

Investigation of Adolescents Who have Internet Addiction Accompanied By Attention Deficit and Hyperactivity Disorder in Terms of Emotion Regulation and Social Cognition



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ABSTRACT

Objective: The aim of this study is to evaluate social cognition and emotion regulation skills in individuals with Internet Addiction (IA) and Internet addiction with comorbid Attention Deficit/Hyperactivity Disorder (IA + ADHD).

Methods: The sample of the study consist of 30 IA, 30 IA + ADHD patients, 30 healthy controls between the ages of 12-17 who applied to the Child and Adolescent Psychiatry Department, Technology Outpatient Clinic. K-SADS-PL, WISC-R, sociodemographic data form, Internet Addiction Scale (IAS), Addiction Profile Index Internet Addiction Form (APIINT), Beck Depression Inventory, Global Assessment of Functioning Scale, and Difficulties in Emotion Regulation Scale were applied to all participants. Social cognition was evaluated using Faces Test, Reading the Mind in the Eyes Test, The Unexpected Outcomes Test, Faux Paus, Hinting Test and Comprehension Test.

Results: In social cognition tests, IA and IA + ADHD groups failed significantly compared to the control group. Emotion regulation difficulties were significantly higher in IA and IA + ADHD groups compared to the control group ($p < 0.001$). Use of the internet for doing homeworks ($p < 0.001$) was found to be higher in the control group than in the IA and IA + ADHD groups.

Conclusion: It has been found that individuals diagnosed with internet addiction have difficulties in both social cognition and emotion regulation, which is more severe in the presence of comorbid ADHD.

Keywords: Internet addiction; social cognition; emotion regulation difficulties; Attention Deficit/Hyperactivity Disorder; DSM-5

INTRODUCTION

In the last two decades, the internet has become an important part of people's daily lives (Kim et al. 2020). During the pandemic period that affects the whole world, the use of internet and technology has evolved into a pre-requisite than ever before. Adolescents are the portion of the society that use the internet most frequently, not only in Turkey but also in the rest of the world. They appear to be an 'under-risk group' in terms of both internet addiction (IA) and accompanying problems (Şendağ and Odabaşı 2007). The prevalence of IA in adolescents is reported as 1-9% in Europe, 1-12% in Middle Eastern countries, and 2-18% in Asia (Spada 2014, Wartberg et al. 2017). In studies using the Internet Addiction Scale developed by Young, IA prevalence was found as 0.5-3.28% (Eldeleklioğlu & Vural-Batık, 2013, Sinkkonen et al.

2014). In studies conducted with adolescents in Hong Kong in the last decade, it has been determined that the prevalence of IA can vary between 3.0% and 26.8% (Chung et al. 2019). Internet addiction (IA), initially reported by Young, is considered a behavioral addiction (Young 1999). IB; although not yet listed in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), this disorder is included in the DSM-5 as "internet gaming disorder". The American Psychiatric Association (APA) has listed the disorder as this because of the many studies on video games (APA 2013). However, since other activities on the Internet have similar behavior patterns, in order to examine the effects of the Internet on adolescents, our study is based on Internet addiction, which also includes other Internet applications.

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IA can negatively affect the social, physical and psychological development of children and adolescents. It has been reported that more than half of adolescents with IA have comorbid psychiatric disorders (Tsitsika et al. 2011). Especially in younger individuals, IA is found to be frequently comorbid with other psychiatric disorders such as attention deficit/hyperactivity disorder (ADHD), depressive disorder, social anxiety disorder, and issues in relation with gambling and substance use disorders (Yoo et al. 2004, Spada et al. 2014). Comorbidity of IA and ADHD is common in children and adolescents (Yoo et al. 2004, Tahiroğlu et al. 2010).

There are many studies showing that IA and ADHD have negative effects on emotion regulation and recognition skills (Akbari 2017, Casale et al. 2016, San et al. 2018). Emotion regulation is defined as awareness of emotions, making sense of emotions, and being able to engage in goal-oriented behaviors without the influence of emotions (Gratz and Roemer 2004). Studies show that adolescents with emotional regulation problems use the internet in the severity of addiction level in order to avoid, suppress and alleviate negative emotions (Yu et al. 2013).

