Clinical and Experimental Health Sciences

Digital Game Addiction and Lifestyle Behaviors in Turkish Adolescents

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ABSTRACT

Objective: Digital game addiction is a concern that threatens public health around the world, especially in adolescents. This study was conducted to determine the relationship between digital game addiction and lifestyle behaviors in adolescents.

Methods: The research was carried out in from three high schools offering different types of education in Maltepe district between March and April 2017. Data were collected by using the Introductory Information Form, Game Addiction Scale for Adolescents and Adolescent Lifestyle Profile Scale. Data were evaluated in computer environment. Descriptive data were shown with numbers, percentages and means. The relationship between game addiction and independent variables was evaluated by chi-square test, Mann-Whitney U test, Pearson Correlation Analysis and Logistic Regression Analysis.

Results: 22.4% of adolescents were determined to be addicted to digital games. The mean scores of health responsibility, nutrition, interpersonal relationships and stress management of adolescents who had game addiction were significantly lower than the adolescents without game addiction. Digital game addiction rates were significantly higher in boys, vocational high school students, ninth grade students, and in those who described that their family had low income, that they had very poor relations with their families/friends, that they had very poor living conditions and that they were generally unhappy.

Conclusions: It was determined that game addiction negatively affected adolescents' lifestyle behaviors, and there was a negative, low to moderately significant correlation between interpersonal relationships and stress management and game addiction.

Keywords: Digital game addiction, lifestyle behaviors, adolescents

1. INTRODUCTION

Today, computers and internet, which provide convenience in many areas of life, are also frequently used for games and entertainment in adolescents. Some aspects of digital games such as providing communication, realizing the dreams that people cannot realize in real life, experiencing a sense of winning and success make games more attractive for adolescents (1). Also, adolescents find it easier to engage with others in an imaginary world of games than face-to-face communication, and they want to gain respect and reputation among other players, driving them to prefer digital games. Thus, adolescents fulfill their needs to realize themselves using digital games (2).

It has been reported that playing digital games is normal unless it is done in excess, and that games even have positive effects such as emotional relief/relaxation and improved leisure time utilization and problem-solving skills (3, 4). However, excessive and uncontrolled gaming has created the term game addiction and the resulting problems have caused serious concerns all over the world (5). Lemmens et al. (6) defined Digital Game Addiction (DGA) as "excessive and compulsive use of computer or video games and the player's inability to control excessive use, even though it causes social and/or emotional problems."

In the literature, game addiction is also referred to as "Game Disorder", "Online Game Addiction" and "Online Gaming Disorder". Although the definitions may differ, they basically describe gaming and the accompanying problems. In addition, it was stated that "Internet Addiction" could be related to game addiction (7). It is also noteworthy that in the third research supplement of the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) developed by the American Psychiatric Association, game addiction was listed under the title of personality disorders and addressed to as "recommended for further research" (8).

All individuals who play games may experience addiction as a part of the normal process. However, as a result of

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developmental changes in the brain and intense emotional and social stress during adolescence, adolescents are more vulnerable in behavior control and susceptible to addiction (5). Research has shown that male adolescents aged 10-19 are at a higher risk of game addiction than other age groups and girls (9,10).

Many studies have shown that DGA was associated with many negative lifestyle behaviors such as unhealthy nutrition behaviors, sedentary life, problems in interpersonal relationships, sleep problems, low life satisfaction, avoiding responsibilities and ineffective coping with stress (11-15). In addition, it has been reported to cause a variety of psychiatric disorders including attention deficit, hyperactivity, impulse control disorders, high levels of anxiety, depression, violence tendency and suicidal ideation (16-19).

In the international prevalence studies conducted on online game addiction, it has been found that game addiction ranged from 0.3% to 50% (10,14, 20-22). Especially in China, Korea and Taiwan, problematic online gaming behaviors have been reported to become a serious public health problem (10, 22). The establishment of specialized treatment centers in Southeast Asia, the United States and Europe reflects the seriousness of the situation (10).

