



RELATIONSHIP OF PROBLEMATIC INTERNET USE WITH EMOTION REGULATION IN ATTENTION DEFICIT HYPERACTIVITY DISORDER

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Abstract

Objective: This study aimed to examine the relationship between problematic internet use and emotion regulation in adolescents diagnosed with attention deficit hyperactivity disorder (ADHD).

Methods: Adolescents diagnosed with ADHD were given the Young Internet Addiction Scale (YIAS). They were divided into two groups problematic internet use (PIU) above 50 points (n=41) and normal internet use (NIU) below 50 points (n=41). The groups were compared by giving the AtillaTurgay DSM-IV Based for Child and Adolescent Destructive Behaviour Disorders Rating Scale (ATS) to the parents and the Difficulties in Emotion Regulation Scale (DERS) to the adolescents.

Results: The sample consisted of 25 (30.5%) girls and 57 (69.5%) boys, with a mean age of 14±1.8 years. Major depressive disorder ($p=0.012$), conduct disorder ($p=0.034$), and elimination disorder ($p=0.040$) were significantly higher in the PIU group compared to the NIU group. The mean scores of the YIAS, Oppositional Defiant Disorder (ODD) subscale of ATS, and the goals subscale of DERS were higher in the PIU group ($p<0.05$). There was a significant positive correlation between YIAS and DERS ($p=0.030$).

Conclusion: The attendance of ADHD with problematic internet use increases emotion regulation difficulties and morbidity. There is a need for studies with a larger sample size and including healthy controls.

Keywords: Attention deficit hyperactivity disorder, problematic internet use, emotion regulation, internet addiction.

Introduction

It has been revealed that more than half of the cases diagnosed with attention deficit hyperactivity disorder (ADHD) are accompanied by at least one psychiatric disorder.¹ Behavioral addictions (such as online gaming, shopping, gambling, and pornography) are the most common of these psychiatric disorders. ADHD has been reported to be highly associated with problematic internet use compared to other psychopathologies.² In adolescents with ADHD, depression, stigmatization, introversion, anxiety, low physical activity, dissatisfaction in family and friend relationships, decreased behavioral inhibition, reward addiction, constant search for entertainment, and low socioeconomic status increase internet use.³ It is known that individuals with ADHD have problems regulating emotions, and this situation significantly affects functionality.⁴ Emotional dysregulation in ADHD includes difficulties regulating aroused emotions, emotional impulsivity, and stimulating positive affective states.⁵

Although "internet addiction" is not yet included as a diagnosis in today's classification systems, this concept is becoming outdated. Instead of internet addiction, "compulsive internet use," "pathological internet use," "excessive internet use," and most frequently, "problematic internet use (PIU)" is preferred in the literature. PIU can be defined as losing control over one's internet use and affecting one's functionality in other areas of life due to internet use.⁶ It has been shown that individuals with problematic internet use are more likely to report problems with emotion regulation.⁷ Emotional dysregulation may be a predictive factor on the path to internet addiction. The Internet may serve as an emotion-regulating function for individuals with emotional dysregulation, helping to distract from negative emotions or regulate feelings of loneliness. Studies supporting this hypothesis have shown that internet use is a means of distancing from reality, stress, and negative emotions and that individuals with emotional dysregulation use the Internet to regulate these negative emotions.^{8,9} Emotional regulation problems are known in other psychopathologies (such as alcohol substance abuse, anxiety disorder, major depressive disorder, sleep disorders, and alexithymia) accompanying internet addiction.¹⁰

According to these findings, we suggest that problematic internet use increases morbidity in adolescents with ADHD, a group at risk for emotional dysregulation. Identification of emotional regulation problems in problematic internet use accompanying ADHD may be protective against the development of other psychiatric conditions and may improve prognosis. For this purpose, this study aimed to examine the relationship between problematic internet use and emotional regulation in adolescents with ADHD.

Methods

Sample

This study is a prospective and cross-sectional study. The study sample consisted of 82 patients aged 12-18 with ADHD admitted or followed up in the Department of Child and Adolescent Psychiatry, Dicle University Faculty of Medicine, between June 2020 and December 2020.

