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Anime watching: is a new kind of addiction? Evaluation of psychopathologies and psychosocial factors associated with problematic anime watching among adolescents

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Abstract

Background In recent years, with the rapid development of technology, research on behavioral addiction concepts such as digital gaming disorders and problematic internet use has increased. As anime-watching has become widespread worldwide, it is thought that this behavior may be one of the areas of problematic technology use, especially in adolescence. However, studies evaluating problematic anime-watching behaviors within the framework of behavioral addictions are quite limited in the literature. In this study, problematic anime-watching behaviors, comorbid psychiatric disorders, and possible psychosocial factors were evaluated in 86 anime watchers aged between 12 and 18 years. Problematic anime-watching behaviors were evaluated according to the diagnostic criteria of other defined disorders related to addictive behaviors in ICD-11. A semi-structured interview tool was used to assess psychiatric comorbidities, and the IGDS9-SF adapted form for anime-watching, the Self-Efficacy Scale for Children, KIDCOPE, and the Social Anxiety Scale for Adolescents were used to collect other data.

Results It was determined that 36.8% of the 86 adolescents in our study had problematic anime-watching behavior. Compared to other adolescents, the problematic anime-watching group had significantly lower self-efficacy scores and significantly higher social anxiety and avoidant coping scores. A significant relationship was found between social anxiety disorder and watching problematic anime.

Conclusions The present study showed that problematic watching of anime may be a variant of behavioral addiction. In conclusion, the relationship between problematic anime-watching behaviors and mental health warrants further examination.

Keywords Problematic anime watching, Psychiatric disorders, Behavioral addiction, Adolescent, Anxiety

Background

In recent years, with the rapid development of technology, media tools, and internet use have become widespread, and research on behavioral addiction concepts such as digital gaming disorders and problematic internet use has increased [1]. Therefore, in ICD-11, problematic behaviors that share primary clinical features with gambling and digital gaming disorders but cannot be

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included in this group are defined as “other defined disorders related to addictive behaviors” [2]. Current research has focused on specific problematic activities, such as online gaming [3], online gambling [4], Instagram addiction [5], YouTube addiction [6], smartphone addiction [7], and online shopping disorder [8]. It emphasizes the importance of addressing problematic or addictive activities separately.

The availability of TV series has increased, leading to a rise in watching new media tools like computers, tablets, and phones, especially among adolescents [9]. In this context, it has been suggested that watching certain series in the media can become problematic, leading to increased studies in this field [10]. Such behaviors may cause social isolation by affecting individual functionality, deterioration in sleep quality, unfulfilled responsibilities, and a decline in academic performance due to time spent watching series alone [11, 12]. Researchers have also examined related behaviors such as short-term online video-watching addiction [13], problematic YouTube use [6, 14], binge-watching online television series [15], and problematic mukbang watching [16]. It has been observed that watching anime, which has become a popular activity worldwide, may become problematic, especially during adolescence. A recent survey study conducted in Japan found that 81% of high school students have been watching anime, and more than half of them used to watch anime at least once a week [17]. In the USA, 72% of the population was reported as regular anime watchers [18]. Anime refers to Japanese culture, and “otaku” refers to individuals who are deeply interested in Japanese culture, including anime. In Japanese, “Otaku” means “fanatic” or “addicted” and describes individuals who devote their lives to their interests and exhibit excessive admiration and addiction-like behaviors [19]. Researchers suggest that watching anime should be evaluated in the field of problematic watching behaviors [20–22]. Therefore, the effects of problematic anime-watching behaviors still need to be better understood.

Low self-esteem, social anxiety, and various psychopathologies, including depression, social anxiety disorder, and substance abuse, significantly contribute to the onset and persistence of problematic internet use behaviors [23]. There is limited research on the relationship between anime-watching behavior and psychopathologies. Psychological symptoms such as depression, suicidal tendencies, anxiety, and aggression are more common in individuals with an anime subcultural identity, and social support mediates the relationship between this identity and psychological symptoms [24]. However, research specifically on problematic anime-watching behavior and psychopathology is lacking. Recent studies indicate prolonged TV watching is associated with social isolation

and higher levels of social anxiety [25]. Social anxiety is also linked to addictive behaviors such as problematic internet use [26], TV series-watching behaviors [27], and YouTube addiction [14]. Self-efficacy, characterized by an individual’s confidence in their ability to perform a task effectively, is associated with problematic watching behaviors [28]. Low self-efficacy has been linked to problematic internet use [29], gaming addiction [30], smartphone addiction [31], and shopping addiction [32]. A study with anime fan communities found that improving self-efficacy is a primary goal [33]. Additionally, coping strategies, which refer to conscious, purposeful responses to stress, may be negatively related to addictive watching behaviors. Anime watching and identification with anime characters are associated with negative coping strategies [34]. Negative coping strategies are also key factors in the development of addictions such as internet addiction and online game addiction [35, 36].

