

Research Article

Internet Gaming Disorder in High-School Adolescents and Related Factors

Hamide Zengin¹, Nursan Çınar², Elif Erbay³, Sümeyra Topal⁴, Funda Akduran⁵

^{1,3}Bilecik Seyh Edebali University, Faculty of Health Sciences, Department of Pediatric Nursing, Bilecik, Turkey; ²Sakarya University, Faculty of Health Science, Department of Pediatric Nursing, Turkey; ⁴Kabramanmaraş Sütçü İmam University, Faculty of Health Science, Department of Pediatric Nursing, Turkey; ⁵Sakarya University, Faculty of Health Sciences, Internal Medicine Nursing

Abstract

Background: Internet gaming disorder is significantly highlighted to have become a serious public health problem in the world.

Objective: It was aimed to determine the prevalence of "Internet Gaming Disorder" in high-school adolescents, and the related factors.

Methods: 1484 high school students constituted the sample. Data were collected with the questionnaire form containing socio-demographic characteristics using the "Internet Gaming Disorder Scale" (IGDS Short Form 9).

Results: 67.3% of the participants were normal gamers, 24.5% and 8.3% of them were irregular gamers and IGD positive, respectively. IGD positivity was significantly high in males and those who reported a poor school success ($p < 0.05$).

Conclusion: High level of internet gaming disorder in those with low school success may be a result of adolescents' desires to experience a low cost excitement, to express themselves and to have a sense of success.

Corresponding Author | Dr. Hamide Zengin, Assistant Professor, Bilecik Seyh Edebali University, Faculty of Health Sciences, Pediatric Nursing, Gulumbe Campus, City Center, 11210, Bilecik, Turkey.

E-mail: hamide.zengin@bilecik.edu.tr

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Introduction:

Adolescents are especially among the most ambitious consumers of video games and online digital entertainment. Global research data indicate that most of the adolescents play games on many devices including personal computers, laptops and consoles and on smart phones along with the fact that technology has become more sophisticated. The growing popularity and abuse of video games among adolescents may be due to the idea that there would be no another more accessible entertainment product that provides a low effort/low cost action and experience of excitement and the experience of progress and success, social connectivity and self-expression¹.

In the 11th Revision of the International Classification of Diseases (ICD-11), the diagnosis of "Gaming Disorder" is defined as a model of gaming ('digital gaming' or 'video-gaming') behavior characterized by impaired control over gaming, increasing priority given to gaming over other activities to the extent that gaming takes precedence over other interests and daily activities, and continuation or escalation of gaming despite the occurrence of negative consequences².

Although it is not yet included in the DSM V, internet gaming disorder (IGD) which is recommended to be studied at an advanced level and included in the third research annex of the manual is one of the candidates in this context. The American Psychiatric Association (APA) has recommended carrying out more studies

that support the clinical diagnosis of this disorder and define that it is a mental problem to be included in the manual³. Individuals typically spend 8-10 hours per day and more time or at least 30 hours a week on the computer. The recommended diagnosis criteria of IGD are¹ excessive thought of internet games², occurrence of the symptoms deprivation when game is not played³, the need to play a game for an increasing amount of time to feel the desired excitement⁴, attempt to control, reduce or abandon gaming that has resulted in failure many times⁵, decreased interest in hobby and entertainment other than internet games⁶, excessive ongoing gaming behavior despite being aware of having psychosocial problems⁷, lying to family members, therapists or others to hide how long the game is played⁸, playing game to avoid problems or get rid of negative mood states, and⁹ the loss of important relationship, job, education or career opportunities due to participating in internet games⁴. According to the criteria specified, five or more of these symptoms should be experienced within a year for the diagnosis of internet gaming disorder⁵.

Over the last decade, the concerns of researchers around the world about "Internet Gaming Disorder (IGD)", which is recommended as a diagnostic category and has a serious potential, have gradually increased. DSM V refers to this disorder as excessive and prolonged gaming behavior on the internet to play often with other gamers in an intense and repetitive manner, resulting in a series of cognitive and behavioral symptoms. Although the definition of IGD is considered to be equivalent to internet addiction, the importance of separate evaluation of these two concepts is emphasized in the literature⁶.