Procedure

Approval for this study was obtained from the Dicle University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee with the decision dated

07/05/2020 and numbered 165. After the approval of the ethics committee, patients aged 12-18 years with ADHD were diagnosed according to DSM-5 (Diagnostic and Statistical Manual of Mental disorders) diagnostic criteria, and their families were informed about the study. Written informed consent (in line with the Declaration of Helsinki) was obtained from the patients and their first-degree relatives or legal custodians before participation in the study. After a structured psychiatric interview, subjects who agreed to participate in the study were given the Young Internet Addiction Scale (YIAS) and Difficulties in Emotion Regulation Scale (DERS) to determine the accompanying psychiatric diagnoses. Atilla Turgay DSM-IV Based for Child

and Adolescent Destructive Behaviour Disorders Rating Scale (ATS) was given to the parents. Those with diagnoses such as mental retardation, autism spectrum disorder (ASD), early onset schizophrenia, and bipolar disorder that would prevent participation in the study were excluded. According to the YIAS scale, subjects who scored 50 and above were included in the "problematic internet use (PIU)" group, and subjects who scored 49 and below were included in the "normal internet use (NIU)" group. Among the 60 cases included in the PIU group, 3 cases with mental retardation, one case with suspected psychosis, one case with bipolar disorder, 2 cases with ASD, and 12 cases (5 cases-7 parents) were excluded from the study due to incomplete completion of the forms. Of the 60 cases in the NIU group, 4 with mental retardation, 2 with schizophrenia, one with bipolar disorder, 3 with ASD, and 9 (5 cases-4 parents) were excluded from the study due to incomplete completion of the forms. Power analysis was performed with the G*Power software package while the study was in progress. It was found that a sample size of at least 40 participants per group was sufficient to obtain an alpha error rate of 0.05, a Cohen effect size of 0.30, and a statistical power of at least 80%. Therefore, the study was completed with a total of 82 patients with 41 PIU and 41 NIU.

Assessment Instruments

Sociodemographic Data Form

The sociodemographic data form was prepared by the researchers and questioned age, gender, academic achievement, age at diagnosis of ADHD, medication use, age of parents, parental illness, education level, family income level, duration of internet use, and habits.

Young Internet Addiction Scale (YIAS)

It is a 20-question scale adapted from the pathological gambling criteria of DSM-IV by Young.¹¹ Turkish validity and reliability study was conducted in 2008.¹² In this Likert-type scale, the options are "rarely," "sometimes," "frequently," "most of the time," and "always" and are scored as 1, 2, 3, 4, and 5 respectively. Scoring 80 and above on the scale indicates a serious impairment in functionality, and people with this score are characterized as "internet addicts." Those who score between 50-79 points on the scale are defined as a "borderline symptomatic group" experiencing internet-related problems. On the other hand, those who score 49 or below on the scale are described as "normal internet users" who do not experience any problems related to internet use in their daily lives.

Difficulties in Emotion Regulation Scale (DERS)

The difficulties in the emotion regulation scale were developed by Gratz and Roemer in 2004. The scale

comprises 36 items, including five-point Likert-type questions and six sub-dimensions. The sub-dimensions in the difficulties in emotion regulation scale can be listed as; not accepting emotional reactions (non-acceptance), difficulties in showing goal-oriented behaviors (goals), impulse control difficulties (impulse), lack of emotional awareness (awareness), limited access to emotion regulation strategies (strategy), lack of emotional clarity (clarity). Items 11, 12, 21, 23, 25, and 29 in the scale are non-acceptance of emotional reactions (non-acceptance); items 13, 18, 20, 26, and 33 are difficulties in demonstrating goal-directed behaviors (goals); items 3, 14, 19, 24, 27 and 32 are control difficulties (impulse); 2, 6, 8, 17 and 34. items indicate a lack of emotional awareness (awareness); items 16, 22, 30, 35 and 36 indicate limited access to emotion regulation strategies (strategy); and items 1, 4, 5, 7, and 9 indicate a lack of emotional salience (salience). In addition to providing information about the sub-dimensions, the scale also assesses the main difficulty in emotion regulation.¹³ The Turkish validity and reliability study of the scale was conducted by Rugancı and Gençöz in 2010.¹⁴

Atila Turgay DSM-IV Based Child and Adolescent Destructive Behaviour Disorders Rating Scale (ATS)

It is a scale prepared by Turgay for evaluating behavioral disorders in children and adolescents by considering DSM-IV diagnostic criteria.¹⁵ With this scale, attention deficit hyperactivity disorder, oppositional defiant disorder, and conduct disorder are screened and evaluated. The scale consists of 41 questions: 9 about attention deficit, nine about hyperactivity and impulsivity, eight about oppositional defiant disorder, and 15 about conduct disorder.¹⁶

Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS)