In light of limited research, it is thought that problematic anime-watching behaviors have serious addiction potential. Furthermore, behavioral addictions are thought to be associated with social anxiety, low self-efficacy, negative coping strategies, and various psychopathologies, including social anxiety disorder and depressive disorders. This study aims to consider the relationships between problematic anime-watching behaviors and psychiatric comorbidities, social anxiety, coping mechanisms, and self-efficacy by evaluating these behaviors within the behavioral addiction framework.

Methods

Participants

The study was conducted at Gazi University, which is a university in the capital of Turkey, between April 2022 and November 2022. The sample consisted of adolescents aged 12–18 years who applied to the Gazi University Faculty of Medicine Child and Adolescent Psychiatry outpatient clinic for different reasons and were found to be watching anime during routine psychiatric interviews. Patients with intellectual disability, autism spectrum disorder, substance use disorder, psychosis, and chronic disease requiring medication and follow-up (neurological, metabolic, genetic, endocrine diseases, etc.) were excluded and a total of 86 adolescents were included in the study. A post-hoc power analysis using the G*Power program was conducted, and with a sample size of 86, an effect size of 0.5, and a margin of error of 0.05, the study’s power was determined to be 0.99.

Procedure

This study is a cross-sectional study in which participants’ problematic anime-watching behaviors were evaluated according to the diagnostic criteria of other defined

disorders related to addictive behaviors in ICD-11 during the interview, and subjects who met at least 1 diagnostic criterion were included in the problematic anime-watching group. K-SADS-P-DSM-5 (Kiddie-Schedule for Affective Disorders and Schizophrenia–Present form-DSM-5), which is a semi-structured diagnostic interview, was used to evaluate comorbid psychiatric disorders [37]. The exclusion of adolescents with intellectual disabilities was confirmed through assessments conducted by the clinician during the clinical interview. Besides the sociodemographic form Self-efficacy Scale for Children, the Social Anxiety Scale for Adolescents and KidCOPE, which are self-report for adolescents, were used.

Measurement tools

Assessment of problematic anime watching behaviors

In our study, problematic anime-watching behaviors were evaluated during the interview using the diagnostic criteria of other disorders defined in ICD-11 related to addictive behaviors, and subjects who met at least 1 diagnostic criterion were included in the problematic anime-watching group. In addition, the Internet Gaming Disorder Scale-Short Form (IGDS9-SF) developed by Pontes and Griffiths (2015) based on DSM-5 “Internet Gaming Disorder” criteria was adapted [38]. The word group “playing games” in the scale was changed to “watching anime”. The Likert-type scale contains a total of 9 items (Pontes and Griffiths, 2015). Based on a five-point Likert scale, where responses are scored as follows: “never” (1 point), “rarely” (2 points), “sometimes” (3 points), “frequently” (4 points), and “very often” (5 points), the total score ranges from 9 to 45. In a recent study, 32 points were shown to be the most appropriate cut-off point [39]. The Turkish adaptation of the IGDS9-SF has been confirmed as a valid and dependable measurement tool [40].

Self-efficacy scale for children

The scale developed by Muris (2001), which assesses children’s social, academic, and emotional self-efficacy, consists of a total of 21 items [41]. The items of the scale are scored on a five-point Likert-type scale as “none” 1 point, “somewhat” 2 points, “good” 3 points, “fairly good” 4 points and “very good” 5 points. Higher scores indicate that the participant feels more competent in the related self-efficacy domain. In a study conducted by Telef and Karaca (2012), it was found to be valid and reliable in Turkish children and adolescents [42].

