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Health-related Quality of Life and Game Addiction Tendencies in Children Visiting Child and Adolescent Psychiatric Clinics

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Abstract

Background: In child and adolescent psychiatry, although there is no formal diagnosis for Internet Gaming Disorder, cases of individuals struggling with video game-related issues are occasionally observed. Factors that might predispose one to gaming disorders include difficulties in the real world and problematic relationships with parents. Focusing on quality of life (QOL), this study aimed to clarify the gaming environment, the factors influencing gaming, and the relationship between health-related QOL and game addiction tendencies.

Methods: A self-administered survey was conducted on children attending child and adolescent psychiatric clinics. Valid responses were obtained from 87 participants. Based on previous research, participants were divided into three groups according to game addiction tendencies, and health-related QOL was compared among these groups. Furthermore, a multiple regression analysis (stepwise method) was conducted, with game addiction tendency as the dependent variable, and health-related QOL, gaming environment, and factors influencing gaming as independent variables.

Results: Regarding the characteristics of health-related QOL, while the subjects had high self-esteem, other subdomains were lower compared with healthy elementary and junior high school students. We conducted multiple regression analysis with game addiction tendency as the dependent variable. The results indicated that the factors that strengthened game addiction tendency included parents' oppressive attitudes, strong child rebellion, longer gaming time on weekdays, and an inability to set time limits for gaming.

Conclusion: This study found that good family relationships were a factor that reduced game addiction tendency. Based on the findings, we conclude that providing support for children's self-control and decision-making, as well as support for family relationships, could improve the tendency toward game addiction. Furthermore, in child and adolescent psychiatry nursing, interventions are needed not only to restrict game usage but also to promote appropriate use.

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Introduction

In recent years, problems related to video games have been observed among children admitted to child and adolescent psychiatric wards. Such problems include disruptions of daily life rhythms owing to the inappropriate use of video games, leading to not only school refusal and social withdrawal but also issues such as excessive in-game purchases, resulting in large expenditures [1]. In particular, massively multiplayer online role-playing games are noted for their high addictive potential among young people. This is because such games are endless, allowing players to acquire more items the more they play and offering the option to obtain even more items through in-game purchases [2]. Attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) have been identified as factors contributing to internet addiction and Internet Gaming Disorder (IGD), and it has been noted that children who visit child and adolescent psychiatry clinics tend to be more susceptible to internet addiction and IGD [3-8].

In modern times, the internet is a part of everyday life, and there are many internet-based video games. Many children play games using consoles such as Nintendo Switch or PlayStation 5, as well as personal computers and smartphones. A 2024 nationwide survey of 5,000 Japanese students, ranging from fourth-grade elementary to third-year high school, found that 98.2% of respondents used the internet, 84.9% of whom reported playing games [9]. Furthermore, 51.9% of elementary school students, 67.1% of junior high school students, and 77.5% of high school students spent more than three hours a day connected to the internet on weekdays. While it is unlikely that all of this online time is spent on gaming, we can infer that the time spent on games has also increased. Excessive immersion in gaming can disrupt one's daily routine and lead to increased irritability. Moreover, it has been reported that children and students with a tendency to become dependent on games and the internet might also be dealing with other issues. Additionally, when parents adopt parenting approaches that impose punishments or restrictions on their children, the children tend to ignore the warnings, which can paradoxically promote dependency [10].

A tendency toward game addiction has been found to be associated with declining academic performance, school absenteeism, sleep problems, restricted leisure activities, suicidal ideation, depression, anxiety disorders, and social phobia [11-15]. Furthermore with advancements in research on the relationship between game use and

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the brain [15,16], it has been noted that the continuous use of gaming consoles can have negative effects on many aspects of children's development [17]. Gaming disorder was included in the addiction field of the World Health Organization's International Classification of Diseases 11th Revision, which came into effect in 2022. Consequently, the need for caution regarding game addiction has been emphasized worldwide [18-21].