It was developed by Kaufman et al. in 1997 from DSM-III-R and DSM-IV diagnostic criteria and is a semi-structured form that includes interviews with parents and children/adolescents to detect both past and present mental disorders. The K-SADS was revised in November 2016 by Kaufman and colleagues following DSM-5 diagnoses.¹⁷ The Turkish validity and reliability study of the revised version of the interview was conducted by Unal et al. in 2019.¹⁸

Statistical Analysis

The data obtained from the study were recorded in the SPSS 22.0 package program. The conformity of the data to normal distribution was evaluated by the Shapiro-Wilk normality test. Numerical results were expressed as mean and standard deviation and categorical as number (n) and percentage (%). The "Independent Sample T-test" was used to compare numerical data, and "Chi-square test" was used to compare categorical data. The correlation of the scale scores with each other was analyzed by "The Pearson correlation test."

Results

The sample consisted of 25 (30.5%) girls and 57 (69.5%) boys, with a mean age of 14±1.8 years. Age and gender

distributions of the groups were similar ($p=0.902$, $p=0.810$). Paternal education level was lower in the PIU group ($p=0.034$). The sociodemographic data of the sample and the groups are given in detail in Table 1.

Table 1. Comparison of sociodemographic data of the groups

		PIU	NIU	Total	P
		n(%) / Mean ± SD	n(%) / Mean ± SD	n(%) / Mean ± SD	
Age (years)		14±1.8	14.1± 1.7	14±1.8	0.902 *
Gender	Female	13 (31.7)	12 (29.3)	25 (30.5)	0.810**
	Male	28 (68.7)	29 (70.7)	57 (69.5)	
School success	Above average	16 (63.4)	25 (61)	51 (62.2)	0.418 **
	Average	9 (22.0)	13 (31.7)	22 (26.8)	
ADHD treatment	Low	6 (14.6)	3 (7.3)	9 (11)	0.375 **
	Yes	27 (65.9)	25 (60)	52 (63.4)	
Family	No	14 (34.1)	15 (40)	30 (39.6)	0.372 **
	Mom and Dad together	34 (82.9)	37 (90.2)	71 (86.6)	
SES	Separated parents	5 (12.2)	4 (9.8)	9 (10)	0.252 **
	Loss of a parent	2 (4.9)	0 (0)	2 (2.4)	
Psychological disorder in the mother	Very low	11 (26.8)	13 (31.7)	34 (29.3)	0.123 **
	Low	15 (36.6)	7 (17.1)	22 (26.8)	
Psychological disorder in the father	Middle	11 (26.8)	15 (36.6)	26 (31.7)	0.149 **
	High	4 (9.8)	6 (14.6)	10 (12.2)	
Psychological disorder in the mother	Yes	13 (31.7)	7 (17.1)	20 (24.4)	0.123 **
	No	28 (68.3)	34 (82.9)	62 (75.6)	
Psychological disorder in the father	Yes	4 (10.3)	1 (2.4)	5 (6.3)	0.149 **
	No	35 (89.7)	40 (97.6)	75 (93.7)	

SES: Socioeconomic Status, n: Number, %: Percentage, SD: Standart Deviation, *Independent sample T-test, **Chi-square Test, $p<0.05$

The duration of internet use ($p=0.001$), use of the Internet for watching movies/series/anime ($p=0.008$), and videos ($p=0.034$) were higher in the PIU group compared to the NIU group. The internet usage characteristics of the groups are given in Table 2.

In terms of comorbid psychopathologies, conduct disorder (CD), major depressive disorder (MDD), and enuresis/encopresis (EU/EP) were found to be significantly higher in the PIU group compared to the NIU group ($p=0.034$, $p=0.012$, $p=0.040$). A comparison of the groups in terms of diagnoses is given in detail in Table 3.

The mean YIAS score of the PIU group ($n=41$) was 61.7±12, while the mean YIAS score of the NIU group was 31.4±10.4 ($p=0.001$). The ATS/ODD subscale score of the PIU group was higher ($p=0.049$). Only the goals subscale score of the DERS scale was significantly higher in the PIU group ($p=0.048$). The comparison of the groups in terms of scale scores is given in Table 4.