KidCOPE

The scale consists of 11 items measuring ten coping strategies [43]. The items are scored as “never” 0 points, “sometimes” 1 point, “most of the time” 2 points and “always” 3 points on a four-point Likert-type scale. From

the scale, three different scores are obtained active coping (cognitive restructuring, problem-solving, emotion regulation, and social support), avoidant coping (distraction withdrawal, social withdrawal, withdrawal, and wishful thinking), and negative coping (self-criticism and blaming others). Higher scores reflect that the relevant coping strategy is used more. In a study conducted by Bedel et al. (2014), the scale was adapted into Turkish and found to be valid and reliable [44].

Social anxiety scale for adolescents

The scale developed by Nolan and Walters (2000) consists of 22 items [45]. The scale consists of 18 items and has three subscales Fear of Negative Evaluation, Social Avoidance and Restlessness in General Situations, and Social Avoidance and Unease in New Situations. The scale is structured as a five-point Likert-type scale, where responses range from “never” (1 point) to “always” (5 points). Total scores can range from 18 to 90. Turkish adaptation and validity studies have been conducted and it has been shown to be a reliable instrument [46].

Statistical analysis

Data were analyzed by using IBM SPSS Statistics 22.0. Descriptive findings for categorical data are presented as number (n) and percent (%), while descriptive findings for numerical data are presented as mean \pm standard deviation (SD), median and minimum–maximum values. The Chi-square test was used to investigate the relationships between categorical variables. The normality of the distribution was evaluated using the Kolmogorov–Smirnov test and the Shapiro–Wilk test. Skewness, kurtosis values, and histograms were examined for numerical data. Two groups were compared using independent samples: the t -test if variables were normally distributed and the Mann–Whitney U test if variables were not normally distributed. Binary logistic regression was used to determine the significant predictors of the dependent variable. Statistical significance was accepted as p values lesser than 0.05 in this study.

Results

Descriptive findings

It was found that 38.4% ($n=33$) of the cases showed at least one addictive behavior disorder criteria according to ICD-11, and those cases were defined as problematic anime-watching groups. It was determined that 33.3% ($n=11$) of the cases had a loss of control over watching anime, 33.3% ($n=11$) had a loss of interest in other pursuits and activities, 72.7% ($n=24$) continued despite negative consequences, and 15.2% ($n=5$) had significant impairment in critical areas of functioning.

There was no significant difference in age, gender, and socioeconomic status between the problematic anime-watching group and other adolescents ($p=0.49$, $p>0.05$, $p>0.05$) (Table 1).

Anime watching habits

The mean IGDS9-SF scores of the problematic anime-watching group (27.36 ± 6.34) were significantly higher than other adolescents (16.32 ± 4.28) ($Z = -7.01$, $p < 0.001$). There was a significant association between problematic anime watching and having ≥ 32 points on the IGDS9-SF ($p = 0.001$). A significant relationship was found between problematic anime watching and watching anime almost every day (6–7 days/week) ($\chi^2 = 11.27$, $p = 0.001$) and watching anime more than 4 h a day ($\chi^2 = 10.77$, $p = 0.001$). A significant relationship was also found between problematic anime-watching and starting to watch anime before high school ($\chi^2 = 4.81$, $p = 0.03$).

Adolescents who were problematic anime watchers were significantly more likely to be members of anime communities ($\chi^2 = 6.47$, $p = 0.01$). A significant relationship was found between problematic anime-watching and beliefs of “thinking that watching anime can lead to addiction” and “thinking that he/she is addicted to anime.” ($\chi^2 = 7.06$, $p = 0.008$; $\chi^2 = 21.44$, $p < 0.001$, respectively) (Table 2).

Individual factors

The diagnostic criteria for at least one psychiatric disorder were met in 79.1% of the cases ($n = 68$). Although there was no significant difference between the two groups in terms of the rate of accompanying psychopathologies ($\chi^2 = 0.244$, $p = 0.62$), there was a significant relationship between problematic anime-watching and

being diagnosed with a social anxiety disorder ($\chi^2 = 4.26$, $p = 0.04$).

It was determined that 40.7% ($n = 35$) had social anxiety disorder, 32.6% ($n = 28$) had depressive disorder, 29.1% ($n = 25$) had ADHD, 7% ($n = 6$) had OCD, and 5.9% ($n = 5$) had GAD.