Spending more and more time on the Internet reduces face-to-face communication and socialization in adolescents and causes loneliness (Bozoglan et al. 2013). This situation makes the effect of IA on social cognition a priority subject to be investigated. Social cognition which is innate and which develops progressively has been defined as cognitive processes such as processing, encoding, storing and remembering information necessary for social communication. It examines the physical and social environments that individuals interact with and the relationships of individuals with their environment, how they make an impression on other people, what they feel and think in social interaction, and how the judgments and behaviors formed in this thought process affect them. It also discusses in detail the cognitive processes and structures that are affected by and those that affect social relations (Fiske and Taylor 2013). Social cognition is the ability to make sense of one's relationships with others and to reflect this situation to their relationships with their social behaviors (Smith and Semin 2007). Theory of Mind (ToM) is one of the areas in which social cognition is examined and it includes the ability to empathize and understand the intentions of others. It is stated that there is a negative relationship between problematic internet use and theory of mind functions (Korkmaz et al. 2018). Social cognition problems are also seen in ADHD cases. Social cognition-related portions of the brain are found in the prefrontal cortex, fusiform gyrus, superior temporal gyrus, anterior cingulate cortex, and amygdala. It has been determined that these regions are also implicated in ADHD (Pinkham et al. 2008).

In this study, it was aimed to evaluate the emotion regulation skills and social cognition characteristics of adolescents with

IA, IA+ADHD and compare them with the healthy control group. Previous studies have shown the relation of emotion regulation difficulties and impairments in theory of mind tests with IA. In this study, it was aimed to evaluate the severity of impairments in emotion regulation and social cognition when IA with the comorbidity of ADHD. Unlike the studies in the literature, social cognition characteristics were evaluated using theory of mind tests that measure different dimensions of social cognition. In addition, the internet use characteristics of adolescents with IA and IA+ADHD and healthy participants were evaluated in detail.

METHODS

Participants

This is a cross-sectional and descriptive study conducted to evaluate the internet usage characteristics and social cognition characteristics of IA and IA+ADHD cases, to determine whether there is a deficit in the social cognition skills of the groups, and to compare the findings with healthy controls. The sample of the study consisted of 60 participants (30 with IA, 30 with IA+ADHD) and 30 healthy controls between the ages of 12-17 who applied to the Child and Adolescent Psychiatry Department, Technology Outpatient Clinic. The control group was selected with a consideration for such characteristics as age and gender.

Procedure

Written informed consent was obtained from the participants and their parents who volunteered to participate in the study. The Kiddie Schedule for Affective Disorders and Schizophrenia Present and Lifetime Version (Turkish) (K-SADS-PL-T) was applied to all participants. According to this evaluation, cases meeting any diagnostic criteria other than ADHD (n=7; major depressive disorder 3 cases, anxiety disorder 2, obsessive-compulsive disorder 1) were not included in the study. The Wechsler Intelligence Scale for Children (WISC-R) was applied to the subjects who continued the study. According to this scale; subject (n=1) who was below the normal intelligence level (under 90 points) was excluded from the study.

A sociodemographic data form including age, gender, school, family and information on care as well as internet use characteristics was applied to the participants meeting all of these criteria. In addition, Internet Addiction Scale, Addiction Profile Index Internet Addiction Form (APIINT), Difficulties in Emotion Regulation Scale (DERS) were applied to the participants. Social cognition was evaluated with ToM test including Faces Test, Reading the Mind in the Eyes Test, The Unexpected Outcomes Test, Faux Pas Test, Hinting Test and Comprehension Test.

Approval for this study was obtained from the Ege University Faculty of Medicine Clinical Research Ethics Committee (Date: 16/09/2015; No: B.30.2.EGE.0.20.05.00/OY/1293/575; Decision No: 15-6/2).