Factors that can make one prone to gaming disorder include a tendency to seek escape from real-world problems; problems in the home environment; low self-esteem; difficulty regulating self, mood, and rewards; and problems with decision-making [22-25]. One study reported a decline in daily life functioning among adolescents with a strong tendency toward internet and game addiction [26]. Such findings underscore the importance of exploring the factors that lead to gaming disorder. Quality of life (QOL), for instance, can refer to the quality of living conditions and overall life experience, among other aspects. Studies have suggested that Japanese children have a lower QOL than children in other developed countries and that their interpersonal problems and feelings of loneliness might trigger mental disorders [27]. Additionally, children with disrupted lifestyles, those with depression, victims of abuse, and those with developmental disorders tend to have both a lower QOL and lower self-esteem [27].

QOL is broadly categorized into health-related QOL, which is directly associated with health, and non-health-related QOL, which includes aspects not directly related to health such as environment, economy, and politics [28]. Used in the healthcare field, the concept of health-related QOL originated from a psychosocial model that takes into account an individual's functional capacity in daily life [29].

Developed in Germany, KINDL® (Questionnaire for Measuring Health-Related Quality of Life in Children, Revised Version) was created to measure health-related QOL in children. Its reliability and validity have been validated, and it has been translated into languages such as English and French. KINDL® is now used in many countries [30]. A Japanese version was developed and validated as a QOL scale for preschoolers aged 4–6 (Kiddy-KINDL®), elementary school students aged 7–13 (Kid-KINDL®), and junior high students aged 14–17 (Kiddo-KINDL®) [31].

Health-related QOL for children is qualitatively different from that for adults; it is also important to give consideration to cultural background [32]. Compared with other countries, the health-related QOL of Japanese children has been reported to be low [33]. Moreover, health-related QOL tends to be low for Japanese children with diseases and those with low-income parents [31]. In addition, among Japanese children, girls have lower self-esteem than boys, and older children have lower self-esteem than younger children [30,34]. Regarding video games, meanwhile, it has been reported that problematic game use is associated with lower life satisfaction [35]. Thus, issues related to video games are significant during adolescence, and although individuals visiting child and adolescent psychiatry clinics may have a tendency toward gaming disorder or game addiction, to the best of our knowledge, no studies have clearly demonstrated these relationships. In light of the above, the present study aimed to elucidate the relationship between gaming environments, factors influencing gaming, health-related QOL, and game addiction tendencies. The findings can help inform nursing strategies in child and adolescent psychiatry departments where patients with gaming-related problems seek treatment or are hospitalized.

Methods

Participants

The initial subjects were 129 patients aged 9–19 who visited the outpatient child and adolescent psychiatry department of a facility in Japan between July 2019 and January 2020. We selected those who were deemed capable of participating in this study by their attending physician and whose condition was judged to be manageable were selected as participants. Patients diagnosed with intellectual disability by the attending physician were excluded.

Measures

Subjects' characteristics

As background information on the subjects, age, student status, grade level, primary diagnosis, and cohabitants were collected from medical records.

Children's health-related QOL

Health-related QOL was measured using the Kid-KINDL® scale for elementary school students aged 7–13 and the Kiddo-KINDL® scale for junior high school students and older participants aged 14–17.

The Kid-KINDL® and Kiddo-KINDL® have the same questionnaire items. They consist of six subdomains: physical well-being, emotional well-being, self-esteem, family, friends, and school, with a total of 24 items (four items for each subdomain). Additionally, the scores for each subdomain are standardized to range from 0 to 100 points, with higher scores indicating a higher QOL [31].

Gaming environment and factors influencing games

Based on the survey by Nakayama et al. [36], we examined the participants' gaming environments, including the time when gaming began, duration of play, possession of personal gaming devices or smartphones, and usage time. Regarding the factors influencing gaming, we used a scale employed in a survey on gaming and lifestyle by the Kagawa Prefectural Education Center [10]. This scale consists of three factors: school adaptation (five items), parental supportive attitude (two items), and parental oppressive attitudes and children's rebellion (four items), with a total of 11 items measured on four-point Likert scales.