Although there are no prevalence indicators at the national level in Turkey, Irmak and Erdoğan (23) found the ratio of addicted players as 28.8%, Baysak et al. (24) as 11.1% and Göldağ (25) as 22.6% in their studies.

Physical inactivity, unhealthy diet, stress, cigarette-alcohol-substance addiction, digital addictions, not taking responsibility for health, and negative interpersonal relationships are the biggest threats to adolescents' health. These behaviors have important lifelong consequences (26-28). All kinds of addictions and game addiction constitute a risk for healthy lifestyle behaviors. The fact that adolescents who spend most of their time with playing games inactively avoid all kinds of responsibilities can also lead to avoiding health responsibilities and adopting negative behaviors (29).

Although research on digital game addiction is rapidly increasing, there is limited research examining digital game addiction and lifestyle behaviors together in adolescents who are at greater risk than others in terms of engaging in risky behaviors and developing addiction (10). In order to determine the current situation; there is a need for descriptive studies with valid and reliable measurement tools. The aim of this study is to determine digital game addiction and lifestyle behaviors in adolescents.

In this research, the answers to the following questions were sought:

- What are the digital game addiction rates of adolescents?
- What are the total scores and subscale scores of adolescents from the Game Addiction Scale for Adolescents (GASA) and Adolescent Lifestyle Profile Scale (ALPS)?
- Is there any difference between ALPS subscale scores of adolescents with and without digital game addiction?
- What are the socio-demographic characteristics of adolescents that increase the risk of game addiction?
- Is there a difference between the socio-demographic characteristics of adolescents and game addiction?

2. METHODS

2.1. Population and Sample

The population of the study consists of students from three high schools offering different types of education in Maltepe district between March and April 2017. These high schools are vocational technical high schools (n=1954), an anatolian high school (n=1317) and a health high school (n=350) attended by a total of 3621 adolescents. In the study; sample selection was not made, it was aimed to reach the whole population. The study was completed with 2001 students (55.2% of the population), who were at the school on the data collection days and completed the data collection forms completely. The inclusion criteria of the study were lack of communication barriers, volunteering, obtaining parental consent and completing the data collection forms completely.

2.2. Variables

Dependent variables: The mean scores obtained from the health responsibility, physical activity, nutrition, interpersonal relationships and stress management subscales of the ALPS were the dependent variables of the study.

Independent variables: Digital game addiction and socio-demographic characteristics including age, gender, height, weight, parents' educational level and profession, socioeconomic level, whether the adolescent worked outside the school, etc. and family relationships, friend relationships, life satisfaction, tendency to violence, coping with stress and mood were independent variables of the study.

2.3. Data Collection Tools

Data were collected by using the Introductory Information Form, Game Addiction Scale for Adolescents (GASA) and Adolescent Lifestyle Profile Scale (ALPS).

Introductory information form: Developed by the researchers based on the relevant literature, the form consists of 31 closed-ended questions covering school characteristics, familial characteristics, interpersonal relationships, disease and health perception, and Body Mass Index (BMI) measurements of adolescents (28, 30, 31).

Body mass index (BMI): BMI was calculated by measuring the height and weight of the students and dividing the weight in kilograms to square meters (kg/m^2). In this study, using the BMI percentile curves of Turkish children developed

by Neyzi et al. (32), those with percentile below 5% were defined as "underweight", 5-85 percentile as "normal", between 85-95 percentile as "overweight" and above 95 percentile as "obese".