Measurements

Difficulties in Emotion Regulation Scale (DERS)

The scale was developed by Gratz and Roemer (2004) to measure difficulties in emotion regulation. It is a five-point Likert-type scale consisting of 36-items. The scale evaluates emotion regulation in six dimensions. The Turkish psychometric evaluation of the scale for adolescents was made by Sarıtaş and Gençöz (2011).

Addiction Profile Index Internet Addiction Form (APIINT)

APIINT is an 18-item scale measuring IA that fits the definition of addiction and can be used for clinical purposes. APIINT can be used on high school and university students, on whom its validity and reliability has been shown already (Ögel 2015).

Internet Addiction Scale

The scale was developed by Young by adapting the DSM-IV "Pathological Gambling" criteria. The five-point Likert-type scale consists of 20 items. The Turkish adaptation of the scale was made by Balta and Horzum (2008).

Reading the Mind in the Eyes Test

Reading the Mind in the Eyes Test assesses one's ability to understand a person's mental state that goes beyond simple emotions by looking at their eye expressions. The Turkish reliability study of the test has been carried out previously (Yıldırım et al. 2011).

Faces Test

The Faces Test has been developed for recognizing emotions from facial expressions. In the Faces Test, subjects are shown 60 photographs reflecting 6 basic emotions (happiness, sadness, fear, surprise, disgust, anger) (Ekman 1976).

The Unexpected Outcomes Test

It is a 12-question test that aims to measure logical thinking skills, the emotions elicited, and the ability to comprehend the conflict between the encountered situation and these emotions (Dyck et al. 2001). In a study conducted with Turkish translation of test, the inter-rater reliability was found to be high (Bora 2009).

Faux Pas Test

It is a scale composed of short stories, where one of the people in conversation says something inappropriate without realizing it. The test measures the faux pas in the stories,

understanding the faux pas, and whether or not the person's feelings are understood (Baron-Cohen et al. 1999).

Hinting Test

The test is designed to measure the ability to predict the intentions behind implicit verbal statements. It consists of 10 short paragraphs with hints (Corcoran et al. 1995). The subjects are asked to elaborate on what the person mentioned in the paragraph actually wants to say.

Comprehension Test

This test consists of 11 questions that assess the emotional reactions to certain situations. The answers given to the questions in the test were formed by way of sampling from basic emotions in the Faces Test. In a pilot study conducted with children, adolescents and adults, the internal consistency coefficient of the test was found to be acceptable (Dyck et al. 2001).

Statistical Analysis

Data was analyzed using the SPSS 21.0 program. Mean, standard deviation and median values of continuous variables are presented. The Chi-Square test of independence was used to determine whether or not there is a significant relationship between two nominal (categorical) variables. The normality of the quantitative data was checked with the Shapiro-Wilk test. Non-parametric tests were used because the parameters were not distributed normally. The Kruskal-Wallis test was used to determine the differences between the three groups. The Mann-Whitney U test was used to determine which group caused the difference in the variables that showed a significant difference as a result of The Kruskal-Wallis test. Bonferroni correction was used to prevent type 1 error in these tests. The $p < 0.017$ value obtained by dividing the significance level by the number of groups to be compared; was accepted as the limit of significance for pairwise group comparisons.

RESULTS

Evaluation of the Sample

The mean age of the study sample was 15.2 ± 1.43 (IA: 15.2 ± 1.45 ; IA+ADHD: 15.2 ± 1.45 , Control: 15.2 ± 1.45). All three groups were formed consisting of 20 boys and 10 girls.

Evaluation of Internet Use Characteristics

Internet use for doing homeworks was found to be statistically significantly higher in the control group (86.7%), IA (56.7%) and IA+ADHD (46.7%) groups (respectively: $p=0.010$; $p=0.001$). The participants in the IA and IA+ADHD groups were similar ($p=0.438$) (Table 1).

