

The Prevalence of Internet Addiction in Turkish Adolescents with Psychiatric Disorders

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ABSTRACT

Introduction: The aim of this study is to determine the prevalence of Internet addiction (IA) in adolescents with psychiatric disorders.

Methods: A total of 310 adolescents, aged from 12 to 18, participated in the study. The psychiatric sample group included 162 participants who had applied to the child psychiatry outpatients service. The psychiatric disorders among those in this group were assessed through clinical interviews based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text Revision (DSM-IV-TR). The control group was chosen from adolescents of families who had never sought psychiatric help. The demographics of the participants and the features of their Internet usage habits were gathered through a questionnaire prepared by researchers. Young's Internet Addiction Test was used to assess internet addiction.

Results: The frequency of IA was found to be significantly higher in the psychiatric sample group than in the control group (24.1% vs. 8.8%, respectively). A total of 23.9% of the subjects had one, and 12.6% had two or more co-morbid psychiatric diagnoses. The frequencies of the diagnostic groups were as follows: attention deficit hyperactivity disorder 55.6%, anxiety disorder 29.0%, mood disorder 21.0%.

Conclusion: IA was found to be significantly more common among adolescents in the child psychiatry outpatient department than among the adolescents who had no psychiatric history, even after confounding variables had been controlled. Further studies are needed to define IA more precisely and to improve prevention approaches.

Keywords: Adolescents, internet addiction, psychiatric disorders

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INTRODUCTION

Internet overuse has been defined as excessive cognitive involvement associated with the use of the internet, unsuccessful attempts to limit and control the use, inability to cease craving for access, persistence in using the internet in spite of impaired functioning at various levels, spending gradually increasing much more time in the internet and longing and craving when there is no possibility of using it (1). The literature that discusses this concept includes terms such as "Internet addiction," "pathological Internet use," "Internet overuse," and "Internet misuse". 'Internet addiction' is the most popular term used for this disorder that should be considered among nonsubstance behavioral addictions in DSM-IV system. The name "Internet addiction" is preferred because it leads to the conceptual confusion in the literature, and the opinions indicating the fact that it should be approached as behavioral addictions in DSM V. As of 2013, 'Internet use gaming disorder' has been incorporated into DSM-V Section 3, a category of disorders needing further research (2).

With the growth of internet users worldwide, IA has become a pandemic in the new era (3). Ko, et al. reported that the prevalence of IA ranged from 1% to 36.7% (4). A meta-analysis is able to estimate the aggregate

prevalence and odds ratio (OR) of psychiatric co-morbidity in patients suffering from IA as compared to healthy controls. Studies are suggesting that there may be an association with pathological internet usage and the psychiatric diagnosis. Globally, ADHD have been reported to be the most frequent psychiatric diagnosis in adolescents with pathological internet usage consistently (5-7). Carli, et al. published a systematic review on the association between pathological internet use and combined psychopathology (5). According to the review, the prevalence rates of psychiatric co-morbidity varied from 57% with symptoms of anxiety to 100% with attention deficit and hyperactivity. Another meta-analysis reported that psychiatric co-morbidity occurs in a range from 13.3% to 26.3% among patients suffering from IA (8).

In order to address this lack of data on IA in patients with psychiatric conditions, we studied the prevalence of IA in adolescents receiving treatment for a diagnosed psychiatric illness. We also evaluated the pattern of Internet use by this population. This is an important contribution to the subject, since there were a few published literatures at the time of the study that examined IA in a population of psychiatric adolescent patients.

In this study, our aim was to examine 1) the prevalence of internet addiction in adolescents with psychiatric disorders, and to compare this to the prevalence in the control group, 2) the factors associated with internet addiction.