Although the psychometric measurements for IGD are controversial, diagnostic criteria defined in DSM-5 were reviewed in the epidemiological survey study carried out by Müller et al. (2015) in seven European countries (Germany, Greece, Iceland, Netherlands, Poland, Romania and Spain). In that study, it was reported that 1.6% of the adolescent group consisting of 12,938 individuals aged 14-17 years met all of the criteria while 5.1% of them were at risk⁶. In the review study on the relevant issue carried out in our country, no comprehensive study was found in this regard. According to international studies, the prevalence of game addiction

varies between 2% and 15%⁷⁻¹¹. It has been stated that problematic online gaming behaviors have become a serious public health problem, particularly in China, Korea and Taiwan. 12-15 According to the American Medical Association, 90% of American teenagers play digital games and 15% of them are estimated to be game addicts³.

In the literature, there is scarcely any study on IGD, which is significantly highlighted to have become a serious public health problem in the world, published in Turkey, and numeric data revealing the seriousness of the problem in the society has not been reached. The aim of this study was to determine the prevalence of "Internet Gaming Disorder", which is significantly highlighted to have become a serious public health problem in the world, in high-school adolescents in Sakarya province, and the related factors.

Method:

This is a cross-sectional study carried out to determine the prevalence of "Internet Gaming Disorder" in high-school adolescents in Sakarya province, and the related factors. All students studying in the high schools (N=25056) in the central districts (Adapazarı, Erenler, Serdivan) of Sakarya province (It is a metropolitan located in the northwest of Turkey) constituted the population of this study, the data of which were collected between April 2018 - May 2018, and the students in the high schools who volunteered to participate in the study and the parents of whom gave consent (n=1484) constituted the sample. The number of students included in the sample of the study was found to be 1372 by using the "simple random sampling from finite population formula". Although this number indicates the minimum number of students to be included in the sample, 1500 students were reached for the study¹⁶, students were not included in the study because the questionnaires were filled out incompletely, and the study was completed with 1484 students.

Inclusion Criteria for Sample:

- o Studying in public high schools in the central districts (Serdivan, Adapazarı and Erenler) of Sakarya
- o Parental consent
- o Student's approval to participate in the study

- o Aged between 13-20 years
- o No communication problem
- o No psychiatric disorders and non-use of drug for it

Ethical Considerations

Approval No. E.18557 and dated 04.12.2017 was received from Sakarya University Faculty of Medicine Non-invasive Ethics Committee for the study. Written approval was obtained from Sakarya Provincial Directorate of National Education to carry out the study in schools. After adolescents and their families were informed about the aim of the study, the confidentiality of answers, and where and how the data would be used, voluntary adolescents whose written consents were received were included in the sample.

Data Collection Tools

The data were collected using a questionnaire form including socio-demographic characteristics of high-school adolescents and the "Internet Gaming Disorder Scale".

Questionnaire Form: It is a form prepared by the researchers and consisted of 18 questions such as the participants' age, gender, working status of parents, parental educational status, grades, school success, how to make use of spare time, at what age they played internet game for the first time, possession of computer, game console, tablet or smartphone through which they can connect to the internet, duration of internet gaming, and the places where they play games mostly.

Internet Gaming Disorder Scale: The validity and reliability study of the scale developed by Lemmens, Valkenburg, and Gentile (2015) was performed by Erkorkmaz, Zengin, Topal, Çınar (2017)^{7,16}. It is a dichotomous type (Yes, No) scale consisting of 9 items, and it was applied to adults and adolescents in the 13-40 age group in the original study. All items are scored as no (0) or yes (1), the minimum score and maximum score to be obtained from the scale are 0 and 9, respectively. With respect to the total score of the scale, 0-2 points indicate an irregular gamer, 3-5 points indicate a normal gamer and 6-9 points leads to the diagnosis of internet gaming disorder.

Data Collection: The questionnaires and consent

forms for their parents were distributed to students and collected at the hours and in the classrooms approved by the administrations of high schools.

Statistical Analysis: Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) 23 package program. During the evaluation of study data, frequency distribution was given for categorical variables and descriptive statistics (mean, standard deviation) were given for numeric variables. The chi-square test was used to examine the relationship between the internet gaming scale groups and the variables. Bonferroni method was used to examine the difference between internet gaming scale groups according to variables, and the results were presented with the regulated p value. Differences were shown by indices a and b in the groups. The same indices in the lines (a, a) indicate that there is no difference while different indices (a, b) indicate that there is a difference. The results were evaluated at a confidence interval of 95% and at a significance level of $p < 0.05$.

Results:

Of the participants, 43.4% were female, 56.6% were male, 26.3% were in the 9th grade, 23% were in the 10th grade, 31.5% were in the 11th grade and 19.2% were in the 12th grade, 56.5% were between 16-17 years old, 50.9% reported a middle school success and 9.9% reported a poor school success. It was determined that 93.1% of the students lived with their families, 35.4% of them played sports, 33% of them were engaged in music, 23.3% of them read books, 48.2% of them were interested in the phone and 41% of them were surfing the Internet.