Table 1. Distribution of Cases per Reasons for Using the Internet

	IA		IA+ADHD		Control		p
	Yes	No	Yes	No	Yes	No	
Doing Homeworks	17 %56.7	13 %43.3	14 %46.7	16 %53.3	26 %86.7	4 %13.3	0.004*
Gaming	20 %66.7	10 %33.3	23 %76.7	7 %23.3	16 %53.3	14 %46.7	0.162
Social Media	29 %96.7	1 %3.3	28 %93.3	2 %6.7	25 %83.3	5 %16.7	0.101
Watching Movies	26 %86.7	4 %13.3	21 %70	9 %30	24 %86.7	6 %13.3	0.282
Other Reasons	3 %10	27 %90	6 %20	24 %80	2 %6.7	28 %93.3	0.260

(Chi-square test; *p<0.05)

Hours of Internet Use

The mean weekly hours of internet use was 46.2 hours in the IA group, 44.6 hours in the IA+ADHD group, and 11.2 hours in the control group.

When we evaluated the groups according to hours of internet use, it was seen that the three groups differed in terms of hours of internet use for doing homeworks, gaming, social media and watching movies. Weekly hours of internet usage for purposes of doing homeworks were not statistically different in the control group from the IA and IA+ADHD groups (respectively; p=0.048; p=0.020) (p<0.017). Internet use for gaming and social media was found to be statistically significantly lower in the control group than in the IA and IA+ADHD groups (gaming; p=0.001; p<0.001, social media; p<0.001; p<0.001). There was no statistically significant difference between IA and IA+ADHD groups in terms of internet use for doing homeworks, gaming and social media. Internet use for watching movies was statistically significantly higher in the IA group than in the control and IA+ADHD groups (respectively; p=0.015; p<0.001). The control and IA+ADHD groups were similar.

Internet Use Characteristics by Gender

Mean weekly hours of internet use by gender were found, in the IA group, as 44.1 hours for girls, 47.5 hours for boys; whereas in the IA+ADHD group, girls 43.8 hours and boys 44.9 hours. Then in the control group, 8.4 hours for girls and 12.6 hours for boys (p=0.563; p=0.784; p=0.366, respectively). In the IA group, both genders were similar in terms of internet use for homework, watching movies, and for other purposes (p=0.289; p=0.894; p=0.966, respectively). A statistically significant difference was found in terms of gaming and using the internet for social media (p<0.001; p<0.001, respectively).

Internet use for doing homeworks and other purposes was similar between genders in the IA+ADHD group (p=0.811; p=0.270, respectively); statistically significant differences were found in terms of gaming, using social media and watching movies (p<0.001; p<0.001; p=0.009, respectively).

In the control group, the gender groups were similar in terms of doing homeworks, watching movies, using social media and using the internet for other purposes (p=0.293; p=0.239; p=0.982; p=0.205, respectively). A statistically significant difference was found in terms of gaming (p=0.015) (Table 2).

When the groups were evaluated according to the types of games played, it was determined that strategy games were played more frequently in both the IA group and the IA+ADHD group than in the control group (p<0.001; p<0.001, respectively).

Evaluation of The Scales

Internet Addiction Scale

No significant difference was found between the IA group and the IA+ADHD group (p=0.346) (Table 3).

Addiction Profile Index Internet Addiction Form (APIINT)

Diagnosis, severity of addiction, frequency of internet use, effects of internet use on the user, craving, motivation subscales of this test were used to evaluate IA. While the control group had lower scores in all subscales than both IA (p<0.001) and IA+ADHD groups (p<0.001); IA and IA+ADHD groups were similar (Table 3).

Difficulties in Emotion Regulation Scale (DERS)

There were similarities between the IA and IA+ADHD groups in the total scale scores and in the subscale scores of 'Impulsivity,' 'Awareness,' 'Strategy' and 'Goals' (p=0.723, p=0.882, p=0.888, p=0.871, p, respectively). =538). It was determined that the control group had significantly lower

