ANKARA MEDICAL JOURNAL

Research Article

Ankara Med J, 2024;(2):140-152 // 10.5505/amj.2024.28159

QUALITY OF LIFE AND DIGITAL GAME ADDICTION IN ADOLESCENTS DURING COVID-19 PANDEMIC: A WEB-BASED CROSS-SECTIONAL STUDY

Raziye Çelen[1], Sümeyye Nur Güneş[2], Sibel Küçükoğlu[1]

[1]Department of Pediatric Nursing, Faculty of Nursing, Selcuk University, Konya, Türkiye

[2]Nurse, Konya City Hospital, Konya, Türkiye

Correspondence:

Raziye Çelen (e-mail: rturgut42@gmail.com)

Submitted: 13.01.2024 // Accepted: 09.05.2024

Ankara Yıldırım Beyazıt University Faculty of Medicine

Department of Family Medicine

ANKARA MEDICAL JOURNAL

Abstract

Objectives: This study aimed to investigate the effect of digital game addiction on the health-related quality of life of adolescents.

Materials and Methods: The sample of this descriptive and cross-sectional study consisted of 300 adolescents between the ages of 10 and 14. The study was carried out in Konya, located in the center of Turkey, between February and June 2021, when there were pandemic restrictions. Participants were recruited through the snowball sampling method using an online web-based platform. Data were collected with the Personal Information Form, Digital Game Addiction Scale for Children, and KIDSCREEN-27 Health-related Quality of Life Questionnaire.

Results: The study revealed that the mean digital game addiction score of the adolescents was 53.32±20.84 and the majority (39.7%) were in the low-risk group for digital game addiction. A weak and moderate relationship was found between digital game addiction and the factors of the KIDSCREEN-27 Questionnaire and the time spent on digital gaming during the COVID-19 pandemic. Low psychological well-being, a bad school environment, young age, being a male, and spending higher amounts of time playing digital games during the pandemic were determined to be the predictors of digital game addiction ($p<0.05$). It was revealed that predictors explained 32% of digital game addiction.

Conclusion: It was revealed that digital game addiction affects health-related quality of life, and digital game addiction is affected by some demographic characteristics, psychological well-being, and school environment.

Keywords: Adolescent, children, digital game addiction, nursing, quality of life.

Introduction

The period of adolescence includes many biopsychosocial changes and challenges such as gaining independence, discovering identity areas, and learning to cope with difficulties in daily life and school.[1] Restrictions such as the closure of schools and continuing education online from home were introduced throughout the world during the COVID-19 pandemic to stop and limit the spread of the virus.[2] In addition to coping with the challenges of adolescence, children and adolescents had to comply with the restrictions imposed by the pandemic, which has been particularly challenging for them.[1] The pandemic has caused a significant change in the quality of life (QoL) of adolescents.[3]

Health-related quality of life (HRQoL) is characterized as the overall sense of well-being derived from one's assessment of the various areas of his or her life by considering their impact on health status.[3] QoL refers to the physical, psychological, social, mental, and functional health status of individuals.[4] Lack of physical activity and increased levels of stress due to the pandemic have affected the HRQoL of adolescents. The study conducted by Ravens-Sieberer et al. (2022)[1] revealed a significant decrease in the HRQoL among adolescents during the pandemic when compared to the pre-pandemic period.

With the pandemic, children's screen time at home has increased due to the restrictions on social gatherings and playing outside.[3,5] Digital technologies are important for online education; however, there is also an increase in the rate of playing digital games.[6,7] Digital games can affect adolescents positively or negatively depending on the content of the games and when and how much they are played. Especially, children in the developmental period are more easily exposed to the negative effects of digital games cognitively, emotionally, socially, and physically.[8] Xu et al. (2020)[9] investigated adolescents' Internet addiction and found that long-term Internet use decreases physical activities and leads to physical problems such as obesity, and physical discomfort, including pain in areas such as the neck, shoulders, and back. Furthermore, extended screen time may lead to hearing and visual impairments. The heightened risk of accidents, such as falls, slips, or hits, is also a concern. Other potential repercussions encompass disruptions in circadian rhythm and a decline in overall sleep quality. In addition, since the screen-related activities of children increased during the pandemic, it is thought that their frequency of playing online games also increased, which in turn affected the HRQoL of children.[10]

It is noteworthy that studies mostly focused on reduced QoL during the pandemic[1,3,9] or focused only on Internet and game addiction.[2,6,11] The literature review undertaken indicated a gap in research, with no existing studies exploring the association between adolescents' QoL and digital game addiction (DGA) specifically during the COVID-19 pandemic. Consequently, the current study was designed to fill this void by investigating the impact of QoL on adolescents' DGA in the context of the pandemic.