METHODS

Subjects

A total of 310 adolescents, aged from 12 to 18 (14.34 ± 1.50), participated in the study. The psychiatric sample group ($n=162$, mean age: 14.24 ± 1.38 , 59.3% male) included adolescents consecutively, who had applied to the child psychiatry outpatients service between July 2011 and September 2011. The psychiatric disorders of the adolescents in this group were diagnosed by a child psychiatrist through clinical interviews based on the DSM-IV-TR. A matching control group ($n=148$, mean age= 14.44 ± 1.61 , 50% male) with ages and genders similar to those of the psychiatric sample group was selected from generally healthy adolescents who had received pediatric outpatient services within the same time interval. The adolescents in this control group, which included adolescents of families who had declared that their child had never sought psychiatric help, did not undergo psychological examinations or psychiatric interviews. The study was approved by the Ethics Committee of Kocaeli University in accordance with the Declaration of Helsinki, and full written informed consent was obtained from the parents/guardians of each participant.

The exclusion criteria for both groups were adolescents who had chronic physical disorders (such as diabetes mellitus or thyroid or kidney disease), mental retardation, neurological illnesses (such as epilepsy or congenital syndromes), or any history of head trauma that prevented self-reporting or filling in the forms. Adolescents who had psychotic or common developmental disorders were not included in the study.

Procedure

Information about both demographics and features of their internet use such as family characteristics, education of parents, purpose of internet use, weekly internet use are gathered through a questionnaire created by the researchers. Questioning participants' most common aim for using internet by asking to score the headings of "training-course work", "playing games", "joining chat sites" and "other. All of the adolescents filled in Young's Internet Addiction Test (IAT) to assess IA in terms of presence and severity. IAT was developed by Young and is composed of 20 questions scored on a 5-point Likert type scale (1). Its reliability and validity were tested in a Turkish study conducted by Bayraktar and Gun (9). The Cronbach alpha value of the test was found to be 0.91, while the Spearman-Brown value was 0.87. According to the scale, those who scored 80 or more points were described as "Internet addicts," those scoring from 50 to 79 points as "Internet users at risk," and those with scores of 49 points or lower as "moderate Internet users" (9).

The diagnosis of IA was based on Young's criteria (10). All adolescents who had 50 or more points on YIAT or who stated that their Internet use exceeded 20 hours per week were re-evaluated in terms of IA. After a face-to-face clinical interview with a child psychiatrist, adolescents who met 5 out of the 8 criteria were diagnosed with IA according to Young's criteria.

Statistical Analysis

Analysis of the data was made by SPSS for Windows 16.0. Normal distribution of the numerical variables was assessed by either the Kolmogorov-Smirnov or the Shapiro-Wilk test. Differences between numerical data with normal distribution were evaluated using the T-test, while those with numerical data that did not have Gaussian distribution were evaluated by the Mann-Whitney U test. The Pearson Chi-Square test was used to analyze the relationship between categorical variables,

and Yates' s correction was used for all 2×2 tables. Fischer's Exact test was used instead of the Chi-Square test when expected cell values were lower than 5. Cochran's Mantel-Haenszel (MH) test was used to determine whether there was a relationship between two categorical variables after controlling for a third confounding variable. Correlations between the variables were assessed with Spearman correlation test. The level of significance was accepted as $p < 0.05$ for all analyses.

RESULTS

Subjects and Internet Use

Table 1 and 2 presents basic demographic data for our sample along with internet habits and preferences. There were no significant differences in gender distribution between psychiatric sample (female $n=66$, 40.7%) and control groups (female $n=74$, 50.0%, $\chi^2=2.677$, $df=1$, $p=0.102$). The median age was not significantly different between psychiatric sample ($mdn=14.5$) and control group ($mdn=14.0$; $U=11294.50$, $z=-0.885$, $p=0.376$).