Table 2. Distribution of Hours of Internet Use of Participants by Gender

			Doing Homeworks	Gaming	Social Media	Watching Movies	Other
IA	Female	Mean ±SD	1.8±2.6	1.0±3.2	34.1±8.1	6.5±4.2	0.7±2.2
	Male	Mean ±SD	2.8±2.8	26.3±10.2	11.3±6.0	6.7±5.3	0.5±1.6
		p	0.289	<0.001	<0.001	0.894	0.966
IA+ADHD	Female	Mean ±SD	1.9±2.4	5.0±12.5	29.0± 13.1	6.3±3.7	1.0± 2.1
	Male	Mean ±SD	2.2±2.8	28.3±11.2	10.3±5.6	2.8±2.6	0.4±0.9
		p		<0.001	<0.001	0.009	0.270
Control	Female	Mean ±SD	3.2±1.4	0.4±0.7	2.8±1.1	2.0±1.6	0
	Male	Mean ±SD	3.9±2.3	3.0±2.6	2.7±1.8	2.9±1.8	0.2±0.5
		p		0.015	0.982	0.239	0.205

Mann Whitney U Test, statistically significant $p < 0.05$

scores than the other two groups ($p < 0.001$). The IA group scored lower than the IA+ADHD group in terms of 'Clarity' and 'Non-Acceptance' subscale scores ($p = 0.002$; $p = 0.005$, respectively) (Table 3).

The Global Assessment of Functioning (GAF) Scale: A significant difference was found between the IA group and the IA+ADHD group ($p = 0.021$) (Table 3).

Evaluation of The Social Cognition Test Scores

The IA and IA+ADHD groups were found similar in terms of their total score in the Faces Test ($p = 0.277$). There was statistically significant difference between the control group and the other groups ($p < 0.001$). Participants were evaluated separately in terms of 6 different emotions (happiness, anger,

sadness, disgust, fear, surprise) in the Faces Test. In sub-scores expressing anger, disgust and fear, IA and IA+ADHD groups scored significantly lower than the control group ($p < 0.001$). The IA and the IA+ADHD group were similar (Table 4).

Reading the Mind in the Eyes Test

In the Reading the Mind in the Eyes Test, while the control group had a significantly higher score than the other two groups ($p < 0.001$); IA and IA+ADHD groups were found to be similar ($p = 0.976$).

Hinting Test

The IA+ADHD group had significantly lower scores than the IA group and the control group ($p = 0.002$; $p < 0.001$, respectively) in the Hinting Test, while the control and IA groups did not differ significantly ($p = 0.720$).

Table 3. Distribution of Participants per IAS, APIINT and DERS Scores

	IA		IA+ADHD		Control		p
	Mean	±SD	Mean	±SD	Mean	±SD	
IAS	83.6	±3.27	84.53	±3.93	13.83	±9.34	<0.001
APIINT							
Diagnosis	18.5	±1.78	18.50	±2.13	6.33	±5.23	<0.001
Severity of Addiction	15.5	±1.38	16.10	±1.79	5.63	±2.55	<0.001
Frequency of Internet Use	4.33	±0.55	4.43	±0.57	2.43	±0.68	<0.001
Effects of Internet Use on the User	19.7	±2.14	20.70	±2.45	3.97	±3.12	<0.001
Craving	6.10	±0.88	6.27	±1.05	2.43	±1.30	<0.001
Motivation	4.40	±0.89	4.87	±1.07	0.80	±1.19	<0.001
DERS							
Goal	17.23	±6.41	17.50	±4.59	13.30	±3.37	0.001
Strategy	18.43	±7.01	18.60	±7.23	14.00	±3.52	0.020
Impulsivity	15.97	±6.35	16.7	±6.34	10.07	±2.39	<0.001
Awareness	15.80	±3.58	16.03	±3.91	13.60	±3.53	0.031
Clarity	10	±7.30	12	±5;22	9	±5;15	0.009
Non-Acceptance	11.9	±5.43	13.27	±5.10	9.77	±2.57	0.025
Total Scale Score	89.83	±23.28	93.70	±24.67	69.87	±9.77	<0.001

IAS: Internet Addiction Test, APIINT: Addiction Profile Index Internet Addiction Form, DERS: Difficulties in Emotion Regulation Scale
 $p^* = IA = IA + ADHD < Control$; Kruskal-Wallis Test, statistically significant $p < 0.05$

