

## Original Article

## Investigation of the Relationship Between Mobile Phone Addiction and Physical Activity Level in Adolescents

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**Keywords:** *adolescent, mobile phone addiction, Physical activity.*

### Abstract

The aim of this study was to examine the relationship between mobile phone addiction and physical activity. This study was planned as a descriptive relational study. The study was carried out with 165 students in a high school located of Konya province. Adolescents' total physical activity score average was  $2267.15 \pm 1257.161$ . When the mobile phone addiction of the adolescents was evaluated, the mean deprivation subscale score was  $17.04 \pm 7.56$ , the uncontrolled subscale mean score was  $14.13 \pm 5.01$ , the tolerance sub-dimension mean score was  $13.36 \pm 7.89$ , and the mobile phone total score mean It was found to be  $44.54 \pm 18.57$ . A very strong negative correlation was found between mobile phone addiction and physical activity level. In our study, in which we evaluated the relationship between the physical activity level of the students and the desire to be liked, who perceive their health as bad and those who were inactive in terms of physical activity were included in the risk group.

### 1. Introduction

Smart/mobile phones have become an indispensable necessity for people because of their various efficiency and convenience (Kim & Lee 2022). Individuals can download various applications, make all kinds of updates, send messages, check their e-mails, listen to online music, watch movies, play games and connect to social media networks from their smart/mobile phones (Elhai, Dvorak, Levine, & Hall, 2017).

Excessive/problematic use of smart/mobile phones, which are seen as games and entertainment resources that support the establishment and maintenance of

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interpersonal relationships, may cause behavioral addiction. In this case, smartphone/mobile phone addiction or excessive use of the phone includes the tendency to always check the notifications on the phone (Elhai et al. 2017; Ratan, Zaman, Islam, & Hosseinzadeh, 2021). This type of behavior pattern can trigger “reassurance seeking” path, which includes symptoms such as loneliness, low self-esteem, depression and anxiety. “Assurance-seeking” behavior can be explained with the following examples. Excessive use of smart/mobile phones may affect sleep patterns by reducing rapid eye movement sleep, slow wave sleep and thus causing sleep deprivation (Billieux, Maurage, Lopez-Fernandez, Kuss, & Griffiths, 2015). Another example, excessive use of smartphones/mobile phones can potentially lead to gaming disorders and internet use disorders. In this case, it is thought to cause psychosocial crises (ie sleep deprivation, stress, mood disorder and anxiety) (Kiraly et al. 2020).

In our country, according to the data of Turkish Statistical Agency, Information Technologies Use in Children Research, 2021, it was reported that the rate of using mobile/smartphone in children aged 11-15 was 75.0% in 2021, which was 37.9% in 2013. In the same study, the purposes of using mobile phones of children in the 6-15 age group were 77.7% attending online classes, 77.4% studying or preparing homework/presentations, 68.7% speaking with or without video, and 66.9% using mobile phones. It has been stated that there is online/offline gaming (TUIK, 2021). These data show that the use of mobile phones is increasing in adolescents and suggest that risky behaviors such as playing games on the phone should be controlled. It is stated that adolescents may be more prone to excessive/problematic use of smart/mobile phones due to their lack of ability to control impulsive behaviors compared to other age groups (Kim & Lee 2022). Adolescence is an intermediate period between childhood and adulthood in which social, emotional and physical growth and development occur rapidly. Establishing appropriate lifestyle habits in adolescence is closely related to lifestyle habits in adulthood. Health conditions in adolescence can also affect health in adulthood. Therefore, encouraging positive health behaviors such as physical activity in adolescents can positively affect health in adulthood (Belanger et al., 2015). Many previous studies indicate that there is a decrease in the physical activity level of adolescents due to various factors such as the increase in smartphone use and the development of the internet (Alaca, 2020; Zagalaz-Sánchez Cachón-Zagalaz, Sánchez-Zafra, & Lara-Sánchez, 2019). Berkley and Leep (2016) reported in their study that mobile phone use was positively associated with sedentary behavior but not with physical activity. In the same study, it was stated that mobile phone use, like other screens (eg televisions), is seen as a sedentary leisure behavior. In addition, it is reported that high frequency use of mobile phone increases the probability of occurrence during exercise and decreases exercise intensity. On the other hand, some studies have reported that there is a negative relationship between physical activity level and mobile phone use (Guo et al., 2022; Yang, Tan, Li, & Wang, 2019). In addition to the physical activity level in adolescents, individual characteristics may affect mobile phone addiction (Choi,

2015; Bravo-Sánchez Morán-García, Abián, & Abián-Vicén, 2021; Tanır, 2021). In this direction, it is thought that this study will contribute to the determination of risk groups in terms of these variables and other studies to be carried out on the subject by evaluating the physical activity and mobile phone addiction of adolescents. In this study, determining the mobile phone addiction and physical activity level of adolescents; The aim of this study was to examine the relationship between mobile phone addiction and physical activity.

