

ORIGINAL RESEARCH

The correlation between internet addiction, type of online activities and Attention Deficit-Hyperactivity Disorder among students of Kashan University of Medical Sciences

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Abstract

Objective: One of the groups at risk of Internet addiction are hyperactive people, who have been warned in many previous studies about the higher possibility of Internet addiction among them than the general population. The present study was conducted with the aim of investigating the correlation of internet addiction, type of online activities and attention deficit hyperactivity disorder among medical students of Kashan.

Materials and Methods: This cross-sectional study was conducted in Kashan. The questionnaires were given electronically and in paper form to the people. The questionnaire included demographic, the IAT and ASRS. The information was entered into the SPSS software version 26 and analyzed using Chi-2 and t-tests.

Results: In this study the average score of the ASRS questionnaire among the students was 46.2 ± 13.2 , of which 50 (11.3%) with ADHD. The average score of the IAT was 67.3 ± 13.0 , and most of the participants, 336 (76.2%) had a moderate addiction to the Internet and the rest, 105 (23.8%) had a severe addiction to the Internet. The most used cases of Internet in the study are, respectively, chat and social communication in 191 cases (43.3%), watching clips and movies in 88 cases (20.0%) and playing Internet games in 54 cases. The Internet addiction score among people with ADHD was 75.0 ± 9.5 , which was significantly higher than that of people without ADHD.

Conclusion: Based on the findings of this study, most of the students had a moderate addiction to the Internet, and hyperactivity had a significant relationship with Internet addiction.

Keywords: Hyperactivity, Internet, Addiction

Introduction

Internet addiction (IA), also known as 'pathological Internet use', refers to an individual's inability to control the amount of Internet use that results in helplessness and/or dysfunction (1). Internet addiction, first reported by Young, is now emerging as a new psychiatric disorder but is still not listed as an independent disease in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (2). Whether or not Internet addiction is a psychiatric disorder is still debated (3). Young first defined a primary diagnostic criterion for IA using the substance dependence criteria found in the DSM-IV-TR, but others consider it a behavioral addiction (4). In response to this disagreement, Yang revised her definition of Internet addiction and made it closer to an impulse control disorder (5). People who use the Internet excessively may suffer negative consequences such as arguing with others, fatigue, lying, academic or career failure, social isolation, and even functional issues such as academic failure, job loss, and marital problems (6). Recent epidemiological studies show that IA may be a common problem worldwide, especially in Asian countries (7, 8, 9). In the studies conducted, the prevalence of IA in Iran is 20%, which is 8.8% in China and 26.4% in Korea. Also, in the study based on age groups, the highest prevalence of IA (35%) is in the age group of 18-23 years old, which is still increasing (10).

Another psychiatric disorder is attention-deficit/hyperactivity disorder (ADHD), which begins in childhood and is characterized by symptoms of attention deficit and motor hyperactivity and leads to significant disruption in academic/occupational, family and social performance (11). In most cases, ADHD in adults in addition to hyperactivity and inattention - described in the children's population - has heterogeneous clinical manifestations including a wider range of functional and emotional disorders (12). Its prevalence in adults is reported to be about 3% (13). In terms of the complications and consequences of this disorder, it can be mentioned that the quality of life and daily activities of people decrease. Even in some cases, ADHD through co-morbidities such as IA (Internet addiction) can lead to a negative impact on the patient and his/her family in terms of economics, education and

interpersonal communication (14). Internet addiction is related to various psychiatric diseases including mood disorders, anxiety disorders and sleep disorders (15, 16, 17), previous studies show that ADHD is most associated with Internet addiction (18, 19). In a study that was conducted with the aim of finding clinical disorders related to Internet addiction, they found that disorders such as ADHD, generalized anxiety and fear of social disease and a number of personality disorders are related to each other. They also found the relationship between attention deficit hyperactivity disorder and Internet addiction among Korean primary school students (20, 21).

Another goal of this study is to investigate the relationship between IA and ADHD with the type of activity people have on the Internet. In recent studies, it has been shown that Internet addiction is actually an addiction to 'Internet activities' and not an addiction to 'Internet use' as a single activity (22). In this regard, examining the type of use that a person makes of the Internet will help to know the common characteristics of that activity with the related disorder. Finally, considering the above and the wide scale of internet use, its many adverse consequences and its potential risks. The purpose of this study is to examine the coexistence of internet addiction and attention deficit/hyperactivity disorder and their relationship with the type of activities on the internet. Students are potentially more vulnerable than other age groups.

Materials and Methods

In this descriptive-analytical cross-sectional study that was conducted with the aim of investigating the relationship between Internet addiction, the type of online activities and attention deficit hyperactivity disorder among Kashan medical students, the statistical population was students studying in Kashan University of Medical Sciences. After selecting the students in a simple random manner and using a table of numbers, the questionnaires were provided to the students in electronic and paper form. The criteria for entering the study were: studying at Kashan University of Medical Sciences, full-time access to network or mobile internet, and not being a transfer or guest student. Exclusion criteria: failure to fully respond to the questionnaire, history of

neurological and mental diseases in the individual (except ADHD).