While 46.3% of the participants stated that they "remembered at what age they played internet game for the first time", 94.6% of them stated that they had a computer, game console, tablet or smartphone through which they could connect to the internet. While the ratio of those who never played internet games was 22.2%, it was determined that the ratio of those who played games every day was 17.3%. It was observed that 6.6% of the students had "duration of internet gaming of 5 hours and more" on school days, and this ratio increased to 19.5% out of school days. While the ratio of those who mostly played internet games in their room was 70.3%, it was determined that 11.4% of them played in

Internet cafes, 11.9% of them played at home but in the room where there are all members, 6.3% of them played while going to school or somewhere else at the outside, 3.8% of them played in the school and study

they did not play games, 28.0% of them did not reduce their duration of gaming although people around them constantly told them to play less often, 48.0% of them played games to avoid thinking about the things that

Table 1: *Distributions of the Scale*

		N	%
Have you had periods during which you just thought of playing games?	Yes	517	34.8
	No	967	65.2
Have you felt yourself dissatisfied because of desiring to play more frequently?	Yes	263	17.7
	No	1221	82.3
Have you ever felt pitiful when you do not play games?	Yes	112	7.5
	No	1372	92.5
Have you not reduced your duration of gaming although people around you constantly tell you to play less?	Yes	416	28.0
	No	1068	72.0
Have you ever played games to avoid thinking about the things that make you angry?	Yes	713	48.0
	No	771	52.0
Have you ever argued with others about the consequences of your gaming behavior?	Yes	385	25.9
	No	1099	74.1
Have you ever kept how long you play a secret from others?	Yes	150	10.1
	No	1334	89.9
Have you lost your interest in other hobbies because you want to play constantly?	Yes	173	11.7
	No	1311	88.3
Have you had problems with your family, friends, or partner because of playing games?	Yes	274	18.5
	No	1210	81.5
Internet gaming disorder scale	Normal gamer	998	67.3
	Irregular gamer	363	24.5
	Positive for IGD	123	8.3

centers, and 5.1% of them played in other places.

While 34.8% of the respondents had periods during which they just thought of playing games, 17.7% of them felt themselves dissatisfied because of desiring to play more frequently, 7.5% of them felt pitiful when

make them angry, 25.9% of them argued with others about the consequences of their gaming behaviors, 10.1% of them kept how long they play a secret from others, 11.7% of them lost their interest in other hobbies because they wanted to play constantly, and 18.5% of them had problems with their family, friends, or par-

Table 2: *Analysis of the Relationship between Internet Gaming Status and Demographic Information*

		Normal gamer	Irregular gamer	Positive for IGD	Chi square	P	
Age	14-15 years	N	243	91	33	1.092	0.896
		%	24.4	25.1	27.0		
	16-17 years	N	571	204	64		
		%	57.3	56.2	52.5		
	18-19 years	N	182	68	25		
		%	18.3	18.7	20.5		
Gender	Female	N	543 _a	81 _b	20 _b	151.827	0.000***
		%	54.4	22.3	16.3		
	Male	N	455 _a	282 _b	103 _b		
		%	45.6	77.7	83.7		

School success	Very good	N	69 _a	22 _a	17 _b	47.537	0.000***
		%	6.9	6.1	13.8		
	Good	N	341 _a	109 _{a,b}	24 _b		
		%	34.2	30.0	19.5		
	Middle	N	505 _a	198 _a	52 _a		
%		50.6	54.5	42.3			
Poor	N	83 _a	34 _a	30 _b			
	%	8.3	9.4	24.4			
Possession of computer, game console, tablet or smartphone that can be connected to the Internet	Yes	N	932	343	114	1.005	0.605
		%	94.4	95.5	93.4		
	No	N	55	16	8		
		%	5.6	4.5	6.6		
Internet gaming status	Never	N	293 _a	24 _b	8 _b	254.692	0.000***
		%	30.3	6.9	6.8		
	1-4 times a year	N	117 _a	12 _b	4 _b		
		%	12.1	3.5	3.4		
	5-11 times a year	N	36 _a	8 _a	3 _a		
		%	3.7	2.3	2.5		
	1-3 times a month	N	195 _a	55 _{a,b}	11 _b		
		%	20.2	15.9	9.3		
Once a week or more	N	233 _a	140 _b	39 _{a,b}			
	%	24.1	40.5	33.1			
Everyday	N	93 _a	107 _b	53 _c			
	%	9.6	30.9	44.9			

*: $p < 0.05$ **: $p < 0.01$ ***: $p < 0.001$

tner because of playing games.

