

Short Communication

Investigating the Relationship Between Digital Game Addiction and Health-related Quality of Life of Adolescents

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Citation Ustundag A, Caymaz V. Investigating the Relationship Between Digital Game Addiction and Health-related Quality of Life of Adolescents. *Journal of Research & Health*. 2024; 14(4):395-404. <http://dx.doi.org/10.32598/JRH.14.4.2365.2>

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ABSTRACT

Background: Adolescence is one of the most important developmental processes in one's life, and the habits gained during this period are likely to continue throughout life. This study determines whether there is a relationship between the digital game addiction levels of adolescents and their quality of life (QoL).

Methods: This is a quantitative study with a relational screening model. It was conducted in Ankara Province, Turkey, and involved 650 adolescents aged 14-18 years, selected via the simple random sampling method in the 2022-2023 school year. The personal information form, KINDL QoL scale, and digital game addiction scale were used to collect the data. The data were analyzed using point double series correlation analysis and Pearson correlation analysis test.

Results: The results showed that adolescents had a moderate QoL (Mean±SD 49.98±8.92), and they were in the risk group for digital game addiction (Mean±SD 44.6±17.51). There was no significant relationship between the QoL of the adolescents participating in the research and the levels of digital game addiction, except other than a significant, positive, and low-level relationship between the QoL and the emotion change and immersion, sub-dimension of the digital game addiction scale ($r=0.079$, $P<0.005$). In addition, there was a significant and positive relationship between the QoL, and a significant, positive, and moderate relationship between digital game addiction levels and gender of the adolescents ($r_{pb}=-0.131$, $P<0.001$; $r_{pb}=0.377$, $P<0.001$).

Conclusion: Precautions should be taken immediately because of the increased risk of addiction to digital games.

Keywords: Digital game addiction, Quality of life (QoL), Adolescents, Digital game, Media

Article info:

Received: 06 Nov 2023

Accepted: 31 Dec 2023

Publish: 01 Jul 2024

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Introduction

Playing is expressed as a regular or spontaneous activity that provides excitement and curiosity and motivates people to have fun and learn by experience [1]. Digital games are games that are played either online or offline on various digital devices, such as phones, tablets, and computers, with interface programs or over the internet [2]. Digital game addiction causes the person to experience physical, social, and emotional problems due to excessive time spent playing games via digital devices [3]. People who are addicted to digital games want to play games all the time, feel wretched when they cannot play and want to communicate less with the real world. This situation can negatively affect the individual and the relationship between the individual and the environment and cause behavioral problems [3]. The most negative aspect of this uncontrolled desire to play games, which includes addiction, is that the physical, mental, and social development of adolescents is negatively affected [4].

Studies have shown that addictive playing of digital games is associated with social isolation, aggression, loneliness, tendency to violence, depression, anxiety, and focusing difficulties [5-8]. Studies have examined the relationship between digital game addiction and these problems but have not investigated the general health-related quality of life (QoL). There are no similar studies in this context. For this reason, the study is important as, to the best of our knowledge, it is the first of its kind in Turkey. In addition, the emergence of conditions, such as academic failure, aggressive behavior when unable to play, depression, difficulty in solving problems, sleep problems, inactivity, obesity, vision, and mood problems are also among the other negative effects of digital game addiction [9-11]. Digital game addiction has educational effects as well as social effects, and these may affect the QoL of adolescents. According to Doğan [12], QoL is a state of health, physical, material, and emotional well-being, and it is the joy that individuals get from life. However, Kahya [13] suggests that digital game addiction changes the lives of adolescents, thereby affecting their QoL. There are different definitions of QoL. According to Özer and Karabulut [14], the QoL should define the satisfaction of a certain situation and the general satisfaction of the individual in his whole life. According to Kahya [13], QoL is expressed as a concept that includes the development of modern life, income level, technological development, social and political factors, and affects people's lives. We can pro-

pose that QoL includes the individual's entire life and its different dimensions.

