Relationship between Smartphone Addiction and Loneliness among Adolescents*

Ergenlerde Akıllı Telefon Bağımlılığı ve Yalnızlık Arasındaki İlişki

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ABSTRACT

Objective: The aim of this study was to examine the relationship between smartphone addiction and loneliness in a group of high school students in İzmir.

Method: The data were collected from 465 students using a Personal Information Form, the Smartphone Addiction Scale-Short Form (SAS-SF) and the UCLA Loneliness Scale.

Results: The average age of the participant students was 16.15 ± 1.04, with males constituting 42.8% and females constituting 57.2% of the study sample. The students' average scores on the SAS-SF and UCLA were 28.14 ± 11.54 and 53.72 ± 5.42, respectively. A significant positive relation was found between SAS-SF and UCLA (r: .202, p: 0.00), and while no significant correlation was observed between SAS-SF, age, and GPA (p > 0.05). A positive moderate correlation was found in terms of the daily duration of smartphone usage (r: .409, p: 0.00).

Conclusion: The study found that students who feel a sense of loneliness tend to use smartphones a lot and are at risk of smartphone addiction. It is recommended that addiction community mental health nurses take preventive measures against smartphone addiction to protect and improve the mental health of the students.

Keywords: community mental health nurse, high school students, loneliness, smartphone addiction.

ÖZET

Amaç: Bu çalışmanın amacı İzmir ilindeki bir grup lise öğrencilerinde akıllı telefon bağımlılığının yalnızlık düzeyi ile arasındaki ilişkiyi belirlemektir.

Yöntem: Araştırmanın verileri literatür taranarak hazırlanan Bilgi Formu, Akıllı Telefon Bağımlılığı Ölçeği Kısa Formu (ATBÖ-KF) ve UCLA Yalnızlık Ölçeği ile toplandı. Çalışmaya toplam 465 öğrenci katıldı.

Bulgular: Çalışmaya katılan öğrencilerin yaş ortalaması 16.15 ± 1.04, %42.8'i erkek ve %57.2'si kadındır. ATBÖ-KF puan ortalaması 28.14 ± 11.54 ve UCLA Yalnızlık Ölçeği puan ortalaması 53.74 ± 5.43'tür. ATBÖ-KF puan ortalamaları UCLA Yalnızlık Ölçeği arasında anlamlı pozitif ilişki saptandı (r: .202, p:0.00). Öğrencilerin ATBÖ-KF puan ortalamaları ile genel not ortalamaları ve yaş arasında anlamlı ilişki saptanmazken (p<0.05), ATBÖ-KF puan ortalamaları ile telefon kullanım süresi arasında pozitif orta düzeyde ilişki saptandı (r:.409, p:0.00).

Sonuç: Ergenlik dönemindeki öğrencilerin yalnızlık duyguları hissederek akıllı telefonları ile daha fazla vakit geçirdikleri ve bağımlılık için risk oluşturduğu söylenebilir. Toplum ruh sağlığı hemşirelerinin davranışsal bağımlılıklardan korunma ve yalnızlık ile baş etme konularında ruh sağlığını geliştirme programlarından yararlanmaları önerilebilir.

Anahtar kelimeler: akıllı telefon bağımlılığı, yalnızlık, lise öğrencisi, toplum ruh sağlığı hemşiresi.

INTRODUCTION

In addition to the traditional features of a telephone, a smartphone is able to fulfill many of the functions of a personal computer (1,2). More specifically, these devices offer users the ability to send e-mails and text messages, watch videos, listen to music, play games, check the news or weather, shop online, make voice or video calls, and follow a variety of social media forums. Along with many applications, they are also portable and can be connected to the Internet from almost anywhere. Therefore, it is not surprising that these devices have become an important part of many people's lives in terms of the amount of time people are engaged with them. Young people especially tend to use smartphones often, to such an extent that many people believe that this usage amounts to addiction (2,3).

Today, it is common for individuals to be inseparable from their smartphones, as demonstrated by the latest data published from the Pew Research Center in the USA, which reports that 46% of smartphone users say "I can't do anything without smartphones" (4). Use of smartphones often affects individuals' daily routines, work, and school lives, as well as social and family relations. Furthermore, frequently checking the smartphones can potentially result in mental and physical problems, such as sleep disorders, anxiety, withdrawal, and low success rates in academic endeavors, in addition to reduction of physical activities and the development of spinal cord deformities (2,5). Some observers have concluded that smartphone usage has developed into a situation that is gradually affecting the public's mental health and creating addiction problems (6) Similar to internet addiction, smartphone addiction too features certain symptoms, such as repetitive engagement in actions that give pleasure, loss of control, negative impacts on daily activities, tolerance (e.g. increased amounts of usage time, more apps) cravings, and withdrawal when actions are unfulfilled (3, 7, 8) to a study conducted on 10,191 adolescents in Taiwan, 30% of the participants developed high levels of tolerance, 36% experienced withdrawal symptoms, 27% had long usage periods, 18% failed to give up using smartphones, and 10% experienced intimacy problems (9).