Academic, emotional, and total self-efficacy scores in the problematic anime-watching group were significantly lower than the non-problematic anime-watchers group ($Z = -3.16$, $p = 0.002$; $Z = -2.68$, $p = 0.007$; $Z = -2.80$, $p = 0.005$); avoidant coping and total social anxiety scores were significantly higher than those of other adolescents ($t = -2.11$, $p = 0.04$, $Z = -2.73$, $p = 0.006$) (Table 3).

Discussion

In this study, problematic anime-watching behaviors, comorbid psychiatric disorders, and associated psychosocial variables including social anxiety, self-efficacy, and coping strategies were examined in adolescents who applied to child and adolescent psychiatry outpatient clinic.

It was thought that problematic anime-watching could be evaluated within the framework of behavioral addiction, but since there was no tool in the literature to evaluate this behavior. In a recent study examining the relationship between problematic online anime-watching behaviors and emotion regulation strategies, problematic online anime-watching behaviors were identified based on participants' self-reports of loss of control of online anime-watching [22]. In our study, problematic anime-watching behaviors were evaluated both with IGDS9-SF scale adapted form and clinically with ICD-11 diagnostic criteria including loss of control on anime-watching, loss of interest in other pursuits and activities, keeping watching anime despite negative outcomes and significant

Table 1 Descriptive data of the adolescents with and without problematic anime-watching behavior

	Problematic anime watchers ($n = 33$)	Non-problematic anime watchers ($n = 53$)	$t, z, \text{ or } \chi^2$	p
Age, years ^a	14.26 \pm 1.51	14.50 \pm 1.61	$t = .70$	.49
Gender, n (%)				
Girl	26 (78.8)	41 (77.4)	$\chi^2 = .024$	.88
Boy	7 (21.2)	12 (22.6)		
Education, n (%)				
High school	21 (63.6)	30 (56.6)	$\chi^2 = .42$	.52
Middle school	12 (36.4)	23 (43.4)		
Mother education score ^a	4.12 (1.93)	4.33 (1.98)	$Z = -.57$	.56
Father education score ^a	4.12 (1.76)	4.52 (1.62)	$Z = -1.08$	.28
Social position index of the family	37.63 (12.16)	39.24 (12.35)	$Z = -.77$	.44

^a Mean \pm SD

Table 2 Comparison of anime watching habits

	Problematic anime watchers (<i>n</i> = 33)	Non-problematic anime watchers (<i>n</i> = 53)	<i>t</i> , <i>z</i> , or χ^2	<i>p</i>
IGDS9-SF			<i>Z</i> = 7.01	
-Total score ^a	27.36 ± 6.34	16.32 ± 4.28		< .001^a
-32 score and above, <i>n</i> (%)	7 (21.2)	0 (0.0)		.001^b
Anime watching duration, <i>n</i> (%)				
-Watching anime almost every day	16 (48.5)	8 (15.1)	χ^2 = .11.27	.001
-Watching anime 4 h or more per day	19 (57.6)	12 (22.6)	χ^2 = .10.77	.001
Beginning period of watching anime, <i>n</i> (%)				
-Pre-high school period	31 (93.9)	40 (75.5)	χ^2 = 4.81	.03
Tools for watching anime, <i>n</i> (%)				
-Television	12 (36.4)	20 (37.7)	χ^2 = .016	.90
-Computer	29 (87.9)	41 (77.4)	χ^2 = .1.48	.22
-Mobile devices	29 (87.9)	42 (70.2)	χ^2 = .1.053	.30
Become a member of anime communities, <i>n</i> (%)	13 (40.6)	8 (15.7)	χ^2 = .6.47	.01
Identification with an anime character, <i>n</i> (%)	25 (75.8)	45 (84.9)	χ^2 = .1.12	.28
Adolescent's thoughts on the effects of watching anime, <i>n</i> (%)				
-Thinking it can lead to addiction	24 (72.7)	23 (43.4)	χ^2 = .7.06	.008
-Thinking of oneself as an addict	21 (63.6)	8 (15.1)	χ^2 = .21.44	< .001

P values in bold indicate statistically significant results

^a Mean ± SD

^b Fisher's exact test

impairment in important areas of functioning. No study in the literature examines the frequency of anime-watching and problematic anime-watching behaviors in clinical samples; it was determined that adolescents with problematic anime-watching behaviors constituted 38.4% of the sample in our study and IGDS9-SF adapted form total score and ≥ 32 points were found to be significantly associated with problematic anime-watching.