Table 2. Internet usage characteristics of the groups

		PIU	NIU	Total	<i>p</i>
		n(%) / Mean ± SD	n(%) / Mean ± SD	n(%) / Mean ± SD	
Internet access at home	Yes	38 (92.7)	34 (82.9)	72(87.8)	0.177**
	No	3 (7.3)	7 (17.1)	10(12.2)	
Presence of computer at home	Yes	14 (34.1)	17 (41.5)	31(37.8)	0.494 **
	No	27 (65.9)	24 (58.5)	51(62.2)	
Limitation of internet usage time at home	Yes	20 (48.8)	19 (46.3)	39(47.6)	0.825**
	No	21(51.2)	22(52.3)	43(52.4)	
ration of Internet use (hours/day)		5.29±3.72	2.80±2.27		0.001*
Duration of Internet use (hours/week)		34.41±27.5	17.29±15.38		0.010 *
Age of onset of Internet use		8.73±3.09	9.32±2.90		0.380 *
Purpose of Internet use	Social media	23(28)	22(26.8)	45(54.9)	0.824 **
	Online game	26(31.7)	21(25.6)	47(57.3)	0.264 **
	Chat	21(25.6)	19(23.2)	40(48.8)	0.659 **
	General information search	15(18.3)	20(24.4)	35(42.7)	0.264 **
	Shopping	6(7.3)	3(3.7)	9(11.0)	0.289 **
	Bet	3(3.7)	1(1.2)	4(4.9)	0.305 **
	Music	28(34.6)	26(32.1)	54(66.7)	0.530 **
	Newspaper/news	8(8.9)	6(7.3)	14(17.1)	0.557 **
	Movie/series/anime	28(34.1)	16(19.5)	44(53.7)	0.008 **
	Video	32(39.0)	23(28)	55(67.1)	0.034 **

n: Number, %: Percentage, SD:Standart Deviation, *Independent Sample T-test, **Chi-square Test, $p < 0.05$

Table 3. Comparison of the groups in terms of comorbid psychiatric diagnoses

		PIU	NIU	Total	<i>p</i>
		n (%)	n (%)	n (%)	
ADHD	AD dominant type	4(9.8)	4(9.8)	8(9.8)	0.509
	HA dominant type	16(39.0)	21(51.2)	37(45.1)	
	Combinee type	16(39.0)	16(39.0)	37 (45.1)	
ODD		22(56.4)	17(43.6)	39 (47.5)	0.269
CD		10(76.9)	3(23.1)	13 (15.8)	0.034
MDD		10 (24.4)	2 (4.9)	12(14.6)	0.012
AD		15 (36.6)	13 (31.7)	28(34.2)	0.641
SpLD		2 (4.9)	5 (12.2)	7(8.5)	0.236
Enuresis/Encopresis		4 (9.8)	0 (0.0)	4(4.9)	0.040
Specific phobia		3 (7.3)	1 (2.4)	4(4.9)	0.305
Obsessive-compulsive disorder		1 (2.4)	2 (4.9)	3(3.7)	0.556
Tourette Syndrome		1 (2.4)	0 (0.0)	1(1.2)	0.314
Trichotillomania		1 (2.4)	1 (2.4)	2(2.4)	1.000

n: Number, %: Percentage, ADHD: Attention Deficit Hyperactivity Disorder, ODD: Oppositional Defiant Disorder, CD: Conduct Disorder, MDD: Major Depressive Disorder, AD: Anxiety Disorder, SpLD: Specific Learning Disability, Chi-square test, $p < 0.05$

Table 4. Comparison of groups in terms of scales

		PIU	NIU	<i>p</i>
		Mean ± SD	Mean ± SD	
ATS	Attention deficit subscale	18.2±3.9	17.7±3.8	0.594*
	Hyperactivity/impulsivity subscale	14.2±7.4	12.6±6.4	0.323*
	ATS Total Score	47.9±17.4	41.7±13.9	0.079*
	ODD Subscale Score	12.2±6.7	9.4±5.8	0.049*
	CD Subscale Score	3.2±3.9	1.7±2.4	0.054*
	Goals	16±3.7	14.2±4.3	0.048 *
DERS	Strategies	14.1±4.4	12.5±3.7	0.085 *
	Awareness	14.4±3.9	15±3.6	0.450*
	Impulsivity	18±5.2	16±5.4	0.897*
	Clarity	13.9±3.1	13.1±2.6	0.198*
	Non-acceptance	14.3±7.2	12.8±4.6	0.248*
YIAS	DERS-total	90.9±20.7	83.7±17	0.922 *
		61.71±12	31.4±10.4	0.001

SD:Standart Deviation, ATS: Atilla Turgay DSM-IV Based Child and Adolescent Druptive Behaviour Disorders Rating Scale, ODD: Oppositional Defiant Disorder, CD: Conduct Disorder, DERS: Difficulties in Emotion Regulation Scale, * Independent Sample T-test, ** Chi-square Test, $p < 0.05$

Statistically significant positive correlations were found between the YIAS and the hyperactivity/impulsivity subscale, ODD subscale, CD subscale and ATS-total. Significant positive correlations were found between the goals, strategies, openness, and DERS-total subscales of DERS and the YIAS. Correlations between the scales are given in Table 5.