While 67.3% of the participants were normal gamers, 24.5% of them were considered as irregular gamers and 8.3% of them were considered positive for IGD.

As a result of the chi-square analysis applied, a statistically significant relationship was found between Internet gaming status and gender and school success ($p < 0.05$). IGD positivity was found to be significantly higher in males and those who reported a poor school success.

Discussion:

In our study, it was concluded that 67.3% of the students were normal gamers, 24.5% of them were irregular gamers, and 8.3% of them were positive for IGD. Although the psychometric measurements for IGD are controversial, diagnostic criteria defined in DSM-5 were reviewed in the epidemiological survey study carried out by Müller et al. (2015) in seven European countries (Germany, Greece, Iceland, Netherlands, Poland, Romania and Spain), and it was reported that 1.6% of the adolescent group consisting of 12,938 individuals

aged 14-17 years met all of the criteria while 5.1% of them were at risk. No comprehensive study on the relevant issue was found in Turkey. According to international studies, the prevalence of game addiction varies between 2% and 15%^{7,9}. In their study carried out with the people between 13-40 years of age in the Netherlands, Lemmens et al¹⁷. Reported that IGD ratio was 5.4%. In the studies related to the prevalence of IGD, the ratio was 8.5% in the USA⁹, 11.9% in Germany⁸, 7.5% in Taiwan¹⁸ and 8.7% in Singapore¹⁹, and the ratio of internet gaming addiction varied between 7.5% and 11.9%. It has been stated that problematic online gaming behaviors have become a serious public health problem, particularly in China, Korea and Taiwan¹³⁻¹⁴. According to the American Medical Association, 90% of American teenagers play digital games and 15% of them are estimated to be game addicts³. The results of the review are similar to our study.

In this study, it was determined that 94.6% of the participants had a computer, game console, tablet or smartphone that can be connected to the Internet, 22.2% of them never played internet games, 9.1% of them played

1-4 times a year, 3.2% of them played 5-11 times a year, 17.8% of them played 1-3 times a month, 28.1% of them played once a week or more, 17.3% of them played internet game every day, 6.6% of them played for 5 hours and more on school days, and 19.5% of them played for 5 hours and more out of school days. In the study of Pontes and Griffiths (2015), 26.7% of the individuals who participated in the survey stated that they played internet games for more than 30 hours a week, 12.4% of them stated that they played at least three times a week, 86.4% of them stated that they played with their mobile phone, and 70.1% of them stated that they played with game console²⁰. In another study of Pontes and Griffiths (2016), it was determined that 20% of the students who participated in the study played internet games every day²¹. These results are similar to our study.

In this study, there was no statistically significant relationship between internet gaming status and age and computer, game console, tablet or smartphone that can be connected to the internet ($p > 0.05$). It can be interpreted that parents provide internet for their children to ensure that they eat, or they use it to soothe them or they may offer internet games as a friend so that they would not spend time alone from infancy. Therefore, IGD positivity increases in children who are faced with these games which are presented from their infancy. Furthermore, they may not have the need to have a smartphone, tablet, or game console because they play very comfortably with the parent's phone.

In our study, a statistically significant difference was found between IGDS score average and gender, school success and internet gaming ($p < 0.05$). While the ratio of male gamers who are irregular and positive for IGD is significantly higher compared to normal gamers, the ratio of female normal gamers is significantly higher compared to gamers who are irregular and positive for IGD. In the study carried out by Monacis et al. (2016) in Italy, IGD scale score level of male and young adults was found to be higher. Lemmens (2015) also showed that the male gamers had higher IGDS score¹⁷. These results are similar to our study.

In our study, IGDS score average of those who considered their school success as good was statistically significantly higher compared to those who considered

their school success as very good or poor, and IGDS score average of those who considered their school success as middle was statistically significantly higher compared to those who considered their school success as bad. High school success indicates that the individual is further engaged in courses and decreases the duration of internet gaming, and thus it can be interpreted that it reduces the ratio of IGD.

In this study, IGDS score average of those who never play games or play internet games 1-4 times a year was statistically significantly higher compared to those who play internet games 1-3 times a month or once a week or more and every day, the internet gaming disorder score average of those who play 5-11 times a year or 1-3 times a month was statistically significantly higher compared to those who play internet games once a week or more and every day, and the internet gaming disorder score average of those who play internet games 1-3 times a month was statistically significantly higher compared to those who play internet games once a week or more. In the study of Lemmens (2015), it was determined that the duration of internet gaming of normal gamers was lower compared to those who were irregular and positive for IGD and that those who were positive for IGD played games on the internet for the most time. This result of the study indicates that the prevalence of IGM positivity increased as the duration of gaming increased. Our study results are similar to the literature.