Previous studies have shown a linear relationship between problematic watching behaviors and watching time [10, 12, 47]. Similarly, in our study, watching anime almost every day and watching more than 4 h per day were associated with problematic anime-watching. In a study conducted with adult anime fans, the age of onset of watching anime was determined to be 14 years, and it was reported that anime fans started to be interested in this field at an earlier age than other fan groups [48]. In addition, it has also been suggested that problematic internet use may be associated with the onset of internet use at an earlier age due to the decrease in the age of technology use [49]. This finding is supported by the significant relationship between starting to watch anime in the pre-high school period and problematic anime-watching in our study.

It is known that anime-watchers are more prone to various anime-related activities, but no research has been found to evaluate the activities associated with

problematic anime-watching behaviors [50]. Problematic anime-watching was associated with being a member of anime communities in our study. In this context, being a member of anime communities may be an essential indicator in identifying problematic anime-watching behaviors. In our study, the high rates of identifying with the anime character and doing anime-related activities in both groups support the studies reporting that anime deals with real-life issues, enabling viewers to connect and identify with the anime character [51]. In addition, our research data support the findings that anime improves creativity in adolescents and increases interest in various art activities [19].

In this study, it was found that there was a significant relationship between problematic anime-watching and adolescents' beliefs about anime, which can lead to addiction and being addicted to anime. This result suggests that adolescents have an insight into being addicted to anime, and this finding should be considered during psychiatric evaluation.

No study in the literature examines psychiatric comorbidities in adolescent anime-watchers in a clinical sample. In a study investigating internet addiction, which is a common behavioral addiction, the rate of psychiatric comorbidity was reported as 88.3% [52]. It has been reported that the most common comorbid psychiatric disorders associated with problematic internet use in

Table 3 Comparison of the individual factors

	Problematic anime watchers (n = 33)	Non-problematic anime watchers (n = 53)	t, z, or χ^2	p
Psychopathology, n (%)				
Yes	27 (81.8)	41 (77.4)	$\chi^2 = .244$	.62
No	6 (18.2)	12 (22.6)		
-Depressive disorder	11 (33.3)	17 (32)	$\chi^2 = .015$	.90
-GAD	2 (6.1)	3 (5.8)		1 ^b
-Social phobia	18 (54.5)	17 (32.1)	$\chi^2 = 4.26$	.04
-OCD	2 (6.1)	4 (7.5)		1 ^b
-ADHD	9 (27.3)	16 (30.2)	$\chi^2 = .84$	.78
-ODD	0 (0.0)	1 (1.9)		1 ^b
-Tic disorder	2 (6.1)	1 (1.9)		.56 ^b
-Nicotine use disorder	2 (6.1)	1 (1.9)		.56 ^b
Self-efficacy questionnaire for children^a				
-Academic self-efficacy	14.84 ± 5.08	18.45 ± 5.24	Z = -3.16	.002
-Social self-efficacy	19.12 ± 6.50	20.77 ± 6.76	Z = -.96	.34
-Emotional self-efficacy	15.51 ± 4.85	19.20 ± 6.83	Z = -2.68	.007
-Total self-efficacy score	49.48 ± 11.34	58.43 ± 14.41	Z = -2.80	.005
Kidcope ^a				
-Active coping	5.42 ± 2.96	5.50 ± 2.26	Z = -.27	.78
-Negative coping	4.21 ± 2.40	3.41 ± 1.69	Z = -1.14	.25
-Avoidant coping	8.42 ± 2.49	7.34 ± 2.20	t = -2.11	.04
Social anxiety scale for adolescents ^a				
-Total social anxiety score	79.21 ± 15.82	67.83 ± 18.93	Z = -2.73	.006

P values in bold indicate statistically significant results

^a Mean ± SD

^b Fisher's exact test, GAD generalized anxiety disorder, OCD obsessive compulsive disorder, ADHD attention-deficit/hyperactivity disorder, ODD oppositional defiant disorder