Game addiction tendency

To measure the tendency toward game addiction, we used a modified version of Young's [37] Internet Addiction Test (20 items), which was adapted for children and students by the Kagawa Prefectural Education Center [10]. The Kagawa Prefectural Education Center [10] surveyed 1,051 students from fourth-grade elementary to third-year junior high. They measured game addiction tendencies using 17 items comprising four factors: cognitive bias (six items), neglect of studies (four items), concealment (four items), and lack of self-control (three items). Items measuring game dependency tendency are scored on a four-point scale, with higher scores indicating a stronger tendency toward game dependency.

Research method

The purpose, content, and method of this study were explained to child and adolescent psychiatrists and outpatient nurses. The attending physicians then confirmed whether participation in this study was possible.

Since this study targeted children and adolescents, consent was obtained from the subjects' guardians. The participants themselves were then provided with written and verbal explanations of the research. Those who gave written consent were included as research participants, and the survey was conducted.

Out of the 129 eligible participants, 106 agreed to cooperate with the study. After excluding those who were not enrolled in elementary, middle, or high school and further eliminating those with incomplete responses to the questions, 87 individuals (effective response rate of 67.4%) were included in the analysis.

Ethical considerations

The study was conducted after obtaining ethical approval for the research protocol's content and implementation from the Medical Ethics Committee of the University of Tsukuba (notification no. 1337) and the Ethics Review Committee of the research facility (reception no. 86).

Analysis

Descriptive statistics were calculated for the participants' background (gender, school affiliation, primary diagnosis) and gaming environment. Cronbach's alpha coefficients were calculated to demonstrate the reliability of the elementary school QOL scale, the junior high QOL scale, the factors influencing gaming, and game addiction tendencies [10].

We compared three groups—elementary school students, junior high school students, and high school students—regarding health-related QOL scale, factors influencing gaming, and game addiction tendencies. For the gaming environment, a chi-square test was conducted regarding gender. Regarding game addiction tendencies, similar to the survey by the Kagawa Prefectural Education Center [10], we divided the scores into three groups: 17–23 points as the low group, 24–53 points as the medium group, and 54–68 points as the high group.

We then compared health-related QOL among these three game addiction tendency groups. Furthermore, we conducted multiple regression analysis (stepwise method) with game dependency tendency as the dependent variable and children's health-related QOL, gaming environment, and factors influencing gaming as independent variables.

Results

Description of the sample

As shown in Table 1, the subjects consisted of 54 males (62.1%) and 33 females (37.9%). Among males, elementary school students were more prevalent while high school students and above were more common among females (χ^2=9.41, p<.05).

Table 1 also shows the primary diagnoses of the subjects. ASD was found in 38 individuals (43.7%), ADHD in 17 individuals (19.5%), and trauma and stress-related disorders in 13 (14.5%). Among boys, ASD was more common while among girls, trauma and stress-related disorders, as well as eating disorders, were more prevalent (χ^2=42.5, p<.001).

Regarding cohabiting family members, 59 individuals (67.8%) lived with both parents while 28 (32.2%) did not have both parents present (four with father only, 22 with mother only, and two living with someone other than their parents).

	Boys n=54	%	Girls n=33	%
School				
Elementary school	19	(35.2)	3	(9.1)
Junior high school	22	(40.7)	14	(42.4)
High school	13	(24.1)	16	(48.5)
Diagnosis				
ASD	29	(53.7)	9	(27.3)
ADHD	16	(29.6)	1	(3.0)
PTSD-related syndrome	2	(3.7)	11	(33.3)
Anxiety disorder	5	(9.3)		
Eating disorders			5	(15.2)
Schizophrenia			5	(15.2)
Other	2	(3.7)	2	(6.0)

Table 1: Subjects' backgrounds.
Note: N=87.