Game addiction scale for adolescents (GASA): GASA was developed by Lemmens, Valkenburg and Peter (6) to determine problematic game behaviors of adolescents between the ages of 12-18 years. The adaptation to Turkish language and validity and reliability study was conducted by Ilgaz (32). The Cronbach's Alpha value for the total reliability coefficient of the adapted scale was found to be 0.92, and in this study, it was 0.94. The Cronbach's Alpha value for the subscales of the adapted scale was found to be between 0.62-0.85, and it was between 0.70 and 0.87 in this study. The scale consists of seven subscales, namely: salience $_{(1)}$, tolerance $_{(2)}$, mood modification $_{(3)}$, withdrawal $_{(4)}$, relapse $_{(5)}$, conflict $_{(6)}$ and problems $_{(7)}$. The scale is a 5-point Likert-type (1-Never, 2 – Rarely, 3 – Sometimes, 4 – Frequently, 5 – Very often). The highest score to be taken from the scale is 105 and the lowest score is 21. Higher scores indicate greater game addiction. As described by Charlton and Danforth (33) and Baysak et al. (24) monothetic vs polythetic diagnoses are used to determine game addiction. In this study, monothetic diagnosis was used for digital game addiction. According to the monothetic diagnosis, if the person scores 3 (sometimes) and above 3 in 21 items, he / she is considered addicted. In polythetic diagnosis, if he scores 3 (sometimes) and above 3 for at least 12 items, he / she is defined as a game addict. Those who scored 63 points and above from the GASA in monothetic diagnosis were digital game addicts.

***Adolescent lifestyle profile scale (ALPS)*:** The Adolescent Lifestyle Profile is a version of Health Promotion Lifestyle Profile II developed for adolescents based on the Health Promotion Model. The reliability and validity study of the scale was conducted by Hendricks, Murdaugh and Pender (34). Adaptation to the Turkish language and validity and reliability study of the scale was conducted by Ardıç (35) and Cronbach's Alpha coefficients were found to be 0.87 for the total scale and 0.58 to 0.77 of the subscales. The scale has seven subscales that can be used independently of each other. There is no cut-off point in the scale consisting of 40 items of four-point likert type. Higher scores indicate improved positive health behavior (35). The subscales are health responsibility, physical activity, nutrition, positive life perspective, stress management and spiritual health. Five subscales were used in this study, excluding the positive life perspective and spiritual health subscales. The Cronbach's Alpha coefficients of the five subscales used in this study ranged from 0.50 to 0.81.

2.4. Data Collection

The data was collected between March and April 2017 by visiting the schools two days a week and using a questionnaire based on self-reporting which lasted 25 minutes on average. The questionnaires were given during the lessons when the students could complete them. Before collecting data from the population, a pilot study was conducted with a different group of 15 students to test the comprehensibility of the data collection forms.

2.5. Statistical Analysis

Data were evaluated in computer environment. Descriptive data were shown with numbers, percentages and means. The relationship between GASA game addiction and independent variables was evaluated by chi-square test, Mann-Whitney U test, Pearson Correlation Analysis and Logistic Regression Analysis. Statistical significance was set at $p < 0.05$.

2.6. Ethical considerations

Written permission was obtained from the Istanbul Provincial Directorate of National Education, the school administration to conduct the research. At the same time, written consent was obtained from the students and their parents to participate in the study. In order to use the GASA and ALPS in this study, permission was obtained by e-mail from the authors who adapted the Turkish version. Ethical permission was obtained from the Ethics Committee of the Institute of Health Sciences (09.10.2017-193) of a university.

3. RESULTS

The mean age of the study sample was 16.5 ± 1.0 years (min=14, max=19). 58.1% of the adolescents were between 14-16 years, 4.9% of them were between 17-19 years of age. 33.4% of the adolescents were girls, 56.2% were vocational technical high school students and 31% were studying in 10th grade, and 57.5% had 1-2 siblings. The mean body weight of the students was 63.27 ± 12.7 kg, average height was 171.43 ± 16.4 cm, mean BMI was 21.48 ± 3.42 and 5.6% of them were obese according to their percentiles. The average monthly income of 29.5% of the families was between 1501-2500 TL (Table 1).