Loneliness is defined as a mood resulting from identity crises experienced during adolescence. Loneliness is experienced during this period, but not as a disorder. To relieve this loneliness, adolescents actively access social media using smartphones which have become one of the irreplaceable elements in our lives (10). They particularly tend to prefer communicating via mobile technological devices to face-to-face conversations (11). They find it comforting to communicate via smartphones, as it prevents them from having to make eye contact or to deal with the ambiguities of body language (12). As has been illustrated in a study undertaken in Turkey, social anxiety, low self-respect, and shyness are among the precursors to loneliness among high school students (13). Failure to attain success via face-to-face communication is compensated through engaging in social networking and cyber relations. The fast, untroubled communication provided by the internet and social media serves to decrease loneliness (14). Using smartphones compulsively at school, on a bus, in the market and at other places helps adolescents feel less lonely (15). Park (2005) found a positive correlation between smartphone usage and loneliness among college students (16). Additionally, in a study conducted by Bian and Leung (2015) in China examining the relation between smart phone usage among undergraduates and the levels of loneliness and shyness, the authors observed that certain levels of loneliness and shyness acted as a precursor to smartphone addiction (14).

The studies in Turkey on smartphone addiction have been conducted by medical faculties or undergraduates (7,8,17). While a number of studies have already been conducted on internet and mobile phone addictions, only a limited number of studies dealt specifically with smartphone addiction and loneliness among adolescents. The aim of this study is to examine the relationship between smartphone addiction and loneliness in a group of adolescents in Izmir.

MATERIALS AND METHODS

This study employed a descriptive, cross-sectional design and used self-report questionnaires to examine the relationship between smartphone addiction and loneliness in a group of adolescents in Izmir. For this study, the following questions were formulated:
1. Is there any correlation between smartphone addiction and loneliness in adolescents?
2. Is there any relationship between certain gender of the adolescents and smartphone addiction?

Participants

The data were collected from four high schools in Izmir between March 25 and April 15, 2016. The population of the study consisted of students at general high schools in Izmir in the 2015-2016 spring term, and the study sample consisted of four general high schools randomly selected by lot from 4 districts (one high school from each district) within the city center of Izmir. A total of 666 students were identified for participation in the study, but only 465 of them were qualified to participate, as they were present at the time of the study, had parental consent, and owned a smartphone.

The inclusion criteria were being between the ages of 13 and 19, agreeing to participate the study, being registered in the schools where the study was conducted, being present in the classrooms when the data were collected, and using smartphones.

Measurements

Information form: A 19-question information form was developed by the researchers based on the literature (3,7) in order to collect data about the participants' socio-demographic characteristics and smartphone use.

Smartphone Addiction Scale – Short Form (SAS-SF): The SAS-SF is a self-report scale developed by Kwon et al. (2013) to evaluate the risk of smartphone addiction among adolescents (3). It is a 6-point Likert scale consisting of 10 items, to which the responses range from "I strongly disagree" (1) to "I strongly agree" (6). Total scores can range from 10 to 60, with higher scores indicating higher levels of smartphone addiction risk. Noyan et al. (2015) tested the scale for Turkish validity and reliability (8). In the one-factor Korean sample of the scale, the cutoff score was determined to be 31 for men and 33 for women (3). The cutoff scores were not determined in the Turkish validity and reliability study of the scale as there were no clinical interviews conducted with participants concerning smart phone addiction. The cutoff scores obtained in the Korean sample were not considered suitable for the Turkish society for reasons such as different technology usage habits and cultural differences. Moreover, the Korean version of the scale has no subscales and therefore, the score is evaluated in total points (3). The Cronbach's alpha internal consistency coefficient was 0.91 for the original version and 0.86 for the Turkish scale (8). In this study, Cronbach's alpha coefficient was found to be 0.89.