The study aimed to address the following research questions:

1. What are the mean scores for the quality of life and digital game addiction among adolescents during the COVID-19 pandemic?

2. Is there a relationship between the demographic characteristics of the adolescents and their quality of life and digital game addiction mean scores?

3. What factors contribute to the digital game addiction of adolescents during the COVID-19 pandemic?

Materials and Methods

Study design

The study is a descriptive and cross-sectional study. This study was reported according to the STROBE checklist.

Participants and Sample

The research took place from February to June 2021, amidst pandemic restrictions, involving individuals aged 10 to 14 in Konya, situated in the central region of Turkey. The age group of the study was determined according to the age group to which the measurement tools used in the study were administered. Using the snowball sampling method, one of the improbable sampling methods, adolescents who used computers, tablets, or smartphones, who attended school, and who volunteered to take part in the research took the online survey. Adolescents (a) who were not between the ages of 10-14, and (b) who were complete in the survey data incompletely were excluded from the study.

The sample size was determined using a single sample t-test through apriori power analysis in the G-power 3.1.9.2 program. Taking into account the mean scale score and standard deviation (83.67±13.50) from Buctot et al.'s (2020) study, a minimum sample size of 300 was calculated, maintaining 95% power, a significance level of 0.05, and an effect size of 0.2.

Measures

Data were collected using the Participant Information Form, the Digital Game Addiction (DGA) Scale for Children, and the KIDSCREEN-27 Health-Related Quality of Life (HRQoL) Questionnaire.

Participant Information Form: The questionnaire was created by the researchers by existing literature.[2,12,13] It includes questions on the sociodemographic characteristics of the adolescents (age, gender, educational status, perceived family income, number of siblings, family type, place of residence, chronic illnesses, whether the child has his room, perceived academic success) and on parent characteristics (age, education level, employment status of parents, etc.). In addition, our literature review showed that games played on computers, smartphones, or tablets are considered digital games.[14] For this reason, the second part of the questionnaire includes questions regarding the participants' possession of a computer and smartphone, their Internet use, and the time they spent playing digital games.

Digital Game Addiction Scale for Children: Hazar and Hazar (2017) developed a 24-item scale aimed at assessing levels of DGA in children aged 10-14. Respondents rate items on a five-point Likert scale. The scale encompasses four factors: excessive focus on and conflict over digital gaming, tolerance development during playtime and the value attributed to play, delaying individual and social tasks/homework, and psychological-physiological reflection of deprivation of and immersion in play. Scores on the scale can range from 24 to 120. The scale categorizes scores into five ranges: 1-24 (Normal), 25-48 (Low-risk), 49-72 (Risk), 73-96 (Addicted), and 97-120 (Highly addicted). The original scale has a Cronbach's alpha (α) of 0.90, while in this study, α the scale was determined to be 0.95.

KIDSCREEN-27 HRQoL *Questionnaire:* The questionnaire, developed by Robitail et al. (2007) to assess the QoL in children aged 8-18, was subjected to a Turkish validity and reliability study conducted by Baydur et al. (2016).[15] Comprising 27 items rated on a five-point Likert-type scale, the questionnaire categorizes items into five factors: physical well-being, psychological well-being, autonomy and relationships with parents, social support and peers, and school environment. Unlike the original scale, a total QoL score cannot be computed. Higher scores on the questionnaire indicate a better QoL. The score for each factor is calculated based on the T value, which is called the Rasch score. The mean T value is converted into 50 and the standard deviation of the T value is converted into 10. The α value of the original questionnaire is in the range of 0.80-0.841.[16] The α was found to be 0.86 in this study.

Data Collection

Data were gathered in two steps. First, after obtaining the necessary permissions, the online survey link created via a web-based platform (http://www.surveey.com/survey/) was sent to the parents and their consent was

obtained. Parents received the survey links via e-mail or WhatsApp. In the second step, the children individually completed the questionnaires online under parental control. Later, the parents shared the survey link with other parents in Konya who met the research criteria via WhatsApp.