Adolescents scored 48.64 ± 19.83 points on average on the Game Addiction Scale. The highest score (mean=8.46 ± 3.77) from the subscales was from the mood modification subscale, while the lowest score was from the problems subscale (mean=5.97 ±3.07). The highest score from the subscales of the Adolescent Lifestyle Profile Scale was from the interpersonal relationships subscale (mean=14.98 ± 3.39) while and the lowest score was from the health responsibility subscale (mean=10.50 ± 2.38) (Table 2).

The scores of adolescents from the ALPS subscales were compared by whether the adolescent had game addiction and the results are provided in Table 3. Accordingly, there was a significant difference between game addiction and health responsibility ($Z=3.416$; $p=.001$), nutrition ($Z=2.071$; $p=.038$), interpersonal relationships ($Z=4.585$; $p=.000$) and stress management ($Z=3.936$; $p=.000$) subscales. The mean scores of the adolescents with game addiction were lower (Table 3).

22.4% of the adolescents (n=449) were considered to have game addiction with a score of 63 or higher from GASA. The addiction ratios of the adolescents were compared with independent variables and the results are shown in Table 2. Boys (χ^2=64.89; p=.000), vocational high school students (χ^2=20.82; p=.000), ninth grade students (χ^2=13.13; p=.004), those with the lowest family income (χ^2=16.32; p=.003), those who described that they had very poor relations with their families (χ^2=32.42; p=.000) and friends (χ^2=12.99; p=.005) and those who described that they had very poor living conditions (χ^2=17.80; p=.000) had higher addiction rates than the others (Table 4).

Table 1. *Socio-demographic characteristics of adolescents who participated in the study (n=2001)*

Variables		Mean (SD)	
Age (mean ± SD)		16.5 ±1.07 years	
		n	**%**
Age groups	14-16 age	1163	58.1
	17-19 age	838	41.9
Gender	Female	668	33.4
	Male	1333	66.6
School type	Technical High School	1124	56.2
	Health High School	207	10.3
	Anatolian High School	670	33.5
Grade	Grade 9	531	26.5
	Grade 10	620	31.0
	Grade 11	613	30.7
	Grade 12	237	11.8
Number of Siblings	1-2 siblings	1150	57.5
	3 – siblings	462	23.1
	4 and over	247	12.3
	None	142	7.1
BMI Percentiles	Under weight (<5. Perc.)	301	15.1
	Normal (5-85 Perc.)	1443	72.1
	Overweight (85 – 95 perc.)	144	7.2
	Obese (>95 perc.)	112	5.6
Family Income	500-1000 TL	83	4.2
	1001-1500 TL	345	17.2
	1501-2500 TL	590	29.5
	2501-3500 TL	467	23.3
	3501 and over	516	25.8

SD= Standard Deviation, BMI= Body Mass Index

A moderately negative statistically significant correlation was found between the Problems sub-dimension of GASA and the stress management sub-dimension of ALPS (r=-. 520; p=.000). Either there was no correlation, or a very low level of significant correlation was found between the other sub-dimensions of the two scales (Table 5).

When independent variables associated with game dependence were subjected to logistic regression analysis, it was found that the risk of developing game addiction was 2.75 times higher for male adolescents than female adolescents, 0.76 times higher for 12th grade students, 0.82 times higher for those with a family income of 500-1000 TL and below, 1.48 times higher for those who described that they had very poor relations with the family, 1.34 times higher for those who described that they had very poor relations with the friends, 0.78 times higher for those who experienced sleep problems, 0.62 times higher for those who resort to violence, 1.58 times higher for those who do not have a healthy lifestyle, and 0.50 times higher for those who played digital games (p <0.05) (Table 6).