The frequency of IA was significantly higher in the psychiatric sample group than in the control group ($n=39$, 24.1% and $n=13$, 8.8%, respectively; $\chi^2=11.88$, $df=1$, $p=0.001$). Although the adolescents in both groups used the Internet mainly for online game (psychiatric sample group, $n=93$, 57.4% and control group, $n=72$, 48.6%), use of the Internet for academic purposes was significantly lower in the psychiatric sample group than in the control group ($n=14$, 8.6% and $n=42$, 28.4% ; $\chi^2=22.338$, $df=3$, $p<0.0005$). The frequency of IA was significantly higher in the psychiatric sample group than in the control group even after stratifying for the purpose of Internet use (MH $\chi^2=5.407$, $df=1$, $p=0.020$) and for gender (MH $\chi^2=10.968$, $df=1$, $p=0.001$). The median time spent on the Internet was significantly higher in the psychiatric sample group than in the control group ($mdn=10.0$ and 7.0 , respectively; $U=9275.50$, $z=-3.446$, $p=0.001$). There was no correlation between YIAT score and age (spearman $\rho=0.069$, $p=0.229$) or starting age of internet use (spearman $\rho=-0.068$, $p=0.231$) in the whole sample.

The odds ratio (OR) for IA was 3.29 (MH Common Odds Ratio Estimate 95% CI for OR=1.68–6.45, $p=0.001$) in the psychiatric sample group compared to the control group. After controlling for the reasons for Internet use and for gender, the ORs for IA in the psychiatric sample group were 2.358 (MH Common Odds Ratio 95% CI for OR=1.182–4.717, $p=0.015$) and 3.195 (MH Common Odds Ratio 95% CI for OR=1.623–6.289, $p=0.001$), respectively.

In children who brought to child psychiatry outpatient unit in search for a psychiatric help, there was significant difference in the prevalence of IA between children who diagnosed with a psychiatric diagnosis ($n=30$, 33.3%) and those who did not ($n=9$, 12.5% ; $\chi^2=8.393$, $df=1$, $p=0.004$). There was no significant difference in the prevalence of internet addiction between controls ($n=13$, % 8.8) and children who brought to psychiatric examination but not fulfilled a psychiatric diagnosis ($n=9$, % 12.5; $\chi^2=0.388$, $df=1$, $p=0.534$).

No significant statistical association was found between gender and IA in the whole sample (boys, $n=34$, 20% vs. girls, $n=18$, 12.9% ; $\chi^2=2.317$, $df=1$, $p=0.128$) even after stratifying by psychiatric sample and controls (MH $\chi^2=1.486$, $df=1$, $p=0.223$). There was no significant difference in age of starting to use the Internet either between study groups (psychiatric sample group: $mdn=10.5$ vs. control group: $mdn=10.0$; $U=11826.50$, $z=-0.208$, $p=0.835$), or between the IA and nonIA groups (IA $mdn=10.50$ vs. nonIA $mdn=10.0$; $U=6564.00$, $z=-0.248$, $p=0.804$). The activity that consumed the greatest amount of time was reported to be gaming in both the psychiatric sample group ($mdn=21$, Kruskal-Wallis $\chi^2=31.554$, $df=3$, $p<0.0005$) and the control group ($mdn=14$; Kruskal-Wallis $\chi^2=26.401$, $df=3$, $p<0.0005$).

Table 1. Descriptive statistics of the participants

Demographic Characteristics	Psychiatric Sample (n=162)	Control Group (n=148)	Statistical Test
Age (mean ± sd)	14.24±1.38	14.44±1.61	z=-0.885; p=0.376
Gender % (n)			
Female (% , n)	40.7 (66)	50.0 (74)	$\chi^2=2.317$; p=0.128; df=1
Male (% , n)	59.3 (96)	50.0 (74)	
Educational Level % (n)			
Grade 7–8 (% , n)	43.7 (69)	49.7 (80)	$\chi^2=0.852$; p=0.356; df=1
Grade 9–12 (% , n)	56.3 (79)	50.3 (82)	
Family Characteristics % (n)			
Intact (% , n)	76.5 (124)	83.1 (123)	$\chi^2=9.213$; p=0.01; df=2
Extended (% , n)	8.6 (14)	12.2 (18)	
Divorced (% , n)	14.8 (24)	4.7 (7)	
Mother Education % (n)			
Low (% , n)	72.2 (117)	80.4 (119)	$\chi^2=2.417$; p=0.120; df=1
High (% , n)	27.8 (45)	19.6 (29)	
Father Education % (n)			
Low (% , n)	54.9 (89)	65.5 (97)	$\chi^2=3.194$; p=0.074; df=1
High (% , n)	45.1 (73)	34.5 (51)	
Parental Employment % (n)			
Working mother (% , n)	24.1 (39)	8.1 (12)	$\chi^2=13.206$; p<0.0001; df=1
Unemployed mother (% , n)	75.9 (123)	91.9 (136)	
Working father (% , n)	82.1 (133)	83.8 (124)	$\chi^2=0.059$; p=0.808; df=1
Unemployed father (% , n)	17.9 (29)	16.2 (24)	