Children's health-related QOL

For Kid-KINDL® and Kiddo-KINDL®, since the QOL scale items for elementary and junior high school students are identical, we confirmed the reliability of the scale for all subjects. The Cronbach's alpha coefficient for all 24 items was .91. The subdomains were physical well-being (α=.66), emotional well-being (α=.73), self-esteem (α=.92), family (α=.72), friends (α=.74), and school (α=.69).

The converted total health-related QOL score for all subjects in this study was (mean±standard deviation) 53.9±19.6. The subscales were physical well-being (59.0±22.2), emotional well-being (59.7±27.2), self-esteem (34.6±39.2), family (66.6±21.8), friends (51.9±27.6), and school (47.1±25.8). When comparing the subjects by their affiliated schools, as shown in Table 2, elementary school students scored the highest in total score (p=.002), physical well-being (p=.002), self-esteem (p=.022), friends (p=.002), and school (p<.001).

Game environment and factors affecting games

Sixty-five respondents (74.7%) owned their own gaming device, and 51 (58.6%) reported owning their own smartphone. While 25 high school students, accounting for 86.2% of respondents, reported having their own smartphone, only seven elementary school students (31.8%) reported the same, indicating a significant difference (χ^2=16.8, p=.002). Regarding the question about where they played games, 52 respondents (59.8%) said they played in places where their family was present, followed by 34 (39.1%) who played in their own rooms. As for when they started gaming, regardless of their current school, the most common response was before entering elementary school (30 respondents; 34.5%). Sixteen respondents (18.4%) reported playing games for more than five hours per day on weekdays; for weekends, the number of respondents increased to 28 (32.2%), including all 16 from the weekday group. There was no difference between males and females in these responses.

As shown in Table 3, more male respondents answered that they "often play games at home" (χ^2=8.04, p=.018). Regarding the method of

	a ES (n=22)		b JHS (n=36)		c HS (n=29)			
	Mdn	*M* ± *SD*	Mdn	*M* ± *SD*	Mdn	*M* ± *SD*	*p*	Bonferroni correction
Health-related QOL								
Total score	**69.3**	**67.1 ± 17.8**	**51.0**	**50.3 ± 16.7**	**45.8**	**48.4 ± 20.2**	**.002**	**a > b • c**
Physical well-being	78.1	73.9 ± 19.6	50.0	54.5 ± 19.2	56.3	53.2 ± 23.0	.002	a > b • c
Emotional well-being	71.9	69.3 ± 26.7	68.8	59.0 ± 24.6	56.3	53.2 ± 29.4	n.s.	
Self-esteem	50.0	54.3 ± 31.4	34.4	36.5 ± 27.7	25.0	31.0 ± 29.0	.022	a > c
Family	75.0	69.6 ± 19.8	65.6	65.1 ± 21.3	68.8	66.2 ± 24.4	n.s.	
Friends	75.0	68.5 ± 24.1	53.1	49.1 ± 27.5	37.5	42.9 ± 25.6	.002	a > b • c
School	71.9	67.3 ± 22.7	34.4	37.5 ± 22.5	43.8	43.8 ± 24.0	<.001	a > b • c
Factors affecting games								
School adaptation	16.5	15.4 ± 3.8	13.5	13.4 ± 4.1	15.0	15.2 ± 3.3	n.s.	
Parental supportive attitude	6.5	5.9 ± 2.2	5.0	5.0 ± 2.1	4.0	4.4 ± 2.3	n.s.	
Parental oppressive attitudes and children's rebellion	12.5	11.5 ± 3.8	10.0	10.4 ± 3.4	10.0	10.0 ± 3.8	n.s.	
Game addiction tendency								
Total score	**39.5**	**39.3 ± 11.5**	**41.0**	**40.3 ± 11.4**	**38.0**	**38.9 ± 13.9**	**n.s.**	
Cognitive bias	13.0	14.2 ± 4.9	16.5	15.4 ± 5.2	14.0	13.9 ± 5.1	n.s.	
Neglect of studies	9.0	8.4 ± 3.1	9.0	9.4 ± 3.3	8.0	8.7 ± 3.8	n.s.	
Concealment	7.5	8.3 ± 3.2	7.5	7.9 ± 3.0	8.0	8.8 ± 3.7	n.s.	
Lack of self-control	9.0	8.4 ± 2.5	8.0	7.5 ± 2.4	8.0	8.0 ± 3.0	n.s.	