Table 2. *Distribution of total and sub-dimension mean scores of Game Addiction Scale for Adolescents and Adolescent Lifestyle Profile Scale*

Scales		Median	Mean (std.)	Min-max.
GASA Total Score		46.00	48.64 (19.83)	21-105
Game Addiction Scale for Adolescents	Salience	7.00	7.78 (3.80)	3-15
	Tolerance	7.00	7.41 (3.84)	3-15
	Mood Modification	8.00	8.46 (3.77)	3-15
	Withdrawal	7.00	6.79 (3.23)	3-15
	Relapse	5.00	6.07 (3.48)	3-15
	Conflict	5.00	6.14 (3.34)	3-15
	Problems	5.00	5.97 (3.07)	3-15
Adolescent Lifestyle Profile Scale	Health Responsibility	10.00	10.50(2.38)	5 – 20
	Physical Activity	14.00	14.85 (4.38)	6-24
	Nutrition	14.00	14.61 (3.39)	6-24
	Interpersonal Relationships	15.00	14.98 (3.39)	5-20
	Stress Management	14.00	13.76 (3.32)	5-20

GASA: Game Addiction Scale for Adolescents

***Table 3. Distribution** of the mean scores of the subscale scores of adolescents with and without game addiction*

Sub dimensions of ALPS	GASA						Statistics	
	GASA Not Addicted (n=1552)			GASA Addicted (n=449)				
	Median	25. – 75. quarter	Mean (std.)	Median	25. – 75. quarter	Mean. (std.)	Z	P
Health Responsibility	10.00	9 – 12	10.58 (2.32)	10.00	8-12	10.22 (2.54)	**3.416**	**.001**
Physical Activity	15.00	12-18	14.93 (4.31)	14.00	11-18	14.57 (4.60)	1.434	.151
Nutrition	14.00	12-17	14.70 (3.33)	14.00	12-17	14.28 (3.59)	**2.071**	**.038**
Interpersonal Relationships	15.00	13-18	15.19 (3.22)	14.00	12-17	14.25 (3.68)	**4.585**	**.000**
Stress Management	14.00	12-16	13.89 (3.31)	13.00	11-16	13.18 (3.33)	**3.936**	**.000**

Z=Mann-Whitney U test

ALPS: Adolescent Lifestyle Profile Scale; GASA: Game Addiction Scale for Adolescents

***Table 4. Comparison** of socio-demographic characteristics and game addiction of adolescents*

Variables		According to GASA Monothetic format				Statistics	
		Not Addicted (n=1552)		Addicted (n=449)			
		n	%	n	%	χ 2	p
Gender	Female	589	88.2	79	11.8	**64.89**	**.00**
	Male	963	72.2	370	27.8		
School Type	Technical High School	832	74.0	292	26.0	**20.82**	**.00**
	Health High School	178	86.0	29	14.0		
	Anatolian High School	542	80.9	128	19.1		
Grade	Grade 9	387	72.9	144	27.1	**13.13**	**.00**
	Grade 10	486	78.4	134	21.6		
	Grade 11	500	81.6	113	18.4		
	Grade 12	179	75.5	58	24.5		
Family Income	500-1000 TL	59	71.1	24	28.9	**16.32**	**.00**
	1001-1500 TL	270	78.3	75	21.7		
	1501-2500 TL	462	78.3	128	21.7		
	2501-3500 TL	386	82.7	81	17.3		
	3501 and over	375	72.7	141	27.3		
Family Relationships	Very good	778	82.7	163	17.3	**32.42**	**.00**
	Good	698	74.1	244	25.9		
	Bad	59	64.8	32	35.2		
	Very Bad	17	63.0	10	37.0		
Friend Relationships	Very good	735	78.8	198	21.2	**12.99**	**.00**
	Good	756	77.9	215	22.1		
	Bad	41	64.1	23	35.9		
	Very Bad	20	60.6	13	39.4		
Living conditions	Very good	426	80.2	105	19.8	**17.80**	**.00**
	Good	1018	78.1	286	21.9		
	Bad	90	66.2	46	33.8		
	Very Bad	18	60.0	12	40.0		
Are you generally happy?	Yes	754	80.6	181	19.4	**17.13**	**.00**
	No	240	69.8	104	30.2		
	Sometimes	558	77.3	167	22.7		

χ^2=Pearson Chi-Square; GASA: Game Addiction Scale for Adolescents; TL: Turkish Lira