According to previous studies, the QoL in adolescents was mostly related to their health. For example, Erturan et al. [15] have evaluated the QoL, levels of loneliness, and life satisfaction in adolescents with acne. Üneri et al. [16] have examined the QoL in adolescents with migraine. Mustafaoğlu et al. [17] have investigated the effects of substance abuse on anxiety, depression, and QoL in adolescents. In addition, many other studies have evaluated digital game addiction with other factors in adolescents. Some of these studies include digital game addiction and psychological needs [18], perceived social support and emotion regulation [19], bullying and empathy level [20], sleep quality [21], and social skills [22].

With the advancement of technology, adolescents continue their lives intertwined with technology. This situation may cause adolescents to spend more time with digital games. As mentioned, digital game addiction in adolescents may likely affect their QoL. Therefore, this study determines whether there is a relationship between digital game addiction and QoL in adolescents. The hypothesis determined within the scope of this main purpose is as follows:

Hypothesis 1: Adolescents' digital game addiction and QoL levels are high;

Hypothesis 2: There is a relationship between adolescents' digital game addiction and their QoL levels and demographic characteristics;

Hypothesis 3: There is a relationship between adolescents' digital game addiction and their QoL.

Methods

Research model

This study is based on the relational screening model, which is one of the general screening models. Relational screening is a research model that determines the relationship between two or more variables and to obtain clues about cause and effect [23].

Study group

This research was conducted in Ankara Province, Turkey in the 2022-2023 school year. Five high schools were selected by using the proportional probability selection method, according to the number of students. A

simple random sampling method was used in the selection of students from the selected schools. In the simple random sampling method, every possible combination of elements has an equal probability of being included in the sample. A total of 650 volunteer adolescents between the ages of 14-18 years and attending high school participated in the study.

Data collection instruments

Data collection tools used in the study were personal information form, KINDL QoL scale [24], and digital game addiction scale [25].

Personal information form

The personal information form was prepared to determine the demographic information of the adolescents participating in the research.

KINDL health-related QoL scale

The Turkish validity and reliability of the scale was conducted by Baydur et al. [24] with children aged 8-18 years. The KINDL general-purpose QoL scale for children and adolescents was developed for ages 4-17 years. The scale has three different forms for age groups (kiddy: For 4-6 year old, kid: For 7-13 year old, kiddo: For 14-17 year old). Kiddo Kindl^R 14-17 years of age version was used in this study. The scale is based on a 5-point Likert scale (1=never and 5=always) and consists of a total of 24 items. The scale has six sub-dimensions as follows: Physical well-being, spiritual well-being, self-esteem, family, friends, and school.

The Cronbach α distribution of the scale is between 0.69-0.95. A confirmatory approach was used for validity and reliability analysis. MAP-scaling success was 60%-100% before and 90%-100% after the modification. Confirmatory factor analysis confirmed the scale structure for the original version (root mean square error of approximation=0.077) was less than the modified version (root mean square error of approximation=0.059), although for the latter the sample was small. The score is calculated over the T value, which is called the rasch score for each dimension, its Mean \pm SD is 50 \pm 10. According to the spelling of the question, negatively oriented items are scored by reversing. The score is calculated by counting the scores given to the items for each dimension, converting them to a scale between 0-100, and summarizing them. A high score is an indicator of good QoL.

Digital game addiction scale

The validity and reliability of the digital game addiction scale for measuring students' digital game addiction was conducted by Hazar and Hazar [25]. The scale is based on a 5-point Likert scale and consists of 21 items and three sub-dimensions as follows: Excessive focusing and procrastination; conflict, deprivation, and seeking; emotional change and immersion. The participants can respond by stating the level of agreement from 1 (strongly disagree) to 5 (strongly agree). The addiction levels were determined as a normal group, low-risk group, risky group, dependent group, and highly dependent group, by dividing the scores by five, which are within the range of the lowest score and the highest score. The lowest score is 21 and the highest score is 105. The grading of the scale is as follows: 1-21: Normal group; 22 - 42: Low-risk group; 43-63 risky group; 64-84: Dependent group; 85-105: Highly dependent group [30]. The Cronbach α internal consistency coefficient of the scale was obtained at 0.92; however, in this study, the value equaled 0.93.