Statistical analysis

The SPSS 22 (IBM Corporation, New York, NY) program was used to analyze the data. There were no missing values in the data. To assess the normal distribution of the data, the Kolmogorov-Smirnov test was employed. Descriptive statistics, including number, percentage, mean, and standard deviation, were utilized to present the data. The Pearson correlation analysis was conducted to explore relationships between variables. Multiple linear regression analysis, employing the enter method, was performed to predict the impact of sociodemographic variables and factors from the KIDSCREEN-27 HRQoL Questionnaire on DGA. All dichotomous variables were recoded as dummy variables (e.g., 0 or 1). The outcomes of the analyzed model were presented, including B (95% CI), standard error (SE), estimated β, adjusted R^2, F-test, and p-value for each variable. The statistical significance threshold for tests was established at $p < 0.05$.

Ethical considerations

The study adhered to ethical standards, as evidenced by obtaining approval from the ethics committee (IRB: 2021/14) before initiation. The principles outlined in the Helsinki Declaration were followed. An informed consent form, detailing the research's purpose, was provided on the first page of the online questionnaire to ensure participants were well-informed before participating. The participants were allowed to fill out the questionnaire after giving consent. Necessary permissions were obtained from the authors regarding the use of the scales.

Results

Of the 300 participants, 33% were male, 20.7% were 14 years old, and 76% had a nuclear family. 59.3% of the adolescents perceived their family income as medium; 74% lived in the city center, and 78.7% had two or more siblings. It was found that 18.3% had a chronic disease; 25.7% contracted the COVID-19 disease, and 66.3% evaluated their academic success as good. The average age of mothers was 39.36±5.99 years, and for fathers, it was 42.71±6.35 years. The education level of most parents was primary school (mothers 39%; fathers 28%). 20.3% of the mothers and 89% of the fathers worked in an income-generating job (Table 1). When the adolescents' use of digital tools was examined, it was seen that 74.7% had their computer, smartphone, and/or tablet; 74% played games with digital tools, and 92.7% had Internet access. The time spent on digital games during the pandemic was 5.72 (7.07) hours (Table 1).

Table 1. Demographic characteristics of the participants (n= 300)

Variables	n (%)	Variables	n (%)
Gender		**Mother's Education**	
Male	99 (33)	Bachelor	58 (19.3)
Female	201 (67)	High School	64 (21.3)
Age		Middle School	47 (15.7)
10	39 (13)	Elementary	117 (39)
11	50 (16.6)	Never studied	14 (4.7)
12	56 (18.7)	**Father's Education**	
13	93 (31)	Bachelor	81 (27)
14	62 (20.7)	High School	78 (26)
Family type		Middle School	50 (16.7)
Nuclear	228 (76)	Elementary	84 (28)
Extended	58 (19.3)	Never studied	7 (2.3)
Separated	14 (4.7)	**Mother's working status**	
Family Income Type		Working	61 (20.3)
Good	105 (35)	Not working	239 (79.7)
Moderate	178 (59.3)	**Father's working status**	
Poor	17 (5.7)	Working	267 (89)
Place of Residence		Not working	33 (11)
City	222 (74)	**Has his/her own computer/smartphone/tablet computer**	
Town	58 (19.3)	Yes	224 (74.7)
Village	20 (6.7)	No	76 (25.3)
Number of siblings		**Playing games on the computer/smartphone/tablet computer**	
Only child	64 (21.3)	Yes	222 (74)
2 +	236 (78.7)	No	78 (26)
Chronic disease		**Has Internet connection**	
Yes	55 (18.3)	Yes	278 (92.7)
No	245 (81.7)	No	22 (7.3)
Contracted COVID-19		**Time spent on digital games during the COVID-19 pandemic, hours, Mean ± SD**	5.72 ±7.07
Yes	77 (25.7)		
No	223 (74.3)		
Academic achievement			
Good	199 (66.3)		
Average	92 (30.7)		
Poor	9 (3)		