Table 4. Comparison of the Groups According to the Faces Test Scores

Faces Test	IA		IA+ADHD		Control		P
	Mean	±SD	Mean	±SD	Mean	±SD	
Happiness	10.07	±1.95	9.67	±0.61	9.93	±0.25	0.09
Anger	8.17	±1.02	8.47	±1.11	9.20	±0.76	<0.001*
Sadness	8.40	±1.19	7.67	±1.86	8.70	±1.06	0.083
Disgust	7.40	±1.35	7.20	±1.58	8.90	±0.66	<0.001*
Fear	3.63	±1.92	3.30	±2.05	5.90	±1.79	<0.001*
Suprise	8.67	±1.60	8.80	±1.56	9.50	±0.68	0.05
Total Score	46.33	±4.17	45.10	±3.88	52.13	±2.10	<0.001*

Kruskal-Wallis Test, statistically significant *p < 0.05
 All subscales of Faces Test; P: IA=IA+ADHD < Control.

The Unexpected Outcomes Test

In the Unexpected Outcomes Test, IA+ADHD and IA groups had significantly lower scores than the control group (p<0.001; p=0.014, respectively).

Faux Pas Test

According to Faux Pas Test, the IA+ADHD group had significantly lower score than the control and IA groups (p<0.001; p<0.001, respectively), and the scores of the control and IA groups were similar (p=0.612) (Table 5).

Comprehension Test

IA and IA+ADHD groups were similar according to the Comprehension Test score (p=0.189). The participants in the control group had have higher scores than the subjects in both IA and IA+ADHD groups (p<0.001; p<0.001, respectively).

DISCUSSION

In this study, IA and IA with comorbid ADHD patients applied to the Child and Adolescent Psychiatry Technology Addiction Outpatient Clinic were evaluated in terms of of

social cognition and emotion regulation skills. Detailed internet use characteristics of all cases were also included in the study.

The results of studies examining the relationship between gender and IA in adolescents are contradictory. While some studies indicate that gender is not associated with IA (Jang et al. 2008, Deniz and Caliskan 2015); others report that the prevalence of IA (Adiele and Olatokun 2014, Metin et al. 2015) and addiction severity are higher in male adolescents (Yoo et al. 2004, Yu and Shek 2016). Studies indicate that the gender variable in terms of internet use varies over the years, with diversified characteristics of such use. As the male adolescent participants of the study outnumbered women participants, groups were formed accordingly. We found that duration of internet usage for boys was longer than girls in IA, IA+ADHD and control groups. The use characteristics were similar in the IA+ADHD group as well.

In IA, IA+ ADHD and control groups, girls preferred using social media and watching movies more, while boys preferred gaming. The characteristics of internet use are similar in the IA+ADHD group. The reasons and purposes for using the internet were also evaluated for these groups. All participants

Table 5. Comparison of the Groups According to the Faux Pas and Hinting Test

	IA		IA+ADHD		Control		P
	Mean	±SD	Mean	±SD	Mean	±SD	
Hinting Test	7,87	±0,35	7,33	±0,80	7,83	±0,38	<0,001
Dual comparison							
	IA-IA+ADHD		IA-Control		IA+ADHD-Control		
p	0,002*		0,720		<0,001*		
	IA		IA+ADHD		Control		P
	Ort.	±ss	Ort.	±ss	Ort.	±ss	
Faux Pas Test	8,70	±0,92	6,77	±2,4	8,83	±0,95	<0,001
Dual comparison							
	IA-IA+ADHD		IA-Control		IA+ADHD-Control		
p	<0,001*		0,612		<0,001*		