Table 2: Comparison of health-related quality of life, factors influencing gaming, and gaming addiction tendencies among schools.
Note: *N*=87, Kruskal-Wallis test, n.s.: not signifficant, Mdn: median, M: average, SD: standard deviation, p: p-value, ES: elementary school, JHS: junior high school, HS: high school.

	Boys (n=54)	%	Girls (n=33)	%	*p*
Play video games at home					
Often	41	(75.9)	17	(51.5)	.018
Sometimes	12	(22.2)	11	(33.3)	
Rarely	1	(1.9)	5	(15.2)	
Video game playing time					
Decide for myself	8	(14.8)	4	(12.1)	.039
The parent/guardian decides	19	(35.2)	4	(12.1)	
I haven't decided	27	(50.0)	25	(75.8)	
Who to play video games with					
Always alone	22	(40.7)	22	(66.7)	.036
Sometimes with family and friends	30	(55.5)	9	(27.3)	
Always with family and friends	2	(3.8)	2	(6.0)	

Table 3: Relationship between gaming environment and gender.
Note: *N* =87, chi-square test, p: p-value.

determining game time, for boys, the most common response was "decided by parents," while for girls, the most common response was "not determined" (χ^2=6.50, p=.039). Additionally, in response to the question about who they play games with, boys more frequently answered "occasionally with family or friends," while girls more often responded "always alone" (χ^2=6.63, p=.036).

The alpha coefficients for the factors we investigated as influences on gaming were school adaptation (α=.78), parental supportive attitude (α=.71), and parental oppressive attitudes and children's rebellion (α=.73). These were determined to have high reliability in this study. The values for the factors influencing gaming for our participants were as follows: school adaptation (14.5±3.6), parental supportive attitude (5.0±2.2), and parental repressive attitude and child's rebellion (10.5±3.6). These factors were compared across the subjects' affiliated schools, but as shown in Table 2, no significant differences were found.

Game addiction tendency

The overall reliability of the game dependency tendency scale,

consisting of four subdomains, showed an α coefficient of α=.89. The α coefficients for each subdomain were cognitive bias (α=.79), neglect of studies (α=.74), concealment (α=.66), and lack of self-control (α=.56). These values were deemed reliable for the purposes of this study.

The total game addiction tendency score for our participants was (mean±standard deviation) 39.6±12.2. The subscale scores were cognitive bias (14.6±5.1), neglect of studies (8.9±3.4), concealment (8.3±3.3), and lack of self-control (7.8±2.6). This was compared by gender and the participants' affiliated schools (Table 2), but no differences were observed in any case. For the total score for game addiction tendency, 10 participants (11.5%) were in the low group, 66 (75.9%) in the medium group, and 11 (12.6%) in the high group. As shown in Table 4, when comparing health-related QOL among these three groups, a difference was observed in the family category (p=.005).

Factors influencing game addiction tendencies

We performed multiple regression analysis (stepwise method) using the total score for game addiction tendency as the dependent variable. As a result, parental oppressive attitudes and children's rebellion (β=.595), weekday gaming time (β=.247), and method of determining gaming time (dummy variable) (β=.182) were positive factors, while the family factor (β=−.217) of the child's health-related QOL was a negative factor (adjusted R2=.611) (Table 5).