The Relationship between the HRQoL and DGA Mean Scores of Adolescents

The mean DGA Scale score of the adolescents was found to be 53.32±20.84. 7% (n=21) of the adolescents were found to have normal levels of DGA, while 39.7% (n=119) were in the low-risk and 31.7% (n=95) were in the risk group. 20.3% (n=61) were found to be addicted and 1.3% (n=4) were found to be highly addicted to digital games. The adolescents obtained the lowest mean score on the factor of psychological well-being (42.82±11.44) and the highest mean score on the factor of school environment (51.72±12.24) in the KIDSCREEN-27 HRQoL Questionnaire. A significant negative and moderate correlation was identified between DGA and mean scores on physical well-being, psychological well-being, and school environment factors (r= -0.250, r=- 0.276, r= -0.430; p<.001, respectively). Additionally, a significant negative and weak correlation was observed between DGA and mean scores on autonomy and parent relations, as well as social support and peer factors (r=-0.196, r=-0.192; p<.001, respectively). Conversely, a significant positive and moderate correlation was found between DGA and the time spent on digital gaming during the COVID-19 pandemic (r=-0.457, p<.001). Notably, age was determined to have no significant effect on DGA (p>0.05; Table 2).

Table 2. Correlation between digital gaming addiction, quality of life, time spent on digital games during the pandemic, and adolescent age (n= 300)

	Mean	SD	1	2	3	4	5	6	7	8
Digital Game Addiction Scale	53.32	20.84	---							
HRQoL (KIDSCREEN-27 T-Score)										
Physical wellbeing	46.3	10.51	-0.250***	---						
Psychological wellbeing	42.82	11.44	-0.276***	0.618***	---					
Autonomy &Parent relations	44.48	11.65	-0.196***	0.479***	0.578***	---				
Peers & Social support	44.77	12.86	-0.192***	0.387***	0.292***	0.385***	---			
School environment	51.72	12.24	-0.430***	0.454***	0.479***	0.484***	0.285***	---		
Time spent on digital games (hours) during the pandemic	5.72	7.07	0.457***	-0.194***	-0.143*	-0.069	-0.102	-0.339***	---	
Age	12.3	1.32	-0.067	-0.245***	-0.282***	-0.123**	0.032	-0.191***	-0.094	---

*p<.05;**p<.01;***p<.001.

Multiple Regression Analysis of the Factors Affecting DGA

A multiple regression analysis was conducted using the enter method to explore the influence of adolescents' QoL, age, gender, and the time spent on digital games during the pandemic on the levels of DGA. The variance inflation factors (VIF) were examined, and their values were found to be within an acceptable range, indicating the absence of multicollinearity issues in the data. The multiple regression analysis model, constructed based on the factors of the KIDSCREEN-27 HRQoL Questionnaire and certain participant characteristics, was found to have a significant effect on DGA (F (8.299)=18.487, p<0.001).

Psychological well-being of the child (β=-0.145 p=0.035), school environment (β=-0.246 p<0.001), age (β=-0.123 p=0.018), male gender (β=-0.140 p=0.006), and the time spent playing digital games during the pandemic (β=0.305 p<0.001) were found to affect DGA (p<0.05). These factors explain 32% of the variance in DGA (Adjusted R^2= 0.319) (Table 3).

Table 3. Factors affecting digital game addiction in the COVID-19 pandemic

Variables	Unstandardized Coefficients (B) (95% CI)	SE	Standardized Coefficients (β)	t	p	VIF
HRQoL (KIDSCREEN-27 T-Score)						
Physical wellbeing	-0.055 (-0.311 - 0.202)	0.13	-0.028	-0.419	0.676	1.899
Psychological wellbeing	-0.265 (-0.51 - -0.019)	0.125	-0.145	-2.119	**0.035**	2.063
Autonomy &Parent relation	0.078 (-0.147 - 0.303)	0.114	0.043	0.679	0.498	1.796
Peers & Social support	-0.088 (-0.261 - 0.085)	0.088	-0.054	-1.002	0.317	1.289
School environment	-0.419 (-0.629 - -0.208)	0.107	-0.246	-3.908	**p<0.001**	1.739
Age	-1.941 (-3.548 - -0.333)	0.817	-0.123	-2.376	**0.018**	1.174
Gender[a]	-6.186 (-10.561 - -1.811)	2.223	-0.14	-2.783	**0.006**	1.108
Time spent on digital games (hours) during the pandemic	0.898 (0.592 - 1.205)	0.156	0.305	5.768	**p<0.001**	1.226
R^2	0.337					
Adjusted R^2	0.319					
F	18.487					
Sig. (ANOVA)	p<0.001					
Durbin-Watson	1.902					