#### *Research Questions*

1. What are the sociodemographic characteristics of adolescents?
2. What is the average score of adolescents' mobile phone addiction and physical activity level?
3. Does the level of mobile phone addiction change according to the socio-demographic characteristics of the adolescents?
4. Is there a relationship between the physical activity level of adolescents and the level of mobile phone addiction?

Smart/mobile phones have become an indispensable necessity for people because of their various efficiency and convenience (Kim & Lee 2022). Individuals can download various applications, make all kinds of updates, send messages, check their e-mails, listen to online music, watch movies, play games and connect to social media networks from their smart/mobile phones (Elhai et al., 2017).

Excessive/problematic use of smart/mobile phones, which are seen as games and entertainment resources that support the establishment and maintenance of interpersonal relationships, may cause behavioral addiction. In this case, smartphone/mobile phone addiction or excessive use of the phone includes the tendency to always check the notifications on the phone ( Elhai et al. 2017; Ratan et al., 2021). This type of behavior pattern can trigger “reassurance seeking” path, which includes symptoms such as loneliness, low self-esteem, depression and anxiety. “Assurance-seeking” behavior can be explained with the following examples. Excessive use of smart/mobile phones may affect sleep patterns by reducing rapid eye movement sleep, slow wave sleep and thus causing sleep deprivation (Billieux et al., 2015). Another example, excessive use of smartphones/mobile phones can potentially lead to gaming disorders and internet use disorders. In this case, it is thought to cause psychosocial crises (ie sleep deprivation, stress, mood disorder and anxiety) (Kiraly et al. 2020).

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prone to excessive/problematic use of smart/mobile phones due to their lack of ability to control impulsive behaviors compared to other age groups (Kim & Lee 2022). Adolescence is an intermediate period between childhood and adulthood in which social, emotional and physical growth and development occur rapidly. Establishing appropriate lifestyle habits in adolescence is closely related to lifestyle habits in adulthood. Health conditions in adolescence can also affect health in adulthood. Therefore, encouraging positive health behaviors such as physical activity in adolescents can positively affect health in adulthood (Belanger et al., 2015). Many previous studies indicate that there is a decrease in the physical activity level of adolescents due to various factors such as the increase in smartphone use and the development of the internet (Alaca, 2020; Zagalaz-Sánchez et al., 2019). Berkley and Leep (2016) reported in their study that mobile phone use was positively associated with sedentary behavior but not with physical activity. In the same study, it was stated that mobile phone use, like other screens (eg televisions), is seen as a sedentary leisure behavior. In addition, it is reported that high frequency use of mobile phone increases the probability of occurrence during exercise and decreases exercise intensity. On the other hand, some studies have reported that there is a negative relationship between physical activity level and mobile phone use (Guo et al., 2022; Yang et al., 2019). In addition to the physical activity level in adolescents, individual characteristics may affect mobile phone addiction (Choi, 2015; Bravo-Sánchez et al., 2021; Tanır, 2021). In this direction, it is thought that this study will contribute to the determination of risk groups in terms of these variables and other studies to be carried out on the subject by evaluating the physical activity and mobile phone addiction of adolescents. In this study, determining the mobile phone addiction and physical activity level of adolescents;

## **2. Material and methods**

### *Purpose of research and questions of the research*

The aim of this study was to examine the relationship between mobile phone addiction and physical activity.

### *Research Questions*

1. What are the sociodemographic characteristics of adolescents?
2. What is the average score of adolescents' mobile phone addiction and physical activity level?
3. Does the level of mobile phone addiction change according to the socio-demographic characteristics of the adolescents?
4. Is there a relationship between the physical activity level of adolescents and the level of mobile phone addiction?

### *Type of research*

This study was planned as descriptive relational.

### *The place and features of the research*

The study was carried out in a high school located in Selçuklu district of Konya province.

### *Study group of the research*

The sample size in the study was calculated in the G\*Power 3.1.9.2 analysis program. With an effect size of 0.31, a power of 95%, and a margin of error of 5%, the total sleep score average in Hoşoğlu (2019)'s study was calculated as 165 ( $40.41 \pm 15.61$ ).