Data collection

After obtaining permission and approval from the [Ankara Provincial Directorate of National Education](#) for the research, the school principals were interviewed and informed about the purpose of the research and the method of its implementation, then the announcements were posted in the schools. In addition, the same announcements were asked to be shared with the parent information groups. Scale forms were prepared and following the approval, the forms were applied face-to-face to the adolescents. Participation was voluntary, and it was encouraged by contacting the guidance services. All adolescents and their parents gave their written consent.

Analysis of data

The results of the scales applied within the scope of the research were analyzed using the SPSS software, version 25. The Shapiro-Wilk normality test showed that the data were normally distributed; therefore, we used parametric tests in the analyses. Point double series correlation analysis and the Pearson correlation analysis tests were performed to determine whether there was a relationship between adolescents' QoL, digital game addiction levels, and demographic variables.

Results

The results of this research were explained within the extent of the research questions. The personal information of the adolescents showed that 44.3% of the participants were girls and 55.7% were boys. Of the participants who were aged between 14-18 years, the majority of the participant were in the 16-year-old age group. Meanwhile, most of the adolescents had two siblings and had a nuclear family. The majority of girls (34.7%) were attending religious vocational high schools and the majority of boys (42.3%) were continuing their education at regular vocational high schools. Adolescents attending 11th grade formed the majority. In addition, while the majority of the mothers of both girls and boys were high school graduates, the majority of the girls' fathers were university graduates (37.2%), and most of the boys' fathers were high school graduates (33.7%).

Digital game addiction and QoL levels of adolescents

The scale scores of the adolescents are shown in Table 1 and shows that the mean score for the KINDL QoL scale of the adolescents is 49.98. The higher score is an indicator of good QoL, and according to the results of the research, the adolescents' perceived QoL is moderate. In terms of sub-dimensions, "friends" has the highest mean (57.84), and "emotional well-being" has the lowest mean (43.66). In addition, the results show that adolescents are in the risk group for digital game addiction (mean=44.6).

The relationship between digital game addiction and QoL levels and demographic characteristics of adolescents

According to Table 2, the point double series correlation analysis shows a significant, positive, and low level of relationship between perception of QoL and gender ($r_{pb}=0.131$, $P<0.001$), and a significant, positive and moderate relationship between the levels of digital game addiction and gender ($r_{pb}=0.377$, $P<0.001$).

The relationship between digital game addiction and QoL levels of adolescents

According to the results of Pearson correlation analysis, Table 3 shows a significant, positive, and low-level relationship between adolescents' perception of general QoL and the "emotional change and immersion" sub-dimension of the digital game addiction scale ($r=0.079$, $P<0.005$).

Discussion

The adolescents have a moderate QoL and they are at risk of being addicted to digital games. There was no significant relationship between the QoL perception of the adolescents and digital game addiction levels, while there was a significant, positive, and low-level relationship between the general QoL perception of the adolescents and the "emotional change and immersion" sub-dimen-

Table 1. Descriptive statistics of scales and sub-dimensions (n=650)

Scales and Sub-dimensions		Minimum	Maximum	Mean±SD
KINDL health-related QoL scale	Physical well-being	0	100	46.32±17.28
	Spiritual well-being	0	100	43.66±16.53
	Self-esteem	0	100	45.62±24.28
	Family	0	100	51.17±12.57
	Friends	0	100	57.84±17.61
	School	0	100	55.29±19.26
	Total	0	100	49.98±8.92
Digital game addiction scale	Excessive focusing and procrastination	11	55	24.5±9.59
	Deprivation and seeking	6	30	10.7±5.09
	Emotional change and immersion	4	20	9.4±4.31
	Total	21	105	44.6±17.51