Abbreviation: VIF, variance inflation factor. [a] Dummy variable (reference): gender (male)

Discussion

The primary objective of this study was to examine how the QoL among adolescents influences DGA during the COVID-19 pandemic. The DGA Scale mean score revealed that almost one-third of the participants (31.7%) were in the risk group. In their study conducted before the pandemic, Irmak and Erdoğan (2019)[13] found the

DGA rate of adolescents as 28.8%. In addition, it has been stated that digital games have the potential to be addictive, as they strongly attract the attention of adolescents due to the enjoyment derived from playing games or constant social comparison with others, and increase psychophysiological arousal.[17] Adolescents who had to cope with many restrictions brought by the pandemic may have preferred digital games as a coping tool in this period.

The study relates adolescents' QoL and their DGA and highlights that adolescents' DGA was affected by different predictors during the pandemic. The results of the study revealed that low scores on the psychological well-being factor of the KIDSCREEN-27, bad school environment, young adolescent age, being a male, and higher amounts of time spent on digital games were significant predictors of DGA in the COVID-19 pandemic ($p<0.05$).

Regarding HRQoL, there is an observed association indicating that lower levels of psychological well-being and an unfavorable school environment contribute to an elevated risk of DGA among adolescents. Studies have found that there is a significant relationship between online game addiction and quality of life in adolescents, and as the level of game addiction increases, the quality of life of adolescents decreases.[18,19] In a meta-analysis, it was emphasized that people's lifestyles changed due to the COVID-19 pandemic and that these changing lifestyles increased game addiction and internet addiction.[20] Consistent with the study findings, a negative relationship was revealed between internet addiction and quality of life in adolescents.[21] These results are consistent with the study findings.

It has been stated that the quality of life of children and adolescents decreased significantly during the pandemic.[3] The QoL of adolescents was adversely affected by factors such as COVID-19 restrictions, closure of schools, increased responsibilities at home, limited peer communication, prolonged stay at home, limited social activities, and physical mobility.[3] With the pandemic, digital tools and games have become an integral part of adolescents' lives as tools of communication with peers, social relations, and education.[22] Online games can be a coping method for adolescents. Those who spend more time in online games can distance themselves from real life. This can cause emotional and psychological distress in adolescents.[18,23]

The findings of the study indicated that being male was associated with a reduced risk of DGA. Another study suggested that female adolescents may be more susceptible to DGA, particularly in the context of a negative family environment and low academic achievement.[13] However, some studies have reported that males are more likely to experience DGA.[14,24] Karaca et al. (2020)[25] stated that while there is a significant increase in DGA scores among male adolescents, being a male is not a risk factor for DGA. Due to the complex nature of addiction, it may be difficult to say that gender alone is a risk factor for DGA.[25]

The study demonstrated that the risk of DGA tends to increase as the age of adolescents decreases. Additionally, a separate study examining the effects of the COVID-19 pandemic on QoL reported that younger children were

more adversely affected than their older counterparts.[1] Another study revealed that compared to the younger age group, adolescents may be in the high-risk group in terms of DGA due to weaker impulse control, active participation in risky behaviors in terms of health, and being more vulnerable.[26] Our findings show that children in different age groups were affected at different levels during the pandemic, and further studies are needed to obtain more comprehensive data on different age groups.

The increase in time spent playing digital games during the pandemic was determined as an important predictor variable that increases the risk of DGA. Several studies have revealed that the time adolescents spend on digital tools increased during the pandemic to meet the need for socialization.[27-29] Due to the restrictions on social areas, online education from home, and adolescents' efforts to become independent from their households, the duration of exposure to digital tools increased, which has posed a risk for DGA.

The study includes some limitations. First, the study could not reveal the cause-effect relationship due to the cross-sectional design. Secondly, the study is based solely on participants' online responses, which were assumed to be correct. Finally, the study was conducted in a single province, which imposes limitations on the generalizability of the findings to broader populations or different geographical areas.