Conclusion:

In this first study carried out in our region, internet gaming disorder was observed to be high in adolescent males. High level of internet gaming disorder in those with low school success may be a result of adolescents' desires to experience a low cost excitement, to express themselves and to have a sense of success.

Ethical Approval: Given

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

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References:

1. King DL, Potenza MN. Not playing around: Gaming disorder in the international classification of diseases (ICD-11). *Journal of Adolescent Health*. 2009;64(5):5-7.

2. World Health Organization. 2018. Gaming Disorder. Updated on: September 2018. [Accessed October 11, 2018]. Available at: <https://www.who.int/features/qa/gaming-disorder/en/>.
3. Irmak AY, Erdoğan S. Dijital oyun bağımlılığı ölçeği Türkçe formunun geçerliliği ve güvenilirliği. *Anatolian Journal of Psychiatry*. 2015;16(Special issue.1):10-18.
4. APA. *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition, 2013.
5. Parekh R. Internet gaming. Updated on: June 2018. [Accessed November 23, 2018] Available at: <https://www.psychiatry.org/patients-families/internet-gaming>.
6. Müller KW, Janikian M, Dreier M. Regular gaming behavior and internet gaming disorder in European adolescents: Results from a crossnational representative survey of prevalence, predictors, and psychopathological correlate. *European Child & Adolescent Psychiatry*. 2015;24(5):565-574.
7. Lemmens JS, Valkenburg PM, Peter J. Development and validation of a game addiction scale for adolescents. *Media Psychology*. 2009; 12(1):77-95.
8. Grüsser SM, Thalemann C, Griffiths M. Excessive computer game playing: evidence for addiction and aggression? *Cyberpsychology and Behavior*. 2007;10(2):290-292.
9. Gentile DA. Pathological video-game use among youth ages 8 to 18: a national study *Psychol Sci*. 2009;20(4):594-602.
10. Desai RA, Krishnan-Sarin S, Cavallo D. Video-gaming among high school students: health correlates, gender differences, and problematic gaming. *Pediatrics*. 2010;43(3):173-183.
11. Porter G, Starcevic V, Berle D. Recognizing problem video game use. *Australian and New Zealand Journal of Psychiatry*. 2010;44(2):120-8.
12. Wan CS, Chiou WB. Psychological motives and online games addiction: a test of flow theory and humanistic needs theory for Taiwanese adolescents. *CyberPsychology and Behavior*. 2006;9(4):317-324.
13. Ko C, Yen J, Chen C. Gender differences and related factors affecting online gaming addiction among Taiwanese adolescents. *J Nerv Ment Dis*. 2005;193(22):273-277.
14. Chiu S, Lee J, Huang D. Video game addiction in children and teenagers in Taiwan. *Cyber Psychology and Behavior*. 2004;7(5):571-581.
15. Hur M. Demographic, habitual, and socioeconomic determinants of internet addiction disorder: an empirical study of Korean teen-agers. *CyberPsychology and Behavior*. 2006; 9(2):514-525.
16. Erkorkmaz Ü, Zengin H, Topal S. The internet gaming disorder scale to Turkish, validity and reliability study. *International Health Sciences Congress*, 29 June - 1 July, Aydın, 2017 (Verbal, Abstract Paper).
17. Lemmens JS, Valkenburg PM, Gentile D A. The internet gaming disorder scale. *Psychological Assessment*. 2015;27(2):567-582.
18. Ko CH, Yen JY, Yen CF, Lin HC, Yang MJ. Factors predictive for incidence and remission of internet addiction in young adolescents: a prospective study. *Cyber psychol Behav*. 2007;10(3):545-551.
19. Choo H, Gentile DA, Sim T. Pathological video-gaming among Singaporean youth. *Ann Acad Med Singapore*. 2010;39(5):822-829.
20. Pontes HM, Griffiths MD. Measuring DSM-5 internet gaming disorder: Development and validation of a short psychometric scale. *Computers in Human Behavior*. 2015;45(2): 137-143.
21. Pontes HM, Griffiths MD. Portuguese validation of the internet gaming disorder scale short-form (IGDS9-SF). *Cyberpsychology, Behavior, and Social Networking*. 2016;19(3): 288-293.