Table 5. *Correlation between subdimensions of Game Addiction Scale for Adolescents and Adolescent Lifestyle Profile Scale*

GASA Subdimensions	ALPS Subdimensions				
	Health Responsibility	Physical Activity	Nutrition	Interpersonal Relationships	Stress Management
	r (p)	r (p)	r (p)	r (p)	r (p)
Salience	-.022 (.320)	.016 (.477)	.003 (.883)	**-.120 (.000)**	-.033 (.136)
Tolerence	-.026 (.247)	.009 (.673)	.007 (.749)	**-.154 (.000)**	**-.078 (.000)**
Mood Modification	-.016 (.473)	.025 (.268)	-.003 (.898)	-.049 (.029)	-.032 (.151)
Withdrawal	-.020 (.364)	-.030 (.123)	-.029 (.193)	**-.129 (.000)**	**-.107 (.000)**
Relapse	-.031 (.161)	-.013 (.563)	-.034 (.125)	**-.174 (.000)**	**-.115 (.000)**
Conflict	-.052 (.020)	-.028 (.213)	-.035 (.122)	**-.162 (.000)**	**-.132 (.000)**
Problems	-.041 (.065)	-.005 (.814)	-.026 (.239)	**-.139 (.000)**	**-.520 (.000)**

Table 6. *Logistic regression analysis of independent variables with game addiction*

Variables		B	Exp(B)	Sig.	95% CI
Gender	Female Male	1.01	2.75	**0.00**	2.00–3.79
School type	Anatolian High School Health High School Technical High School	0.14	1.15	0.33	0.87-1.56
Grade	Grade 9 Grade 10 Grade 11 Grade 12	0.27	0.76	**0.02**	0.51-1.12
Family income	500-1000 TL 1001-1500 TL 1501-2500 TL 2501-3500 TL 3501 TL and over	0.18	0.82	**0.00**	0.45-1.49
Family relationships	Very Good Good Bad Very Bad	0.39	1.48	**0.01**	0.58-3.79
Friend relationships;	Very Good Good Bad Very Bad	0.28	1.34	**0.03**	0.55-3.28
Sleep problems	No Yes	0.24	0.78	**0.04**	0.57-1.06
Enjoying life	Yes Sometimes No	0.14	1.15	0.47	0.78-1.69
Healthy Lifestyle	No Yes	0.45	1.58	**0.00**	1.22-2.04
Resort to violence	No Yes	0.47	0.62	**0.00**	0.45-0.86
Playing digital games in free time	No Yes	0.68	0.50	**0.00**	0.39-0.64

4. DISCUSSION

In this study, which was conducted to determine the digital game addiction and lifestyle behaviors of adolescents, it was found that approximately one fourth of the adolescents were addicted to digital games. Among the sub-scales of GASA, the highest score was obtained from the mood changing subscale, and the lowest score was obtained from the problems subscale. Adolescents got the highest score from the interpersonal relationships subscale, and the lowest score from the health responsibility subscale from the ALPS. Game addicted adolescents; average scores for health responsibility, nutrition, interpersonal relationships, and stress management were lower than non-game addicts. Digital game addiction rates of males, vocational high school students, ninth grade students, those with low family income, those who stated that their relations with their family and friends were very weak, and those who stated that they were generally unhappy were found to be higher than the others.

In this study, it was found that adolescents who are addicted to digital games assume less health responsibility than adolescents who are not addicted to digital games. It is stated in the literature that adolescents who spend most of their time with playing games may inactively avoid all kinds of responsibilities including health responsibility and adopt negative behaviors (29). In their research, Stockdale and Coyne (36) found that individuals with game addiction had poorer health than those without game addiction.