UCLA Loneliness Scale (UCLA-LS): The UCLA Loneliness Scale is a 4-point Likert type self-report scale that serves to determine an individual's level of general loneliness. The original form of the scale has a total of 20 items; 10 positive, indicating the individual does not feel lonely, and 10 negative, indicating the individual feels lonely. Responses to these items range from "I never feel this way" (1) to "I often feel this way" (4) (18). The highest possible score is 80, while the lowest possible score is 20. High scores indicate that an individual feels lonely more often than an average person. The Turkish validity and reliability study of the scale was conducted by Demir (1989), who found the Cronbach's alpha reliability coefficient of the Turkish scale to be 0.94 (19). In this study, Cronbach's Alpha coefficient was found to be 0.41.

Ethical Considerations

Ethical approval for the study was granted by the University Medical Faculty's Ethics Committee of Medical Researches in Izmir on November 2, 2015, with protocol number 2016/22, and institutional approval was granted by Izmir Ministry of National Education, with the governorship approval number 12018877-604.01.02-E.3101387. After obtaining approval from the Ethics Committee and the government, information about the study was hand delivered to the school principal and counselors of each high school. On the first day of the data collection of the study, after being given verbal permission from the

teacher, the researchers informed the students about the study by reading out the research instructions in the classrooms during counseling courses. Informed consent forms were then handed out to the students by the researchers, who asked them to receive consent from their parents if they wished to voluntarily participate in this study. Each participant and the caretakers or guardians of the adolescent participants provided a written informed consent after first receiving a full explanation of the study's purpose and procedure. On the second day, the students who had returned the signed consent forms were asked to fill out the study forms, and the researchers collected the forms once they were completed.

Data Analysis

For analysis of the descriptive data, the SPSS- 22.0 (Statistical Package for the Social Sciences) was used. It was used to determine the average, minimum, maximum, standard deviation, and percentage distributions, and for the comparative analysis, the Student's t-test, Pearson correlation, regression analysis, and one-way analysis of variance (ANOVA) among the parametric methods were used. The results were assessed at a 95% confidence interval and $p < 0.05$ significance level.

RESULTS

The average age of the students who took part in the study was 16.15 ± 1.04, and the mean of their latest school grade point averages (GPA) was 83.69 ± 9.1. The personal and socio-demographic information of the students is shown in Table-1. Regarding the individual characteristics of the students, 42.8% of them were male and 57.2% were female, 31.4% were tenth graders, 57% perceived their economic situation as good, and 93.1% resided in a home. When students were asked whether there was internet connection at their place of residence, 90.8% responded 'yes', while 9.2% responded 'no' (Table-1).

Table-1. Comparison SAS-SF, UCLA-LS Average Score and Some Characteristics of Participants

Characteristics	N	%
Gender		
Female	266	57.2
Male	199	42.8
Class		
Nine	134	28.8
Ten	146	31.4
Eleven	106	22.8
Twelve	79	17
Economic Situation		
Poor	8	1.7
Moderate	161	34.6
Good	265	57.7
Very Good	31	6.7
Residence area		
House	433	93.1
Dorm	32	6.9
Internet Access		
Yes	422	90.8
No	43	9.2

The student participants' daily average amount of time of smartphone use was 4.04 ± 3.15 hours (Table-2). In terms of the activities for which the students used the smartphone, 78.3% used it for listening to music, 77.2% for texting, 70.9% for following social media, 57.5% for watching videos/films, 57.3% for chatting, 31.3% for following scientific information, 22.5% for note taking, 11.4% for shopping, and 10.6% for sending e-mails.

The average score obtained by the students was 28.14 ± 11.54 on the SAS-SF, while it was 53.72 ± 5.42 on the UCLA Loneliness Scale. A positive correlation was found by the Pearson Correlation between the SAS-SF and the UCLA Loneliness Scale (r: .202, p: 0.00). While no significant correlation could be determined between the SAS-SF, age, and GPA (p >

0.05), a positive moderate correlation was found for the daily duration of smartphone usage (r: .409, p: 0.00) (Table-2).

Table-2. Students' average scores of SAS-SF and UCLA-LS and the correlation between SAS-SF and some variables

Scales	Min	Max	Ort	SD	R	p
SAS-SF	10	62	28.14	11.54	.202.202	
UCLA-LS	20	80	53.72	5.42	.202	0.00
Age	14	19	16.15	1.04	.11	0.81
GPA	53.00	100	83.69	9.10	-.028	0.553
Daily average duration of smartphone usage	1	24	4.04	3.15	.409	0.00

In the regression analysis performed, a statistically significant relationship was determined between age, GPA, duration of daily smartphone usage, and the scores obtained on the SAS-SF (F = 28.189; p = 0.000 < 0.05). The variables of age, GPA, and duration of daily smartphone usage were found to be poor determinants of addiction to smartphone (R^2 = 0.197). In other words, the ages of the phone users (p = 0.857 > 0.05) and their GPA (p = 0,815 > 0.05) were shown to have no impact on their addiction to smartphones. An increase in the addiction to smartphones (ß = 1.468, p = 0.000) was found to be impacted by the relationship between the average scores obtained by the students on the UCLA Loneliness Scale (ß = .176, p = 0.000) and the duration of daily smartphone usage.