z, Mann-Whitney U test; χ^2 , Pearson Chi-square test.

Psychiatric Diagnoses

53.5% of psychiatric sample group met criteria for at least one lifetime DSM-IV Axis I diagnosis. A total of 23.9% of the subjects had one, and 12.6% had two or more co-morbid psychiatric diagnoses. The frequencies of the diagnostic groups were as follows: attention deficit hyperactivity disorder 55.6%, anxiety disorder 29.0%, mood disorder 21.0%, oppositional defiant disorder and conduct disorder 8.0%. The prevalence and patterns of all psychiatric disorders are given in Table 3.

DISCUSSION

Our study researched the prevalence of IA in adolescents with psychiatric disorders and found IA to be significantly higher in the group of adolescents

who had applied to the child psychiatry clinic for any reason than in the control group, even when the intervening variables were controlled. It has been stated in the literature that variables such as level of education, academic success, participation in a regular social activity, reasons for Internet usage, and family functioning may affect the prevalence of IA. These results have shed some light on the etiology of the problem as well as the effect of the problem on the health, particularly the mental health, of adolescents. It is apparent that the etiology of IA is rather complex and there are a range of possible risk factors that may influence the onset and the development of the problem. As indicated from the results, these factors relate to different facets of adolescent life ranging from childhood development and psychopathologies, to communication with parents. These results have also contributed to the understanding

Table 2. Internet use period, purpose, YIAT scores and internet addiction rates bases on YIADM

	Psychiatric Sample	Control Group	Statistical Test	
Internet Use Period (hour/week)	17.00±19.43	10.54±13.26	t=3.446	p=0.001
Purpose (%)	Online game	48.6	$\chi^2=11.418$	p=0.001
	Social networking sites	27.7	$\chi^2=0.282$	p=0.596
	Educational	28.4	$\chi^2=22.338$	p<0.0005
	Other	36.5	$\chi^2=0.045$	p=0.832
YIAT Score (mean ± sd)	All participants	21.12±14.23	t= -4.204	p<0.0005
	Female	18.56±13.99	t=3.071	p=0.003
	Male	23.67±14.10	t=3.022	p=0.003
Dispersion Based on YIADM (%)	All participants	8.8	$\chi^2=11.880$	p=0.001
	Female	8.1	$\chi^2= 3.160$	p=0.75
	Male	9.5	$\chi^2=9.099$	p=0.003

t, independent samples t-test; χ^2 , Pearson Chi-square test; IA, internet addiction; YIAT, Young’s internet addiction test; YIADM, Young internet addiction diagnosis measurements.

Table 3. Psychiatric disorders in psychiatric sample group

Psychiatric Diagnosis	n	%
ADHD	90	55.6
ODD+CD	13	8.0
Anxiety disorders	47	29.0
Generalized anxiety disorder	19	11.7
Social phobia	12	7.4
Obsessive-compulsive disorder	6	3.7
Anxiety NOS	15	9.3
Separation anxiety disorder	1	0.6
Panic Disorder	1	0.6
Post-traumatic stress disorder	2	1.2
Mood Disorders	34	21.0
Major depressive disorder	13	8.0
Dysthymia	17	10.5
MDD+Dysthymia	4	2.4
Learning disorder	35	21.6
Somatoform disorder	14	8.6
Tic disorder	9	5.6
Elimination disorder	8	4.9
Stuttering	6	3.7