children and adolescents are ADHD, depressive disorder, social anxiety disorder, and ODD. At the same time, binge-watching behaviors are frequently accompanied by anxiety and depression symptoms [10, 27]. In a study evaluating psychiatric comorbidities in anime watchers in a community sample based on self-report, significantly lower levels of mood disorders and anxiety disorders were found in anime watchers compared to the general population [50]. Another study comparing anime fans with fans of other subcultures found that this group had higher rates of anxiety and depression symptoms [24]. In our study, it was found that social anxiety disorder, ADHD, and depressive disorder most frequently accompanied problematic anime-watching. In addition, a significant relationship was found between problematic anime-watching and social anxiety disorder. Besides studies showing low self-efficacy in individuals with problematic internet use, there are also studies showing an inverse relationship between smartphone addiction and shopping addiction and self-efficacy [29, 31, 32]. In a study on adolescents with gaming addiction, it was shown that social self-efficacy in real-life situations was

negatively correlated with the severity of gaming addiction. In contrast, social self-efficacy in virtual environments showed a positive relationship [30].

The significantly lower academic, emotional, and total self-efficacy scores in the problematic anime-watching group identified in our study are consistent with the literature. As a result, it is thought that problems related to self-efficacy may be a potential risk factor for problematic anime-watching attitudes, such as behavioral addictions.

It is known that there is a bidirectional relationship between negative coping strategies and the development of addictive behaviors [36]. In a study conducted with individuals with gaming addiction, it was found that the use of avoidant coping strategies was associated with gaming addiction. Avoidant coping style is known to be a predisposing factor for addiction [53]. Several recent studies have shown that problematic watching behaviors may be related to escape motivation and avoidant coping strategies [54]. In another study examining the effect of anime-watching on young people, anime-watching and identification with anime characters were associated with avoidant coping strategies [34]. The findings in our

study showed a positive correlation between problematic anime-watching and coping strategies. Evaluating coping strategies seems important to predict problematic addictive behaviors, including anime-watching.

As previously mentioned, “Otaku” is a term that refers to individuals who are introverted and have difficulty in social communication. Anime watchers adopt otaku philosophy, and they have significantly higher social anxiety [55]. Our finding of higher levels of social anxiety in problematic anime-watchers group supports this finding. It is known that individuals with high anxiety levels tend to watch television more often than the general population to relax and pass the time [56]. Another study also showed that individuals with problematic watching behaviors had higher social anxiety scores [27]. In a study examining the relationships between YouTube addiction, social anxiety, and parasocial relationships with YouTubers, it was found that there was a significant relationship between YouTube addiction, parasocial relationships, and social anxiety [14]. When our findings are evaluated together with the results in the literature, it is thought that individuals with social anxiety may be more prone to problematic anime-watching behaviors. Therefore, problematic anime-watching habits may be one of the clinical presentations of social anxiety disorders, so adolescents suffering from problematic anime-watching habits should be evaluated for anxiety symptoms.

This study is the first study to consider anime-watching behavior as an addictive behavior. Our research results showed that watching anime may be a variant of behavioral addiction. It is thought that using the ICD-11 diagnostic criteria for disorders related to addictive behaviors and a scale to assess problematic anime-watching and the compatibility of the findings with each other strengthen our results, it is necessary to develop tools specific to the assessment of problematic anime-watching behavior. In addition, the fact that psychiatric comorbidities were evaluated with a semi-structured interview tool supports the strength of our study. The limitation of our study is the relatively small number of participants due to a specific period. In addition, the scales used in this study are self-report questionnaires that may include bias. The findings of our study should be replicated in larger clinical samples. Cross-cultural studies with larger samples including healthy control groups will provide more valuable findings in the future. Our findings may guide clinicians in conceptualizing and clinically evaluating problematic anime-watching.

Conclusions

This study has shown that problematic anime-watching may be a variant of behavioral addiction. Moreover, problematic anime-watching behaviors may be related to

psychological factors such as social anxiety symptoms, avoidant coping strategies, and low self-efficacy. In conclusion, the relationship between problematic anime-watching behaviors and mental health warrants further investigation.

Abbreviations

K-SADS-P-DSM-5	Kiddie-Schedule for Affective Disorders and Schizophrenia – Present form-DSM-5
IGDS9-SF	Internet Gaming Disorder Scale-Short Form
GAD	Generalized anxiety disorders
OCD	Obsessive compulsive disorders
ADHD	Attention-deficit/hyperactivity disorders
ODD	Oppositional defiant disorder

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Authors' contributions

YHY and YI contributed to the study conception and design. YHY collected and analyzed the data. YHY and YI interpreted the data and wrote the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This research is approved by the Gazi University Ethics Commission on 08.03.2022 (approval number 05).

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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