Discussion

Characteristics of health-related QOL in the participants

A previous study of health-related QOL conducted with 142 elementary school students [38] reported the following average scores: total score (71.7), physical well-being (79.7), emotional well-being (82.8), self-esteem (52.7), family (71.2), friends (77.4), and school (65.0). Another study involving 2,306 junior high school students [39] reported the following: total score (61.3), physical well-being (65.9), emotional well-being (76.3), self-esteem (35.4), family (66.7), friends (71.0), and school (52.6). Although a simple comparison cannot be made owing to the lack of statistical analysis, for elementary school students, the QOL of our participants was lower in all areas except for self-esteem and school, while for junior high school students, QOL was lower in all areas except for self-esteem.

Previous studies [40] have reported that self-esteem decreases as age increases. Similarly, in our study, elementary school students showed the highest levels while high school students showed the lowest. Compared with elementary school students, junior high and high school students tended to have lower health-related QOL in all areas except for emotional well-being and family. This is thought to be influenced by background factors and the illnesses of children visiting child and adolescent psychiatric clinics [27]. This suggests that it is necessary to implement treatment and care that account for the fact that middle and high school students receiving psychiatric care for childhood tend to have a low health-related QOL.

Game addiction tendency

The number of respondents who owned dedicated gaming consoles or smartphones for playing games was higher than in the survey conducted by the Kagawa Prefectural Education Center [10]. In our study, about 70% of respondents indicated that they frequently played games. Additionally, about 60% reported not having set times for playing games, and 20–30% played games for five hours per day or more on both weekdays and weekends. In the Kagawa Prefectural Education Center study [10], meanwhile, about 30% of respondents played games at home, and about 40% did not set a specific time for gaming.

	Low (n=10)		Middle (n=66)		High (n=11)		
Health-related QOL	*Mdn*	*M* ± *SD*	*Mdn*	*M* ± *SD*	*Mdn*	*M* ± *SD*	*p*
Total score	53.8	54.9 ± 19.8	54.0	55.7 ± 19.6	49.0	42.4 ± 17.4	n.s.
Physical well-being	64.6	64.4 ± 25.7	57.4	58.3 ± 21.6	56.3	58.0 ± 23.9	n.s.
Emotional well-being	70.8	66.9 ± 22.8	62.5	61.0 ± 26.6	50.0	45.5 ± 32.0	n.s.
Self-esteem	29.2	36.3 ± 33.6	35.6	41.1 ± 30.5	31.3	30.1 ± 25.6	n.s.
Family	70.8	70.6 ± 22.6	72.3	69.6 ± 19.7	47.5	44.9 ± 22.7	.005
Friends	41.7	43.1 ± 30.1	56.3	54.9 ± 27.2	46.9	42.0 ± 26.5	n.s.
School	45.8	48.1 ± 24.5	47.6	49.1 ± 26.7	33.3	34.1 ± 18.4	n.s.

Table 4: Comparison of health-related QOL based on game addiction.
Note: *N*=87, Kruskal-Wallis test, n.s.: not significant, Mdn: median, M: average, SD: standard deviation, p: p-value

Selected items	*B*	*β*	*p*	*tolerance*	*VIF*
Constant	13.19		.016		
Parental oppressive attitudes and children's rebellion	2.01	.595	<.001	.81	1.2
Weekday gaming time	1.80	.247	<.001	.88	1.1
QOL "family"	-0.12	-.218	.003	.89	1.1
Determining video game time	3.05	.182	.011	.93	1.1
R^2=.629, adjusted R^2=.611					

Table 5: Multiple regression analysis with total game addiction tendency score as the dependent variable.
Note: *N*=87. Multiple regression with stepwise method, B: unstandardized coefficient, *β*: standardized coefficient, R^2: coefficient of determination, VIF: variance inflation factor.

Regarding gaming duration, over 50% of our respondents reported playing for about 30 minutes per day on weekdays, while on holidays, about 30% played for about an hour per day, which was the most common response. Furthermore, more than 50% of respondents reported playing games alone. However, in the Kagawa Prefectural Education Center study [10], the largest number of respondents indicated that they occasionally played with friends or family.