According to the Student's t-test, which was applied to independent groups, a significant difference existed between the genders in terms of the average scores obtained by the students on the SAS-SF (p = 0.000< 0.05) and on the UCLA Loneliness Scale (p = 0.029 < 0.05).

Table-3. The effect of independent variables on SAS-SF

Dependent Variable	Independent Variable	ß	t	p	F	Model (p)	R2
SAS-SF	Stable	-.851	-.088	0.93	28.189	0.000	0.197
	UCLA-LS	.176	4.180	0.000			
	Age	.008	0.181	0.857			
	GPA	.010	0.235	0.815			
	Daily Duration of Smartphone Usage	.401	9.503	0.000			

DISCUSSION

The aim of this study was to determine the relationship between smartphone addiction and loneliness in a group of adolescents in Izmir. The present study was planned in response to the very limited number of studies in Turkey that have focused on the smart phone addiction of high school students. Because in recent years, the use of smartphones has become an indispensable part of life, especially among high school and university students, to such an extent that for some individuals it can develop into an obsessive-compulsive thought disorder and can negatively impact the physical and mental health of the affected individuals (8). Im et al. (2013) examined the relation between psychiatric symptoms and smartphone usage among the college students in their study, and found that in the group whose risk of smartphone addiction was higher, more psychiatric symptoms were observed (20). Choi et al. (2012) indicated that the use of smartphones affected the students' campus life, interpersonal communication, and mental health (21).

In the current study, the average scores obtained by the high school students on the SAS-SF was low, just as it was for the adolescents in Taiwan (3). The activities for which the students generally used the smartphone included texting, listening to music, following social media, watching videos/films, and chatting. In particular, various forms of social media are

used as tools that enable individuals to engage in communication, obtaining information, sharing their individual status, uploading videos or pictures, chatting in small or large groups, and following social media, all of which are popular among adolescents. In addition, quick texting with the applications that can be downloaded on phones is also quite common among young people. According to the Turkish Statistical Institute's (TUİK) ''Household Use of Information and Communication Technology Research'' (2015), 74% of the entire Internet connection is made through a smartphone (22). Furthermore, the report specified that it is most frequently used by the age group of 16 and 24, and that social media constituted 78.8% of smartphone usage in 2014. In a study conducted in China among young people, it was determined that there was an increasing tendency to smartphone addiction, as the duration of time on social media sites increased (23). In their study on high school students, Doğan and Tosun (2016) discovered that a significant correlation existed between the time spent on social web sites and problematic usage of smartphones (24). The study findings are similar to those found in the literature.

The students obtained a high average score on the UCLA Loneliness Scale, and there was a positive correlation between the SAS-SF and the UCLA Loneliness Scale. In a study by Şar (2013), a positive relation was determined between adolescents' problematic phone usage and feelings of loneliness (25). Enez Darcin et al. (2016) demonstrated in their study that there was a correlation between loneliness and smartphone addiction among university students, and that students who primarily used their smartphones to access social networking sites also had an excessive pattern of smartphone use (11). Moreover, in Doğan and Karakuş's (2015) study, it was observed that the loneliness of high school students led to an increase in the time they spent on social media web sites (15). Since it is generally accepted that the feeling of loneliness is more intense during adolescence, it seems reasonable to conclude that the use of smartphones increased as a result of adolescents trying to manage feelings of loneliness. On the other hand, especially adolescences who feel lonely may more frequently use the social web sites and can engage in communication using fake identities (15) that make them feel more relaxed and more courageous in the virtual environment (26). Creating problematic relations in unreliable environments may also let them do cyber bully behaviors. In Peker &Eroğlu's study (2015), it was detected that the tendency of cyber bullying increases if the perceived social support of adolescences decreases (27).