### *Data Collection Techniques and Tools*

The data of the research were collected in a face-to-face classroom environment between 7-11 March 2022. When the sufficient number of samples was reached, the data collection process was terminated. In the collection of data; Personal information form prepared by researchers questioning socio-demographic characteristics, International Physical Activity Questionnaire and Cell Phone Addiction Scale were used.

### *International Physical Questionnaire (UFAA)*

In this study, the short form of the International Physical Activity Questionnaire (IPAQ) will be used to determine the physical activity levels of individuals. International validity and reliability studies Craig et al. (2003) validity and reliability studies in Turkey were conducted by Sağlam (2010) on university students.

There are 7 questions in total in the survey. The 1st and 2nd questions are about vigorous activities, 3rd and 4th questions are about moderately vigorous activities, 5th and 6th questions are about walking and 7th questions about the time spent by the individual sitting. In the evaluation of all activities, the criterion is that each activity is done for at least 10 minutes at a time. A score is obtained as “MET-minutes/week” by multiplying the minute, day and MET value (multiples of resting oxygen consumption).

In calculating the energy consumption for physical activities, the weekly duration (minutes) of each activity is multiplied by the MET energy values created for the International Physical Activity Questionnaire. Walking time (minutes) was multiplied by 3.3 METs to calculate the walking score. In the calculation, 4 METs were taken for moderate-intensity activity and 8 METs for vigorous activity. Thus, the energy consumption of each individual for vigorous, moderate, walking, sitting and total physical activities was obtained in MET-min/Week unit. According to the total physical activity score, the physical activity levels of the participants were “inactive (under 600 MET-min/week), moderate (minimally active) (between 600-3000 MET-min/week) and very active (3000 MET-min/week and above)” (Craig et al., 2003, Sağlam et al. 2010).

### *Cell Phone Addiction Scale*

The Cell Phone Addiction Scale was developed by Chóliz (2012) and the reliability and validity of the scale were tested. The Turkish validity and reliability of the scale was performed by Fırat and Çelik (2017). Cronbach  $\alpha$  values; .92 for the whole scale and .77 to .87 for the sub-dimensions (Fırat & Çelik 2017). There are 22 items in the scale. The scale has nine items (8, 11, 13, 14, 15, 16, 20, 21, 22) in the Deprivation sub-dimension, six items in the second sub-dimension Uncontrolled/Problems (1, 2, 3, 4, 7, 10), and the third sub-dimension

Tolerance/Inhibition consists of seven items (5, 6, 9, 12, 17, 18, 19) and a total of three factors. Scoring of the scale consists of two parts. Scale; The first 10 items are 11-22, scored from 0=Never to 4=Mostly. It is a 5-point Likert-type scale with items scored from 0 = Strongly Disagree to 4 = Totally Agree. It can be said that the higher the score on the scale, the higher the dependency. While the scale can be scored according to sub-dimensions, it can also be evaluated over the total score (Firat & Çelik 2017).

#### *Data Evaluation*

The data of the study were evaluated using the statistical package program SPSS for Windows 22.0 (Statistical Package for Social Science). Number of units (n), percentage (%), mean±standard deviation (mean (SD)) values will be used as summary statistics. The normal distribution of the data was evaluated with the Kolmogorov–Smirnov test and the Q-Q plot. Since the data showed normal distribution, t-test and One-Way Anova were used in independent groups. Pearson correlation analysis was used to evaluate the relationship between the two scales. The results were evaluated at 95% confidence interval and  $p<0.05$  significance level.

#### *Ethical Procedure*

Ethical permission of the research was obtained from the Ethics Committee of the Faculty of Sport Sciences (Meeting date: 3.12.2021, Decision number: 151). Before starting the study, informed consent form was obtained from the parents. In addition, the aim of the research, its duration and the procedures to be carried out during the research were briefly explained to the adolescents in a language they could understand, the "Informed Consent" principle, the "Autonomy" principle by stating that individuals could withdraw from the research at any time, and the "Confidentiality and Confidentiality Protection" principle by being told that individual information would be protected after it was shared with the researcher. has been brought.

### **3. Results and Discussions**

The mean age of the adolescents is  $16.67\pm 0.82$ , 50.9% of them are male, 62.4% of them have nuclear family structure, 50.3% of their mothers are high school graduates, 52.1% of them are university graduates. It was determined that 58.2% of them had their mothers working, 66.7% of them their fathers were working, 40% of them had medium income and 44.2% of them were perceiving their health as good.