Categorized by scores, about 10% of our participants were in the low group for game addiction tendencies, 80% were in the medium group, and over 10% were in the high group. Meanwhile, in the Kagawa Prefectural Education Center study [10], about 30% were in the low group, 70% in the medium group, and 2.3% in the high group (i.e., less than 10%). Thus, our participants seemed to have a higher tendency toward game addiction than those in the Kagawa Prefectural Education Center study [10].

Video game usage patterns and game addiction tendencies in our participants were considered to be related to their interpersonal relationship characteristics. Many children and adolescents who visit psychiatric clinics struggle with interpersonal relationships, have few friends, and often experience school refusal. Therefore, they may be more likely to escape real society and become immersed in games. This tendency could also be related to the high number of children with primary diagnoses of ASD or ADHD, as these children often have limited social interactions and easily focus on a single activity [3-8,41].

Our multiple regression analysis showed that the factors associated with game addiction tendency were parental oppressive attitudes and children's rebellion, weekday gaming time, and the method of determining gaming time, which strengthened game addiction. A correlation was found between weekday gaming time and gaming addiction tendencies.

The results revealed that weekday gaming time could be a useful indicator when assessing gaming addiction tendencies in children who visit child and adolescent psychiatric clinics. Meanwhile, the family aspect of children's health-related QOL was a factor that reduced game addiction. According to Paulus et al. [25], the integrated IGD model includes internal factors such as executive function impairment, self-regulation, self-control, decision-making, decreased mood regulation ability, low self-esteem, depression, and obsessive-compulsive disorder; social factors such as positive and negative experiences, balance, and satisfaction; and external factors such as the strength of game-related rewards and parental influence. Regarding the method of determining game time, our findings suggest that individuals who do not set a specific time for gaming are more likely to develop game addiction tendencies. This is thought to be related to a decline in self-regulation, self-control, and decision-making, as noted in Paulus et al. [25]. Moreover, parental oppressive attitudes and children's rebellion and the family aspect of health-related QOL in our study correspond to parental influence as an external factor in Paulus et al. [25]. Sugaya et al. [15] also noted that the family environment significantly affects IGD in children and adolescents. Therefore, we can presume that among those who visit child and adolescent psychiatric clinics, many individuals fit the factors for IGD.

Although our participants might not have been diagnosed with IGD, we can speculate that a decline in self-regulation, self-control, decision-making, and family environment might be related to their high tendency toward game addiction. A tendency toward game addiction can also be influenced by insufficient self-control and attempts to escape or avoid negative emotions [36]. From our findings, we can conclude that to mitigate the tendency toward game addiction, it is important to not only support self-control and decision-making but also assist in building stable relationships within the family. Moreover, while game addiction tendencies are associated with mental and social problems, simply restricting games is not a viable solution for children living in the internet and digital age [42]. Instead, we need to focus on the proper use of the internet and video games. Therefore, in child and adolescent psychiatry nursing, interventions are needed to not only impose restrictions but also enable appropriate use [43].

Based on the overall results of this study, we examined the tendency toward game addiction. Among our participants, those with a high tendency for game addiction showed lower family QOL, suggesting a lack of belonging within family settings [44]. For such children, encouraging appropriate use of games is crucial [44], as emphasizing the dangers of game use [6, 11, 13, 15, 22] and suppressing it may lead to an even greater dependence. Furthermore, building connections and finding a place in the real world, rather than in online virtual spaces such as games and the internet, could help prevent gaming addiction tendencies.

Limitations

Since this study's subjects were recruited from only one facility, and there were biases in gender ratio, affiliated schools, and diagnoses, the findings have limited generalizability. Therefore, the results should be interpreted with caution. Furthermore, it is necessary to clarify characteristics based on diagnostic names. In the future, we aim to increase the number of target facilities and subjects, explore research by disease type, and further investigate intervention methods based on these findings.

Competing Interests

The authors declare that they have no competing interests.

Author Contributions

TS contributed to the conception of the study and the overall research process. MT, KO, and TT participated in creating the research plan and were responsible for the investigation and analysis. CM oversaw the study's design, data analysis, and paper writing, as well as the overall research.

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