P: Kruskal-Wallis Test, p < 0.05; p: Mann-Whitney U testi, p<0,017

in our study were students. It was found that the control group used internet for a longer duration, to do their homeworks compared to other groups. Our study found no significant difference between the groups in terms of other reasons for using the internet (gaming, using social media, watching movies, using the internet for other purposes). Similar to our study, in other studies looking into reasons for use of the internet, it was found that adolescents most frequently use the internet for educational purposes (Kayri et al. 2014). Internet usage durations of the participants were also evaluated between each of the groups. IA group used the internet for an average of 46.2 hours, the IA+ADHD group used the internet for 44.6 hours, and the control group used the internet for 11.2 hours. Internet use more than five hours per day and more than 38.5 hours per week is considered as Internet addiction (Kwiatkowska et al. 2007). According to DSM-5, Internet Gaming Disorder (APA 2013) requires 8-10 hours or more per day or at least 30 hours per week use of the internet. Simkova and Cincera (2004) determined that non-addicted people use an average of 13 hours a week, while addicted people use an average of 44 hours.

It is stated that the most common purpose of internet use in cases with higher daily/weekly use of the internet is entertainment. Social media use and gaming are the most common reasons for using the as shown in studies conducted with participants with IA (Leung and Lee 2012). In our study, the use of internet by the participants with IA for purposes of gaming and social media is compatible with literature. When we evaluated the characteristics of the games played by the cases, a significant difference was observed between the IA and control groups regarding strategy games. It is reported that multiplayer online games (Massive Multiplayer Online Games MMOGs-) have become an important entertainment tool that millions of young people spend a significant part of their free time with (Blinka et al. 2015), and that these games had harmful effects on public and academic functions of these youngs (Blinka et al. 2015, Haagsma et al. 2013).

All subscales of the APIINT were administered to all subjects included in this study. IA+ADHD and IA groups were similar in all subscales. It has been reported in the literature that the severity of addiction increases when IA is comorbid with ADHD (Yoo et al. 2004, Metin et al. 2015).

In our study, it was determined that adolescents with IA problem in accordance with the literature had more difficulties in emotion regulation. (Akbari 2017; Casale et al. 2016). There is no study in the literature comparing IA and IA+ADHD cases in terms of the severity of emotion regulation difficulties. In this study, it was determined that individuals with IA were at risk in terms of emotion regulation difficulties, and the severity of this difficulty increased with ADHD comorbidity. Bunford et al. (2014) found that patients with ADHD between the ages of 12 and 16 had higher scores on

the awareness, clarity, impulsivity, and strategy subscales of the scale compared to healthy controls.

The participants in this study were also evaluated in terms of social cognition. While the Faces Test total score, fear, disgust, anger subtest scores, Reading the Mind in the Eyes Test, Comprehension test scores of the IA and IA+ADHD groups were similar, these two groups were found to have lower scores than the control group. The three groups were similar in the happiness and sadness subtests of the Faces test. In the surprise subtest of the Faces Test, it was determined that the IA group scored lower than the other two groups. The IA+ADHD group scored lower than the other two groups in the Faux Pas Test and Hinting Test In the Unexpected Outcomes Test, it was determined that the IA+ADHD group scored lower than the IA group and the IA group scored lower than the control group. Social cognition skills of IA cases were found to be poorer than those of the control group.

In a study conducted by Akdeniz et al. in 2020 in which adolescents with IA were evaluated with the Eyes Test, it was stated that the addicted group received lower scores from this test compared to the healthy group (Akdeniz et al. 2020). In ADHD cases with IA, social cognition were found to have a more negative course. In this study, the results of the Faces Test (total score and fear, disgust, and anger sub-scores) were more negative in the IA+ADHD group. Participants with ADHD scored lower than the Reading the Mind in the Eyes Test and Faux Pas Test (Mary et al. 2015). Unexpected Outcomes Test scores were lower in participants with ADHD, a finding consistent with literature (Dyck et al.2001).

CONCLUSION

Participants with IA had deficits in both social cognition and emotion regulation skills, and these deficits were more severe in the presence of comorbid ADHD. It is thought that the evaluation of social cognition skills in children and adolescents with IA and IA with comorbid ADHD is very important in terms of the etiology, clinical course and treatment of these diseases. This study provided a more detailed evaluation of adolescents with internet addiction and comorbid ADHD in terms of social cognition and emotion regulation skills.

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