In this study, it was determined that adolescents with digital game addiction ate unhealthy food. The mean score of the adolescents with game addiction was lower. In parallel with our study findings, there are studies showing that problematic gaming and technology-related addictions are associated with poor nutrition habits (11,37). In this study, it was determined that game addicted adolescents got lower scores in ALPS interpersonal relations dimension. It has been reported that excessive game play isolates people and decreases their level of socialization (27). It was reported that symptoms of problematic gaming and social media use

negatively affects adolescents' life satisfaction, and that symptoms of problematic gaming had a negative effect on their perceived social competence (38).

In this study, adolescents with game addiction had lower scores from the stress management subscale of ALPS than those without game addiction. Saquib et al. (39) found a strong and significant correlation between game addiction and stress and stated that individuals with game addiction were at 4.7 times higher risk than those without game addiction. Mentzoni et al. (14) found that people with psychological health problems were more prone to game addiction. There are studies showing that adolescents use online games as a tool to deal with stress (21,37). The results showing that games provide emotional relief and relaxation also support this finding (3). These findings suggest that adolescents play digital games to cope with stress or that their stress increases as they play.

This research found that 27.8% of male adolescents and 11.8% of female adolescents were addicted to digital games. In addition, according to logistic regression analysis, it was found that males had a 2.75 times higher risk of being dependent. This finding is in line with the findings of previous studies (14, 37). In the study of Wittek et al. (40), it was found that males were 2.9 times more likely to have game addiction than females. In a study, higher activity and functional link was found in the mesocorticolimbic system that controls brain pleasure mechanisms and behaviors in male compared to female subjects with game addiction (41). However, the addictive potential of the game types preferred by men may be higher. It is also thought that this finding may be due to the fact that most of the games are prepared by men for men (19).

In this study, it was seen that 28.9% of those with low family income were high and 27.3% of those with high family income had digital game addiction and their addiction rates were higher than other income groups. In addition, analysis has shown that having a low income increases the risk of game addiction. In the literature, it is stated that families with low income have lower education level. Families with low levels of education may not know the negative effects of game addiction and strategies to protect adolescents from game addiction (42). On the other hand, it is stated in the literature that adolescents with high income level play more online games to spend time and for social interaction. It is also mentioned that children of families with higher incomes can easily access digital gaming means, which may increase game addiction (25). The high level of addiction of adolescents in both low and high income families suggested that game addiction was not only affected by family income. Therefore, awareness of parents and adolescents should be raised regarding game addiction in both settings.

Adolescents with poor family and friends relationships were found to have a higher risk of game addiction. The results of the study by Choi et al. (43) showed that adolescents play online games to spend time and engage in social interaction. Lenhart (44) in his study; reported that 72% of teens play online games every day and that these teens have poor friendships in daily life. In the study of Bonnaire and Phan (45), adolescents who have poor family relationships and conflict with their families experienced problematic gaming and online gaming disorders significantly more than others. In addition, Han et al. (46) reported in their study that harmony within the family may be important in controlling problematic gaming. In line with these findings, it can be concluded that both poor family and friend relationships lead adolescents to game addiction and that game addiction affects family and friend relationships negatively.

In this study, digital game addiction was found to be higher in adolescents with sleep problems. It has been reported that in adolescence, 7.5 hours of sleep for girls and 8.5 hours for boys are necessary for a healthy life (28). It has been reported that game addiction disrupts normal sleep patterns of adolescents and generally causes less sleep, longer time to fall asleep and more interruptions during sleep (13, 47). There are studies showing that time and duration of sleep are affected by digital game addiction (14, 28, 39). Results of other studies also show that game addiction is associated with sleep problems (10, 48).

5. CONCLUSIONS

The results showed that game addiction negatively affects healthy lifestyle of adolescents. It should be noted that male gender, vocational high school students, adolescents with low family income and those with poor relationships with family/friend constitutes risky groups. The inclusion of efforts to improve stress management, family and friendship relations and to develop communication skills and good nutrition, sleep, and healthy lifestyle behaviors to prevent and reduce game addiction can increase the effectiveness of the initiatives.

Conflict of Interest

There are no conflicts of interest in connection with this paper.

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