Table 5. The relationship between ATS, YIAS and DERS

(r/p)	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Attention deficit subscale	1.000												
2. Hyperactivity/impulsivity subscale	0.313 **	1.000											
3. ATS-total	.004 0.546 **	0.844 **	1.000										
4. ODD Subscale Score	<0.00 1 0.318 **	<0.00 1 0.623 **	1 1 0.886 **	1.000									
5. CD Subscale Score	.109 0.178 **	** 0.382 **	** 1 0.676 **	** 1 0.638 **	1.000								
6. YIAS	.081 0.194 *	* 0.258 **	** 0.355 **	** 0.333 **	* 0.288 **	1.000							
7. Goals	.377 0.099	.774 0.032	* 0.257	** 0.369	* 0.275	** 0.284	1.000						
8. Strategies	.469 -0.081	* 0.255	** 0.318	** 0.416	* 0.281	* 0.234	** 0.594	1.000					
9. Awareness	.302 -0.115	.477 -0.080	.691 -0.045	.995 -0.01	.425 0.089	.628 -0.054	.270 0.123	.076 0.197	1.000				
10. Impulsivity	.168 0.154	* 0.255	** 0.424	** 0.495	** 0.363	.128 0.169	** 0.726	** 0.606	.422 0.090	1.000			
11. Clarity	.439 -0.87	** 0.328	** 0.291	** 0.290	* 0.247	* 0.239	** 0.426	** 0.568	** 0.384	** 0.442	1.000		
12. Non-acceptance	.337 -0.107	.194 0.145	* 0.228	** 0.342	* 0.253	.114 0.176	** 0.397	** 0.596	.103 0.181	** 0.461	** 0.509	1.000	
13. DERS-total	.739 -0.037	* 0.228	** 0.350	** 0.460	** 0.357	* 0.240	** 0.761	** 0.827	** 0.406	** 0.798	** 0.726	** 0.773	1.000

ATS: Atilla Turgay DSM-IV Based Child and Adolescent Destructive Behaviour Disorders Rating Scale, ODD: Oppositional Defiant Disorder, CD: Conduct Disorder, YIAS: Young Internet Addiction Scale, DERS: Difficulties in Emotion Regulation Scale, Pearson Correlation Test, r: correlation coefficient, * $p < 0.05$, ** $p < 0.01$

Discussion

In this study, we aimed to investigate the relationship between problematic internet use and emotion dysregulation in adolescents with ADHD. It was concluded that the PIU group used the Internet more for watching movies/series/cartoons and videos, had a higher rate of psychiatric comorbidity, and had a higher goals score, which is a subscale of the DERS. A significant positive correlation was found between the YIAS and the subscales of the DERS (goals, strategies, clarity, and DERS total).

Although the duration is not specified among the recommended criteria of internet addiction or problematic internet use, there are studies in the literature suggesting that the duration of use of the addicted group is high. In a study by Liu et al. involving 3560 high school students, an average weekly internet usage time of more than 20 hours

was associated with internet addiction.¹⁹ In our study, the internet usage time of the PIU group was quite high. Apart from the duration of internet use, there are other characteristics that distinguish problematic internet users from others. The purpose of using the Internet is one of them.²⁰ In a study comparing adolescents with and without ADHD diagnosis, it was shown that adolescents diagnosed with ADHD used the Internet mostly for online games and chatting, while adolescents in the control group used the Internet mostly for homework, unlike the other group.²¹

Conditions such as internet/online gaming addiction are usually not seen alone. Comorbid psychiatric diagnoses often accompany. In our study, MDD, CD and enuresis/encopresis were significantly higher in the PIU group. In the correlation analysis of YIAS and ATS, YIAS was positively correlated with all subscales except the attention deficit subscale. In a study examining