The questionnaire used in this study included three parts of questions about the studied variables (demographic and primary findings of the participants) and IAT and ASRS questions. After completing the study questionnaires, the score of the questionnaires was calculated and the information was entered into the SPSS version 26 software and analyzed using Chi-2 and t-tests.

IAT questionnaire constructed by 'Yang'. This questionnaire contains 20 items that the subject must answer on a Likert scale from 0 to 5. The score of 0 to 30 indicates no Internet addiction, score of 31 to 49 indicates a mild Internet addiction, score of 50 to 79 indicates a moderate Internet addiction, and score of 80 to 100 indicates a severe Internet addiction. The validity and reliability of the questionnaire used in this study has been confirmed by Mousavi. The reliability of this questionnaire has been reported in Mousavi's research using Cronbach's alpha coefficient of 93%. (23).

The way to investigate ADHD disorder in adults is done with the ASRS-v1.1 questionnaire (24). The answers given to each of the test materials are graded on a 5-point scale (never = 0, sometimes = 0, often = 1, and most of the time = 1). To identify the prevalence of attention deficit hyperactivity disorder among subjects in the studies conducted in Iran, the reliability of this questionnaire using Cronbach's alpha was 0.81.

Descriptive characteristics were analyzed using statistical indicators of mean, standard deviation and frequency. 95% of confidence intervals were used to estimate the true prevalence in the studied population. Chi-square test or its non-parametric equivalent (Fisher's test) was used for the analysis. Excel, SPSS and STATA software were used for data processing. The significance level was 0.05.

Results

This cross-sectional study was conducted with the aim of investigating the relationship between Internet addiction, types of online activities and attention deficit hyperactivity disorder among Kashan medical students

Table 1 shows the demographic and initial findings of the students participating in the

study. Based on the findings, 441 students with an average age of 23.0 ± 3.0 years participated in this study, of which 265 (60.1%) were women, 87 (19.7%) were married, and most of the students were 209 people (47.4%) lived in the student dormitory, and most of them were medical students, 172 people (39.0%), and dentistry, 105 people (23.8%).

Table 1 Demographic and preliminary findings of the students participating in the study

Variable		Frequency	Frequency percentage	Standard deviation $\pm$ mean
Age(year)				23.0 $\pm$ 3.0
Gender	Female	265	60.1	
	Male	176	39.9	
Marital status	Single	354	80.3	
	Married	87	19.7	
Residence	Dormitory	209	47.4	
	Private house	86	19.5	
	With family	146	33.1	
Field of study	Medical	172	39.0	
	Dentistry	105	23.8	
	Nursing	64	14.5	
	Midwifery	33	7.5	
	Health	34	7.7	
	Other fields	33	7.5	
Total		441	100	

Based on the findings shown in Table 2, the average score of the ASRS questionnaire among students was 46.2 ± 13.2 points based on the questions of the first part of the questionnaire (6 questions), which was indicator of the participant's disease to ADHD, 50 people (11.3%) have met the criteria of suffering from it.

Table 2 Frequency and score of 'attention deficit hyperactivity disorder' among the studied subject

Variable		Frequency	Frequency percentage	Standard deviation $\pm$ mean
ASRS Questionnaire score				46.2 $\pm$ 13.2
People with ADHD	Has	50	11.3	
	Don't have	391	88.7	

Based on the findings shown in Table 3, the average score of the IAT questionnaire among students was 67.3 ± 13.0 , and most of the participants, 336 (76.2%) had moderate internet addiction. Others, 105 people (23.8%) had severe addiction to the Internet.

Table 3. Frequency and Internet addiction score among the studied subjects

Variable		Frequency	Frequency percentage	Standard deviation $\pm$ mean
IAT questionnaire score				67.3 $\pm$ 13.0
Category of participants	Not have	-	-	
	Mild	-	-	
	Moderate	336	76.2	
	Severe	105	23.8	

As shown in Table 4, the most used cases of Internet use among the students participating in the study are, respectively, chat and social communication, in 191 cases (43.3%), watching clips and movies in 88 cases. (20.0%) and internet games in 54 cases (12.2%).

Table 4. The frequency of the most used activities on the Internet platform in the studied subjects

Variable	Frequency	Frequency percentage
Chat and social communications	191	43.3
Game	54	12.2
Watching clips and movies	88	20.0
Training use	50	11.3
Occupational and business use	30	6.8
Other cases	28	6.3

According to the findings shown in Table 5, the Internet addiction score among people with ADHD was 75.0 ± 9.5 , significantly higher than people without ADHD, 63.8 ± 15.1 ($P < 0.001$).

