18, Emirtekin et al. (2019) (31) found that 19% of adolescents' smartphone addiction was explained by social appearance anxiety.

In Model 3, on the other hand, both problematic internet use and social-appearance anxiety in adolescents were determined to affect smartphone addiction. Various studies show that adolescents are highly prone to smartphone and internet use, particularly because smartphones provide easy access to the internet and anonymity among adolescents with social-appearance concerns (17). Adolescents with pronounced social-appearance anxiety feel more confident and more comfortable on the internet, and can interact with other individuals more easily, compared to face-to-face interaction (17,32). In their meta-analysis study, Prizant-Passal et al. (2016) (17) found that individuals with high social-appearance anxiety had higher problematic internet use and smartphone addiction. In particular, adolescents with high social-appearance anxiety prefer to socialize on the internet, especially with smartphones, because they can mask their identities and photographs on the internet, and they are highly unlikely to receive criticism of their images, which is what they worry about. Adolescents with high social-appearance anxiety have more online communication than face-to-face communication.¹¹ In

their study with 319 university students, Demirci et al. (2015) (33) found that adolescents with high social-appearance anxiety had higher levels of smartphone addiction and that these two variables were mutually influential. In other words, adolescents who are smartphone addicts were identified as those who experience high social-appearance anxiety. In their study with 381 university students, Hawi and Samaha (2017) (34) found that students with a high level of smartphone addiction had higher levels of social-appearance anxiety compared to students without smartphone addiction.

In the literature, there was no study investigating the effect of both PIUS and social appearance anxiety of adolescents together on smartphone addiction. The strength of our study was that it had a large sample size ($n = 700$) and that the sample was made up of the most delicate age group in terms of smartphone use. Also, addressing social appearance anxiety in adolescents in our study was very important in terms of preventing problems that may adversely affect the future health of adolescents such as eating behavior disorders, anxiety and depression and addiction (35).

Schools are the most appropriate places for health education and screening programs to promote and maintain health. Adolescents are open to the information provided at school and are more willing to participate in existing programs and activities with their peers. The duties and responsibilities of school nurses in Turkey involve the transfer of accurate health information to students and the organization of training programs to have them gain positive attitudes towards health education. Accordingly, the school nurse should plan training programs on the conscious use of technology for students. Besides, with the awareness training interventions, the school nurse should draw attention to the effects of technological devices on adolescents resulting from their inappropriate use. Early recognition and treatment of adolescent's smartphone addiction are crucial, given the negative consequences of untreated addiction on adolescent development.

In this study, the high social appearance anxiety of adolescents was found to significantly affect smartphone addiction. Social appearance anxiety is another important issue that the school nurse should pay attention to. Enhancing the self-confidence of adolescents who particularly have high social appearance anxiety and helping them to be aware of their strength is among the important responsibilities of the school nurse. The school nurse should also follow the time when adolescents are online and when they quit, encourage them to spend more time with their family and friends, and direct them to social activities (e.g. sports, cinema, etc.) that they are/may be interested in instead of online games.

Limitations and Suggestions for Future Research

This study has several limitations. The primary limitation of our study is the cross-sectional nature of the work, which prevents the establishment of causal relationships. The present study was limited in that we did not collect data on all the variables that could be related to PIUS-A and SAS, such as prior family and individual mental health history. This study determined that adolescents with high problematic internet use and high social-appearance anxiety were more likely to have a smartphone addiction. This study found that 48% of smartphone addiction was explained by problematic internet use and social-appearance anxiety. In future studies, we recommend that some sociodemographic characteristics of adolescents such as their past mental health history and familial features should be taken into consideration and the effect of these variables on smartphone addiction should be investigated. Besides, issues such as internet addiction and smartphone addiction should be addressed in detail in schools, and adolescents should be provided with counseling services on these issues.

Declaration of Competing Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article

MAIN POINTS

- This study found that 48% of smartphone addiction was explained by problematic internet use and social-appearance anxiety
- This study determined that adolescents with high problematic internet use and high social-appearance anxiety were more likely to have a smartphone addiction
- Early recognition and treatment of adolescent's smartphone addiction are crucial, given the negative consequences of untreated addiction on adolescent development.

ETHICS

Ethics Committee Approval: The Ethics Committee approval was obtained from the Non-Interventional Research Ethics Committee (date: 01.11.2018, protocol no: 4293-GOA, issue: 2018 / 28-17). Following approval by the Ethics Committee, permission for the research was granted by the Provincial Directorate of National Education of Istanbul Governorship.

Informed Consent: Informed consent was obtained.

Peer-review: Externally peer-reviewed.

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UNCORRECTED

Table 1 Adolescent characteristics

Characteristic	Mean	SD
Mean Age	15.67	1.02
	N	%
Adolescents' Age		
14	68	9.7
15	282	40.3
16	188	26.9
17	145	20.7
18	17	2.4
Gender		
Female	302	43.1
Male	398	56.9
Student's class		
9 th class	338	48.3
10 th class	193	27.6
11 th class	169	24.1
Mother's Education Level		
Primary	193	27.6
Middle	156	22.3
High School	211	30.1
University	140	20.0
Father's Education Level		
Primary	111	15.9
Middle	169	24.1
High School	233	33.3
University	187	26.7
Perception of income		
Low	68	9.7
Middle	562	80.3
High	70	10.0
Per Weekly Internet Usage		
<5 hours per week	445	63.6
5-14 hours per week	224	32.0
15-39 hours per week	10	1.4
>40hours per week	21	3.0
Internet Usage Purposes		
Studying	130	18.6
Watching Movie	137	19.6
Chatting	109	15.6
Using Social Media Sites	211	30.1
Online game	113	16.1

Table 2. The Relation of Adolescent' Smartphone Addiction Levels With Their Problematic Internet Use and Social Appearance Anxiety Levels

	1	2	3
1. Smartphone addiction	1.0		
2. Problematic internet use	0.669*	1.0	
3. Social appearance anxiety	0.454*	0.431*	1.0

Not: * p<0.001

Table 3. The Predicting Status of Problematic Internet Use and Social Appearance Anxiety Levels of the Adolescent for Their Smaetphone Addiction Levels

	Model 1	Model 2	Model 3
	β	β	β
PIUS-A	0.669*		0.581*
SAAS-A		0.454*	0.204*
R	0.669	0.454	0.694
R²	0.448	0.207	0.481
F	565.540	181.671	323.467
p	<0.001	<0.001	<0.001
DW	1.766	1.829	1.796

Note: * p<0.001; DW: Durbin Watson; PIUS-A (Problematic Internet Use Scale-Adolescent); Social-Appearance Anxiety Scale—Adolescent Form (SAAS-A).