The total physical activity score of the adolescents was found to be  $2267.15\pm 1257.161$ , and 32.7% were found to be inactive, 52.1% minimally active and 15.2% very active. When the mobile phone addiction of the adolescents was evaluated, the mean deprivation subscale score was  $17.04\pm 7.56$ , the uncontrolled subscale mean score was  $14.13\pm 5.01$ , the tolerance sub-dimension mean score was  $13.36\pm 7.89$ , and the mobile phone total score mean It was found to be  $44.54\pm 18.57$  (Table 1).

**Table 1.** *Distribution of Adolescents' Physical Activity Level and Mobile Phone Addiction Scale Mean Scores*

Scales	Number (n)	Percentage (%)
Physical Activity Questionnaire		
Physically inactive (Inactive) ( $<600$ MET-min/week)	54	32,7
Low physical activity level ( $600-3000$ MET-min/week) (Low Active)	86	52,1
Physical activity level is very high (more than $3000$ MET- min/week) (Very Active)	25	15,2
	<b>Mean<math>\pm</math>SD</b>	<b>Min-Max</b>
Physical Activity Total Score	2267,15 $\pm$ 1257,161	375-4432
Mobile Phone Addiction Scale Total Score	44,54 $\pm$ 18,57	22-75
	17,04 $\pm$ 7,56	7-32
Deprivation Sub-Dimension	14,13 $\pm$ 5,01	7-22
Uncontrolled/Problems Sub- Dimension	13,36 $\pm$ 7,89	2-26

When the sociodemographic variables of the adolescents and their mobile phone addiction mean scores were analyzed, it was seen that the boys' mobile phone addiction mean scores were higher than that of the girls, and the difference was statistically significant ( $p<0.05$ ). It was observed that the mean mobile phone addiction score of the adolescents with nuclear family structure was higher than that of those with extended family structure, and the difference was found to be statistically significant ( $p<0.05$ ).

A significant difference was found between the education level of the mother and father and the mobile phone addiction, and it was determined that the difference was due to those whose mothers and fathers were primary school graduates ( $p<0.05$ ).

A significant difference was found between the working status of the mother and father and mobile phone addiction, and it was determined that the difference was caused by those whose mothers and fathers worked in any job ( $p<0.05$ ). It was observed that there was a statistically significant difference between perceived income status and mobile phone addiction, and the difference was due to those who perceived their income well ( $p<0.05$ ). It was observed that there was a statistically significant difference between perceived health status and mobile phone addiction, and the difference was due to those who perceived their health well ( $p<0.05$ ) (Table 2).

A significant difference was found between the level of physical activity of adolescents and mobile phone addiction, and it was seen that the difference resulted from those in the inactive group in terms of physical activity (Table 2).

**Table 2.** *Distribution of Mobile Phone Addiction Scores of Students by Sociodemographic Characteristics*

<b>Variables</b>	<b>Mobile Phone Addiction Score Average</b>	<b>Test value P value</b>
<b>Gender</b>		
Girl	42,12±17,91	t:1,654
Boy	<b>46,88±18,99</b>	p:0,01*
<b>Family Type</b>		
Nuclear family	<b>46,30±18,58</b>	t:0,245
Extended family	41,62±18,33	p:0,03*
<b>Mother Education Status</b>		
Primary education	<b>46,97±18,73</b>	
High school	44,51±18,44	F:4,728
University	41,34±18,69	p:0,01*
<b>Father Educational Status</b>		
Primary education	<b>46,00±20,15</b>	F:7,238
High school	43,91±17,74	p:0,02*
University	41,64±16,39	
<b>Mother Working Status</b>		
working	<b>45,26±18,44</b>	t:0,882
Not working	43,55±18,83	p:0,04*
<b>Father Working Status</b>		
working	<b>46,77±18,96</b>	F:3,026
Not working	40,09±17,07	p:0,02*
<b>Perceived Income</b>		
Good morning my baby	<b>47,18±19,61</b>	F:1,028
Middle	43,24±18,98	P:0,04*
Bad	43,20±17,44	
<b>Perceived Health Status</b>		
good morning my baby	<b>46,35±17,60</b>	
Middle	43,61±19,41	F:5,920
Bad	43,95±18,50	P:0,03*
<b>Physical Activity Level</b>		
Physically inactive (Inactive) (<600 MET-min/week)	<b>68,00±4,21</b>	F:0,245
Low physical activity level (600-3000 MET-min/week) (Low Active)	37,72±11,35	p:0,001*
Physical activity level is very high (more than 3000 MET-min/week) (Very Active)	27,90±5,09	

t: t test, F: One Way Anova, \*p<0,05

The relationship between mobile phone addiction and physical activity level of adolescents is evaluated in Table 3. A very strong negative relationship was found between cell phone addiction and physical activity level (r:-0.935, p<0.001). It can be said that as the physical activity level of the students increases, cell phone addiction decreases.