Table 2. Correlation analysis results of scales and sub-dimensions by demographic characteristics of the study group (n=650)

Variables		Mean±SD	1	2	3
Gender	Gender	1.5±0.49	1		
	KINDL health-related QoL scale	49.9±8.9	0.131**	1	
	Digital game addiction scale	44.6±17.51	0.377**	0.047	1
Grade	Grade	2.0±0.8	1		
	KINDL health-related QoL scale	49.9±8.9	-0.060	1	
	Digital game addiction scale	44.6±17.51	-0.056	0.047	1
Age	Age	1.9±0.8	1		
	KINDL health-related QoL scale	49.9±8.9	-0.055	1	
	Digital game addiction scale	44.6±17.51	-0.043	0.047	1
Number of siblings	Number of siblings	3.0±1.1	1		
	KINDL health-related QoL scale	49.9±8.9	0.013	1	
	Digital game addiction scale	44.6±17.51	-0.013	0.047	1
School	School	2.9±1.3	1		
	KINDL health-related QoL scale	49.9±8.9	-0.008	1	
	Digital game addiction scale	44.6±17.51	-0.035	0.047	1
Mother's education level	Mother's education level	3.8±1.2	1		
	KINDL health-related QoL scale	49.9±8.9	-0.032	1	
	Digital game addiction scale	44.6±17.51	-0.013	0.047	1
Father's education level	Father's education level	4.1±1.1	1		
	KINDL health-related QoL scale	49.9±8.9	-0.009	1	
	Digital game addiction scale	44.6±17.51	-0.037	0.047	1
Family structure	Family structure	1.2±0.6	1		
	KINDL health-related QoL scale	49.9±8.9	0.074	1	
	Digital game addiction scale	44.6±17.51	0.060	0.047	1

SD: Standard deviation.



**Significant correlation at the 0.01 level (2-tailed).

sion of the digital game addiction scale. Health-related QoL is related to individuals' self-perceived health and includes physiological, psychological, and functional aspects of health [26]. QoL in adolescents is quite comprehensive as it includes dimensions related to physical and psychological well-being, past experiences, and relationships in various environments, such as family, school, and peers [27]. In this context, social support and

psychological well-being are among the factors affecting adolescents' perception of QoL. Previous studies have proven that adolescents with low social support are at increased risk of addiction [28]. Wunsch et al. [29] have studied the impact of COVID-19 on physical activity, screen time, and health-related QoL in children and adolescents in Germany and found that they were negatively affected because of the pandemic. In addition, Wan and

Table 3. The relationship between adolescents' QoL perceptions and digital game addictions

Scales		1a	1b	1c	1d	1e	1f	1g	2a	2b	2c	2d
KINDL scale	Physical well-being	1										
	Emotional well-being	0.402**	1									
	Self-esteem	-0.022	-0.170**	1								
	Family	0.100*	0.116**	0.134**	1							
	Friends	0.085*	0.000	0.409**	0.169**	1						
	School	-0.063	-0.161**	0.211**	0.069	0.079*	1					
	Total	0.466**	0.331**	0.636**	0.444**	0.610**	0.428**	1				
Digital game addictions scale	Excessive focusing and procrastination	0.021	0.003	0.042	0.045	0.017	-0.022	0.035	1			
	Deprivation and seeking	0.022	0.014	0.043	0.020	0.030	-0.051	0.027	0.772**	1		
	Emotional change and immersion	0.047	0.023	0.062	0.053	0.041	0.006	0.079*	0.756**	0.730**	1	
	Total	0.030	0.011	0.051	0.044	0.028	-0.025	0.047	0.958**	0.894**	0.873**	1

*Significant correlation at the 0.05 level, **Significant correlation at the 0.01 level.