ADHD, attention-deficit hyperactivity disorder; ODD, oppositional defiant disorder; CD, conduct disorder; NOS, not otherwise specified.

and conceptualization of the underlying etiological mechanism of IA (11). When the effect of these variables on IA was controlled, IA prevalence was consistently found to be 2.5–3 times higher in the psychiatric sample group than in the control group. However, in studies that were conducted using a control group composed of community samples, the possibility of psychiatric disorder in the group of adolescents with IA was reported to be 3–4 times higher than in the control group. Those results have led to the belief that there is a two-way interaction between IA and psychological disorders. While on the one hand overuse of the Internet can become a method of alleviating psychiatric symptoms, on the other hand inappropriate use and overuse of the Internet can cause more symptoms to develop. Our study also suggests that there may be a strong relationship between IA and having a psychiatric disorder. However, further studies are needed in order to examine what specific types of psychiatric disorders are responsible for this strong relationship.

Many studies have also found the rates of IA to be higher in male adolescents (11–13). Since male adolescents having easier access to the Internet, using it for game-playing purposes might have contributed to the statistical differences between genders that were found in previous studies. In our study, no gender differences in the groups were found to be affecting the rates of IA, and neither the male adolescents in psychiatric sample group nor in the control group had more IA than girls. In addition, finding more IA in the control group when the effect of gender is controlled suggests that the existence of a psychological disorder is a more important indicator for IA than gender. More studies are needed to examine the sociological and psychological factors that relate to IA, in order to explain any gender differentiation.

This study is meaningful because it establishes the relationship between mental disorders and IA. The most common disorder diagnosed in the present study was ADHD (55.6%). ADHD affects 5–10% of children and 4% of adults in the general population (14). Studies on IA suggest that problematic Internet use is usually associated with ADHD and related symptoms (15, 16). Children and adolescents with ADHD are also more likely to have IA than their peers without ADHD (16, 17). Anxiety disorders were the second most common diagnostic group in the present study.

The most common anxiety disorder was generalized anxiety disorder (11.7%). However, this study is limited by the fact that it is a cross-sectional study rather than one that has a control group composed of community samples with no mental disorders. Comprehensive sample-sized longitudinal studies are needed to examine the relationship between IA and mental disorders through structured diagnosing meetings and to research specific differences between ways the groups are diagnosed.

The lack of a structured assessment method such as K-SADS in addition to the clinical assessment based on DSM IV-TR in the psychiatric patient group and the clinical evaluation by different investigators is a significant limitation of our study.

In our study, only taking into consideration the psychiatric diagnosis, and not evaluating objectively through scores of scales of variables that may be effective as anxiety, depression hence not checking out is one of the most important limitations.

In our study, focusing on the effect of only psychiatric disorders on internet addiction, not to emphasize other sociocultural factors that can play a role in the etiology of internet addiction is stated as an important limitation.

In current, the prevalence of IA in adolescents with psychiatric disorders was determined. The frequency of IA was found to be significantly higher in the psychiatric sample group than in the control group (24.1% vs. 8.8%, respectively). The most frequent reason for using the Internet in both the psychiatric sample group and the control group was reported as being to online play games. However, a few studies have now shed some light on the embedding of Internet gaming addiction in the context of the individual, the game and gaming environment, and the broader framework of culture (18, 19). Further studies are needed in order to examine what specific types of psychiatric disorders are responsible for this strong relationship and sociological and psychological factors that relate to IA. Comprehensive sample-sized longitudinal studies are needed to examine the relationship between IA and mental disorders through structured diagnosing meetings and to research specific differences between the groups are diagnosed.

Ethics Committee Approval: The study was approved by the Ethics Committee of Kocaeli University in accordance with the Declaration of Helsinki.

Informed Consent: Full written informed consent was obtained from the parents/guardians of each participant.

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