Smartphones, which were used to make phone calls and send texts, have started to do what computers can do and thus gained an important place in our lives. Smartphones meet the needs such as navigation, access to information and communication, and are more frequently used by children and adolescents. Adolescents excessively use smartphones to play games, call their friends and access to internet, which indicates that smartphone addiction may be common in this population like internet addiction. Access to the internet and excessive use of smartphones may prevent adolescents from reducing the frequency of use and cause deprivation, poor performance in school, as well as domestic and social issues. Studies indicate that excessive use of smartphones negatively affects mental and physical health. Hwang et al. (2012) reported that a group that excessively used smartphones had high anxiety and depression scores (28). Demirci et al. (2015) suggested that those who used their smartphones more frequently had higher depression and anxiety scores (17). Smartphones may cause anxiety and depression, and excessive use of them may distort the biological clock, cause sleep disorders, and cognitive, emotional and mental symptoms. In addition, adolescents frequently wake up due to the notifications they receive, and failure to sleep at night reduces the synthesis of melatonin (29). Anxiety and depression also worsen the addiction to smartphones (30). Kim et al. (2015) found that there was a correlation between smartphone addiction and depression, aggression and impulsions (30).

No significant relation was found between the students' GPAs and the average scores of the students on the smartphone addiction scale. However, studies in the literature show that increased use of smartphone has a negative impact on students' academic performances (2). Constantly checking the smartphones, sending of text messages, or following of social media

while studying or listening to lessons may distract students or affect their participation in the lessons. In a study by Karpinski et al. (2013) on college students, a negative relationship was identified between students' social media use and GPA (31).

Similar to the results in the literature, a positive moderate relationship was found between the daily average duration of smartphone use and smartphone addiction. This is an expected result given that the frequent repetition of an activity that gives pleasure increases the risk of addiction. Demirci et al. (2014) demonstrated in their study that the risk of smartphone addiction increased as the daily duration of smartphone use increased (7). Noyan et al. (2015) identified a significant relation between daily average duration of smartphone use and the scores obtained on SAS-SF (8). Wu et al. (2013) indicated that there was a relationship between the risk of smartphone addiction and the daily duration of time the participants spent with their devices (23).

In this study, a significant difference was determined between the scores obtained on the SAS-SF scale in terms of gender; specifically, the average scores of the female students on the SAS-SF were higher. In the literature, different studies show similar results. Kwon et al. (2013) observed that there was a difference between genders in terms of average scores on the short form of the smartphone addiction scale; female students obtained higher scores (3). Likewise, Demirci et al. (2014) found that the average scores obtained by female students on the smartphone addiction scale were significantly higher than those of male students (7). It is important to point out that although substance and internet addiction are predominantly seen among males, smartphone addiction is more commonly observed in females (32).

Since the data of this study were collected from a group of high school students, the results cannot be used to make generalizations about other age groups. Community mental health nurses should have access to studies with a larger sample in order to obtain information about the rate of smartphone addiction, the risk factors, and the development of protocols, particularly those which are based on prevention studies.

The literature shows that individuals with smartphone addiction suffer musculoskeletal system disorders, such as improper cervical posture and ligament injuries; and improper cervical posture may cause degeneration of lumbar vertebrae. In addition, excessive use of smartphones may cause sleeping problems and headaches. In this study, there were no scales or questions on the forms addressing the adolescents' physical health complaints that may be related to the use of smartphone. Other limitations of the study include the lack of a clinical interview with participants concerning smartphone addiction, collection of the data using only the self-report scale, and the failure to calculate the reliability coefficient of the UCLA Loneliness Scale, although it was infrequently used in this research.

The high school students who participated in the study obtained low the average scores on the SAS-SF, and a positive correlation was found between the SAS-SF scale scores and the UCLA Loneliness Scale scores. Individuals who feel lonely tend to engage in a greater use of technology and smartphones.

The role of a community mental health nurse is critical in identifying and protecting against behavioral addiction. Therefore, nurses should be aware of the rate of smartphone addiction and the factors involved in the development of the addiction. They must also have the capacity to administer preventive strategies against smartphone addiction to protect and improve the mental health of the high students at the school. It is important that new care plans include the possibility of smartphone addiction. Creating secure network for adolescences should to be provided and nurses should be in contact with the families. Families should particularly be informed about providing smartphone and internet use in scheduled hours for their adolescences, and providing secure internet networks which help them avoid possible cyber tyranny on the internet.

Based on these findings, nurses should also be aware of the mental needs of adolescents as well as their changing physical needs, and be able to deal with them from this point of view. Additionally, adolescents should undergo periodic checkups to determine whether they manifest any signs of addiction, and nurses should cooperate with families and teachers. At-risk adolescents should be identified and offered relevant prevention programs. Finally, social skill programs aimed at decreasing or managing the problems of loneliness should be developed with the aim of securing the students' health.

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