Chiou [30] have stated that playing games on the internet is a popular online activity among adolescents and that young people prefer to play games for entertainment, excitement, challenge, or emotional coping. In this context, the results can be interpreted in such a way that adolescents have deficiencies in the physiological, psychological, and functional aspects of health due to the moderate level of perceived QoL, and they are likely to prefer playing digital games to overcome these deficiencies, especially if they confront emotional changes. Our results showed that adolescents are at risk of being addicted to digital games. This outcome suggests that adolescents may prefer digital games less when they have sufficient emotional support as Çavuş et al. [31] have stated that girls use digital games more for leisure, while boys use digital games as a tool to seek and create a new identity. Low social support and the resulting psychosocial problems decreased impulse control [32], lower coping abilities [33], and some genetic factors that increase the susceptibility of males to digital game addiction [34] are among the risks for males. Adolescence is considered a critical period in terms of increased potential for digital addiction [35].

According to Üstündağ [35], the COVID-19 pandemic, which caused adolescents to spend more time at home, affected the increase in digital game playing duration and behaviors that can be considered as gaming disorders as

with the decrease in social and emotional support, adolescents started to play games to spend their spare time, continued this behavior due to their excitement and pleasure, and therefore, game addiction levels increased. The pandemic may have an impact on adolescents putting them at risk for digital game addiction, as well as affecting their QoL. Previous studies have shown that the pandemic has reduced psychological well-being due to high uncertainty and stress, had a significant effect on stress, depression, and anxiety levels, and decreased the QoL of adolescents after the closure of schools [36-40]. Our results showed a significant and moderate relationship between the QoL of the adolescents, the level of digital game addiction, and gender, which was in favor of boys. Previous publications have reported increased digital game addiction levels in high school boys compared to girls [41-44]. On the other hand, a few studies have reported higher digital game addiction in girls [45-47]. Meanwhile, our results are in parallel with previous publications. Digital game addiction is a disease that threatens male health, especially in which adolescent boys are at risk, and it should be among the issues that primary healthcare services should focus on [48].

Many factors can affect adolescents' perceived QoL. Previous reports have stated that socioeconomic and cultural characteristics of the family, lifestyle, number of children in the family, age, gender, school environment,

friends and peers, smoking and alcohol consumption, screen/internet addiction, and cultural and social structure affect the QoL of adolescents [49-52]. The education level and the good socioeconomic status of the parents increase the amount of health information and healthy life behaviors given to the children. The high educational level of the parents and the good socioeconomic status positively affect the QoL of adolescents [53, 54].

The strength of the research is that it is the first research conducted on this topic in Turkey. However, our relatively small sample group and one-off design limit the broad applicability of our findings.

Conclusion

Due to the moderate life quality of adolescents, importance should be given to the development of social skills that can help adolescents get more satisfaction from their lives. The results of the current study also revealed that any action aimed at improving the QoL of adolescents aged 14-18 years in particular should be encouraged to build resilience to life-threatening situations. We also showed that precautions should be taken without any further delay because of the increased risk of addiction to digital games. From a public health perspective, moderate QoL and high-risk digital game addiction may help to recognize the importance and urgency of healthy lifestyles in the general adolescent population. Therefore, this research makes an important contribution to the literature on the mental health and well-being of adolescents living in Turkey. Based on the emerging findings in adolescents who potentially continue into adulthood, identifying and addressing early signs of poor QoL and risk in gaming addiction provides an opportunity to enable teens to make healthier progress through adolescence.

Ethical Considerations

Compliance with ethical guidelines

The study was carried out following the guidelines of the Declaration of Helsinki and the Spanish Society of Psychology. Ethical approval for the study was provided by the Research Ethics Committee of [University of Health Sciences](#) (Code: 2023-45).

Funding

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors.

Authors' contributions

Conceptualization and methodology: All authors; Data collection: Vildan Caymaz; Software, validation, formal analysis, investigation, resources, data curation, analysis and writing: Alev Üstündağ.

Conflict of interest

The authors declared no conflict of interest.

Acknowledgments

The authors thank all adolescents who participated in the research.

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