In conclusion, the results highlighted that a majority of adolescents fell into the risk group for DGA during the pandemic. It was further observed that game addiction constitutes a variable influencing the QoL, and DGA is influenced by certain demographic characteristics, psychological well-being, and the school environment. To improve the HRQoL of adolescents and to protect them from risky behaviors, their awareness should be raised using a holistic approach including the collaboration of parents, pediatric nurses, and educators. It is recommended to develop community-based interventions through this collaboration. Conducting longitudinal studies that evaluate adolescents' QoL and DGA together may make a significant contribution to the field.

Ethical Considerations: Ethical approval was received from the Selcuk University Faculty of Nursing Non-Interventional Clinical Researchers Ethics Committee (Approval No. 2021/14)

Conflict of Interest: The authors declare no conflict of interest.

Acknowledgements: Authors thank all adolescents and their parents for participating in the study. In addition, we would like to thank Assoc. Prof. Hakan Baydur for his support during the Rasch score analysis of the KIDSCREEN-27 HRQoL Questionnaire.

*This study was presented as an oral presentation at the 7. International & 18. National Nursing Congress, in Konya, Turkey.

References

1. Ravens-Sieberer U, Kaman A, Erhart M, Devine J, Schlack R, Otto C. Impact of the COVID-19 pandemic on quality of life and mental health in children and adolescents in Germany. Eur Child Adolesc Psychiatry. 2022;31(6):879-89 (doi:10.1007/s00787-021-01726-5).
2. Dong H, Yang F, Lu X, Hao W. Internet addiction and related psychological factors among children and adolescents in China during the coronavirus disease 2019 (COVID-19) epidemic. Frontiers in psychiatry. 2020;11:751.
3. Nobari H, Fashi M, Eskandari A, Villafaina S, Murillo-Garcia Á, Pérez-Gómez J. Effect of COVID-19 on health-related quality of life in adolescents and children: a systematic review. International journal of environmental research and public health. 2021;18(9):4563.
4. Wartberg L, Bröning S, Lindenberg K. Problematic gaming in youth and its association with different dimensions of quality of life. Zeitschrift für Kinder-und Jugendpsychiatrie und Psychotherapie. 2022;50(1):9-15.
5. Dana A, Nodeh H, Salehian MH, Mokari Saei S, Sarvari S. Smartphone usage status, sleep pattern, health-related quality of life, and physical activity among adolescents from before to during the COVID-19 confinement: A cross-sectional study. International Journal of School Health. 2022;9(1).
6. Oflu A, Bükülmez A, Elmas E, Tahta EG, Çeleğen M. Comparison of screen time and digital gaming habits of Turkish children before and during the coronavirus disease 2019 pandemic. Turkish Archives of Pediatrics. 2021;56(1):22-6 (doi: https://doi.org/10.14744/TurkPediatriArs.2020.41017).
7. Moore SA, Faulkner G, Rhodes RE, et al. Impact of the COVID-19 virus outbreak on movement and play behaviours of Canadian children and youth: a national survey. International Journal of Behavioral Nutrition and Physical Activity. 2020;17(1):1-11.
8. Hazar Z, Hazar M. Effect of Games Including Physical Activity on Digital Game Addiction of 11-14 Age Group Middle-School Students. Journal of Education and Training Studies. 2018;6(11):243-53.
9. Xu D-D, Lok K-I, Liu H-Z, et al. Internet addiction among adolescents in Macau and mainland China: prevalence, demographics and quality of life. Sci Rep-Uk. 2020;10(1):1-10.
10. Adıbelli D, Sümen A. The effect of the coronavirus (COVID-19) pandemic on health-related quality of life in children. Children and Youth Services Review. 2020;119:105595 (doi:https://doi.org/10.1016/j.childyouth.2020.105595).