comorbidities and internet addiction, any DSM-IV diagnosis was significantly higher in individuals with internet addiction. In the same study, MDD was also reported to be significantly higher.²² In a recently published study involving 218 children and adolescents, no difference was found between the groups regarding MDD, but social anxiety disorder, externalizing disorders, and ODD were found to be high.²³ A study conducted in our country reported a significant relationship between internet addiction and hyperactivity-impulsivity, oppositional defiant disorder and conduct disorder scores.²⁴ A study examining behavioral and emotional characteristics in children and adolescents with internet addiction concluded that internalizing and externalizing disorders were significantly more common.²⁵ In a study evaluating mental conditions accompanying Internet addiction, elimination disorders were reported at a high rate.²⁶ In a study conducted by Kahraman and Demirci in 2018 on IA and ADHD, it was reported that there was a positive and significant relationship between ODD scores and IA severity.²⁷ In a study conducted by Bozkurt et al. on internet addiction and psychiatric disorders with subjects aged 10-18 years, it was reported that 23% of the subjects with IA were accompanied by ODD and 15% by AD.²⁶ In our study, both the intergroup differences and the relationships between the scales can be considered compatible with the literature. As can be seen, the type and frequency of psychiatric comorbidity differ between studies. However, the common opinion is that comorbidity is frequent. The variability of comorbid conditions in our study is due to methodological differences and the fact that both groups had ADHD.

Difficulty in emotion regulation is closely related to ADHD, as in many psychopathologies. Difficulty in emotion regulation has also been shown to affect executive functions like ADHD.²⁸ In a twin study investigating emotion regulation in ADHD and other neurodevelopmental disorders, it was reported that there was a strong relationship between ADHD and ER and that a genetic effect contributed to this relationship.²⁹ A study in our country reported that the ADHD-combine type had significantly more ER difficulties than the control group.³⁰ Our study found a positive correlation between ATS and all subscales of the DERS and DERS total except for the awareness subscale.

Studies examining ER and internet use have shown a strong relationship between problematic internet use and emotion regulation difficulties.¹⁰ A one-year prospective study examining the relationship between emotion dysregulation and internet addiction in university students concluded that the impulse control difficulty subscale predicted IA in males.³¹ In a study involving 716 adolescents and looking at the development of internet addiction from a developmental perspective, negative emotions were reported to be a predictive factor for internet addiction.³² Our results, which showed a statistically significant positive correlation between YIAS, DERS-total, and subscales, are consistent with the literature.

In an article examining internet addiction and psychopathologies, it was reported that ADHD and emotion regulation difficulties negatively affect interpersonal relationships and that these individuals prefer online relationships to real relationships.³³ While there are studies indicating that pathological internet use increases irritability and aggression in ADHD, that is, internet addiction exacerbates ADHD, there are also studies reporting that decreased emotional response clarity, inability to use emotion regulation strategies and problems in controlling

impulsive behaviors increase internet use.^{34,35} It has been stated that individuals with emotion dysregulation difficulties are more likely to turn to the internet as they have difficulty coping with negative emotions and emotional dysregulation is an important predictor of addiction development.³⁵ Budak's study on emotion dysregulation and IA in 2017 reported that the awareness subscale and IA were inversely related, while the remaining subscales of clarity, non-acceptance, strategies, impulse, and goals were positively related.³⁶ In our study, problematic internet use was positively associated with goals, strategies, and clarity subscales. In this context, the relationship between emotion dysregulation and pathological internet use can be explained by the inability of adolescents who have problems with emotion regulation to use effective strategies, turning to the internet with the desire to avoid negative emotions, inadequate self-control skills, and difficulty in controlling their impulses.

Limitations

The limitations of the study include the inclusion of adolescents in the study regardless of their treatment status, the use of self-report scales, self-reported internet use, the small sample size, the lack of a healthy control group, and a cross-sectional study. Apart from these limitations, the presence of comorbid mental disorders, in which patients may have difficulty in emotion regulation, can also be counted as a limitation. The group with problematic internet use determined according to the YIAS consists of individuals with both internet addiction and borderline symptomatic. This is also one of the limitations of the study.

Conclusion

In conclusion, our study concluded that adolescents diagnosed with ADHD with problematic internet use had more comorbidities than adolescents diagnosed with ADHD with normal internet use and experienced more emotion regulation difficulties as the severity of ADHD and internet use increased.

Conflicts of Interest

None.

Compliance with Ethical Statement

Approval for this study was obtained from the Dicle University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee with the decision dated 07/05/2020 and numbered 165.

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Author Contributions

YB, BK, ÖK: Hypothesis; YB, BK, ÖK: Design; YB, ÖK: Data Collection; YB: Literature review; YB, BK, ÖK: Analysis and Interpretation of Results; YB, BK, ÖK: Writing; YB, BK, ÖK: Critical Review

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