**Table 3.** *Comparison of Students' Mobile Phone Addiction and Physical Activity Level*

Variables	Mobile Phone Addiction	Physical Activity
Mobile Phone Addiction	1,00	
Physical Activity	r:-0,935 p:0,001*	1,00

r:Pearson Korelasyon Analizi, \*p<0,001

### ***Discussions***

Increasing mobile phone addiction rates and accompanying physical, psychological, social and academic problems can negatively affect adolescents' transition to adulthood. The time spent on mobile phone use especially minimizes the time allocated for physical activity and study, paves the way for an unhealthy lifestyle and reduces academic achievement (Bravo -Sánchez et al., 2021; Barkley & Lepp, 2016; Chu, Tak, & Lee, 2020). Physical activity level is a key concept that can actually control cell phone addiction. In line with this importance, this study examined the relationship between mobile phone addiction and physical activity level in adolescents.

According to the results of the research, it was determined that more than half of the adolescents had minimal active physical activity and moderate mobile phone addiction. In addition, it was observed that the significant difference between the physical activity level of adolescents and mobile phone addiction was caused by those in the inactive group in terms of physical activity. Studies in the literature support these results as well (Bravo-Sánchez et al., 2021; Zagalaz-Sánchez et al., 2019; Zong et al. 2021).

Adolescents' mobile phone addiction can be affected by sociodemographic characteristics as well as physical activity level. According to the results of the current research, it was determined that the mobile phone addiction mean scores of men, who have a nuclear family structure, whose mother and father are both primary school graduates, who work in any job, who perceive their income and health well, are higher. In a study different from the present study, it was found that male adolescents have higher physical activity levels than females; it has been stated that female adolescents have a higher risk of mobile phone addiction compared to males (Tanar, 2021).

In another study, it was reported that addictive mobile phone use of secondary school students negatively affects academic performance, especially in female gender (Bravo et al 2021). Choi (2015), on the other hand, stated in his study with university students that cell phone addiction levels differ according to gender. In another study, it was stated that physically inactive adolescents had a higher rate of problematic smartphone use than physically active ones. In the same study, it was found that girls are more likely to use problematic smartphones than boys (Pereira, Bevilacqua, Coimbra, & Andrade, 2020). In line with the results of

this study, it is important to identify risky adolescent groups in terms of mobile phone addiction and to monitor them in order to develop positive health behaviors. In the present study, a very strong negative correlation was found between adolescents' mobile phone addiction and physical activity level. It can be said that as the physical activity level of the students increases, mobile phone addiction decreases. In the study of Kim and Lee (2022), it was accepted that participation in moderate physical activity more than five days a week, vigorous physical activity more than three days a week or strength exercise more than three days a week is effective in preventing smartphone addiction in Korean adolescents.

In other studies conducted with different sample groups (university students), it was stated that mobile phone use has a negative relationship with physical activity level (Guo et al. 2022; Lin, Wang, Liao, Luo, & Kao, 2020; Yang et al. 2019; Zagalaz-Sánchez et al., 2019; Zhong, Wang, & Zhang, 2021). It has been reported that cell phone addiction/overuse may adversely affect physical health by reducing the time spent on physical activity (Kim, Kim, & Jee, 2015; Penglee, Christiana, Battista, & Rosenberg, 2019). The results of this study show that physical activity, which is one of the positive health behaviors, can be effective both in improving physical health and in preventing behavioral problems such as addiction. In this direction, it is important to create environmental conditions as well as individual programs that will support physical activity.

#### **4. Conclusions**

In this study, in which the relationship between the physical activity level of the students and the desire to be liked was evaluated, in terms of mobile phone addiction, men, those who have a nuclear family structure, those whose parents are primary school graduates and those who work in any job, those who perceive their income and health as good, and those who are inactive in terms of physical activity are at risk. was included in the group.

In addition, it was observed that as the physical activity level of adolescents increased, cell phone addiction decreased. In this direction, physical activity can be used as an effective tool to prevent mobile phone addiction in adolescents. For this reason, it is very important to identify those who are at risk of mobile phone addiction, especially among adolescents, and to take protective measures. For this reason, parents can be supported to be role models in terms of their mobile phone usage behaviors, especially in regulating children's mobile phone usage behaviors. In addition, the awareness of adolescents about the benefits of physical activity can be increased and they can be directed to sports branches suitable for their abilities and interests.

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