11. Montag C, Elhai JD. Discussing digital technology overuse in children and adolescents during the COVID-19 pandemic and beyond: On the importance of considering Affective Neuroscience Theory. Addictive behaviors reports. 2020;12:100313.
12. Mart M, Kesicioğlu OS. COVID-19 Pandemi Sürecinde Ailelerin Evde Oyun Oynamaya İlişkin Görüşleri. Electronic Turkish Studies. 2020;15(4).
13. Irmak AY, Erdoğan S. Predictors for Digital Game Addiction Among Turkish Adolescents: A Cox's Interaction Model-Based Study. J Addict Nurs. 2019;30(1):49-56 (doi:10.1097/jan.0000000000000265).
14. Gülbetekin E, Güven E, Tuncel O. Adolesanların Dijital oyun bağımlılığı ile fiziksel aktivite tutum ve davranışlarını etkileyen faktörler. Bağımlılık Dergisi. 2021;22(2):148-60.
15. Baydur H, Ergin D, Eser E. KIDSCREEN yasam kalitesi olcegi ozbildirim ve vekil olcum sonuclarinin karsilastirmasi: Ebeveynler cocuklarinin yasam kalitesini ne kadar ongorebiliyor? Journal of Dr Behcet Uz Children's Hospital. 2016;6(1):15-24.
16. Robitail S, Ravens-Sieberer U, Simeoni M-C, et al. Testing the structural and cross-cultural validity of the KIDSCREEN-27 quality of life questionnaire. Quality of Life Research. 2007;16(8):1335-45.
17. Kliesener T, Meigen C, Kiess W, Poulain T. Associations between problematic smartphone use and behavioural difficulties, quality of life, and school performance among children and adolescents. BMC psychiatry. 2022;22(1):1-12.
18. Fazeli S, Zeidi IM, Lin C-Y, et al. Depression, anxiety, and stress mediate the associations between internet gaming disorder, insomnia, and quality of life during the COVID-19 outbreak. Addictive Behaviors Reports. 2020;12:100307.
19. Fahrizal Y, Irmawan HS. The quality of life of adolescents experiencing online game addiction during the COVID-19 pandemic. Jurnal Keperawatan Indonesia. 2023;26(1):68-77.
20. Alimoradi Z, Lotfi A, Lin C-Y, Griffiths MD, Pakpour AH. Estimation of behavioral addiction prevalence during COVID-19 pandemic: a systematic review and meta-analysis. Current addiction reports. 2022;9(4):486-517.
21. Li L, Feng X, Luo S, et al. Internet addiction and health-related quality of life in adolescents: The mediating role of sleep disturbance. Sleep Medicine. 2024;117:53-9.
22. Diotaiuti P, Girelli L, Mancone S, Corrado S, Valente G, Cavicchiolo E. Impulsivity and depressive brooding in internet addiction: a study with a sample of Italian adolescents during COVID-19 lockdown. Frontiers in Psychiatry. 2022;13.
23. Araujo CPd, Piva J, Vettoretti Nicoladeli A, et al. Lifestyle and quality of life in children and adolescents during the covid-19 social distancing period. Jornal de Pediatria. 2024;100(1):53-9 (doi:https://doi.org/10.1016/j.jped.2023.07.006).

24. Savci M, Ercengiz M, Yildiz B, Griffiths M, Aysan F. Can risky behaviors, gaming addiction, and family sense of coherence accurately classify gender among university students? Current Psychology. 2021:1-10.
25. Karaca S, Karakoc A, Can Gurkan O, Onan N, Unsal Barlas G. Investigation of the online game addiction level, sociodemographic characteristics and social anxiety as risk factors for online game addiction in middle school students. Community Mental Health Journal. 2020;56(5):830-8.
26. Buctot DB, Kim N, Kim SH. Comparing the Mediating Effect of Adolescent Lifestyle Profiles on the Relationship between Smartphone Addiction and Health-related Quality of Life Among Male and Female Senior High School Students in the Philippines. International Journal of Mental Health and Addiction. 2021:1-18.
27. Kaya A, Karataş N, Gürcan M, Dalgıç Aİ. A grounded theory study to explore the digital gameplay experiences of adolescents at risk of addiction in Turkey. Journal of Pediatric Nursing. 2022;63:e36-e43.
28. Kaya A. Adölesanlarda Dijital Oyun Bağımlılığının Mutluluk ve Yaşamın Anlamına Etkisi. Bağımlılık Dergisi. 2021;22(3):297-304.
29. Aktaş B, Bostancı N. Covid-19 pandemisinde üniversite öğrencilerindeki oyun bağımlılığı düzeyleri ve pandeminin dijital oyun oynama durumlarına etkisi. Bağımlılık Dergisi. 2021;22(2):129-38.