Table 5 Internet addiction score according to ADHD among the study subjects

ADHD	IAT questionnaire score (standard deviation $\pm$ mean)	*P-value
Have	75.0 ± 9.5	0.001>P
Don't have	63.8 ± 15.1	

t-test independent*

Discussion

This cross-sectional study was conducted with the aim of investigating the relationship between Internet addiction, types of online activities and attention deficit hyperactivity disorder among Kashan medical students in 1402. According to the findings, the score of the ASRS questionnaire among the students was 46.2 ± 13.2 , based on the questions of the first part of the questionnaire (6 questions), which determined whether the participant had ADHD, 50 people (11.3 %) had the criteria of suffering from it. In a study conducted by Biederman (88) in 2006 with the aim of investigating the prevalence of ADHD in adults, its rate was estimated from one to five percent in different centers. In a study conducted by Ganji (25) in 2013 with the aim of investigating the prevalence of "Attention Deficit/Hyperactivity Disorder" and its subtypes in students of Azad Universities of Markazi Province, 1773 students (1191 men, 582 women)) were selected by stratified random sampling among all students of Azad universities of Markazi province. The overall prevalence of attention deficit/hyperactivity disorder among students was 6.6% in childhood and 7.3% in adulthood. In another study, Hadid (26) estimated the prevalence of hyperactivity at 3.7%. The reason for the higher rate of ADHD in the present study compared to the previous studies can be attributed to the difference in diagnostic tools in the conducted studies.

Based on the findings, the average score of the IAT questionnaire among students was 67.3 ± 13.0 , and most of the participants, 336 people (76.2%) had moderate addiction to the Internet, and no addiction or mild addiction were

observed among the participants. Others, 105 people (23.8%) had severe addiction to the Internet.

Contrary to the findings of this study, which showed a very high rate of internet addiction among students, in a study conducted by Salehi (27) in 2014 with the aim of investigating the prevalence of internet addiction and its related factors among students of Mashhad University of Medical Sciences, 383 of medical students were examined in 2013. It was found that 2.1% of the studied population were at risk and 5.2% were addicted. In this regard, Khanjani and Akbari (2013) (28) in another study, estimated 14% of Internet addiction among teenagers in Tabriz. The reason for the lower rate of Internet addiction in other studies can be attributed to the difference in the time periods of the study, the difference in the age of the statistical population, and the difference in the questionnaire used. In addition, the difference in the results of the studies can be attributed to the lack of a universal diagnostic criterion to define Internet addiction, which can be attributed to the incompatibility of the results of the studies. The prevalence of IA varies among the included studies. Cultural reasons and sample selection may also help explain differences in the results obtained.

According to the findings, the most used cases of using the Internet among the students participating in the study are, respectively, chat and social communication, in the amount of 191 cases (43.3%), watching clips and movies in 88 cases (20.0%). and internet games in the amount of 54 cases (12.2%).

In a study conducted by Salehi (27) in 2014 with the aim of investigating the prevalence of Internet addiction and its related factors among students of Mashhad University of Medical Sciences, 383 medical students of Mashhad were examined in 2012. Chatting with new people, communicating with friends and family, and playing games were among the most common activities of students.

In another study conducted by Jafari (29) on students of Kabul University, he found that the most used internet among students was to find scientific materials and resources.

The reason for the difference in the results obtained in different studies can be explained by the creation of many social networks in recent years and the daily entanglement of people with the Internet.

Based on the findings, the internet addiction score among people with ADHD was 75.0 ± 9.5 , significantly higher than that of people without ADHD, 63.8 ± 15.1 . In this regard, similar to the findings obtained, in the study conducted by Vatani (30), it was stated that people addicted to the Internet have significantly more symptoms of ADHD than people who are not addicted to the Internet. The findings of his study are in line with the findings of Yoo and colleagues (31) and also with the findings of Dalbudak and colleagues (32). Also, Dalbudak and colleagues (32) in Turkey found a significant relationship between ADHD symptoms and Internet addiction.

Ha and colleagues (2006) after their research also reported that more than 60% of children with Internet addiction have attention deficit disorder with hyperactivity (33). Yen and colleagues (2017) (34) stated that adolescents with Internet addiction showed much more symptoms of attention deficit hyperactivity disorder than adolescents who did not have Internet addiction. In 2012, Ko (15) in a prospective study that lasted for 2 years stated that teenagers with attention deficit hyperactivity disorder are more likely to be addicted to the Internet than other teenagers. In the study conducted by Vatani (30), the findings showed that internet addicts have significantly more ADHD symptoms than non-internet addicts. The findings of his study are in line with the findings of Yoo and colleagues (31) and also with the findings of Dalbudak and colleagues (32). Chen et al. (35) reported that severe ADHD symptoms were significantly associated with the occurrence of IA.

Despite the similar results obtained in the conducted studies, the heterogeneity between

some results obtained from the conducted studies can show the effect of demographic factors and other social or family factors on this relationship. In general, was recommended factors such as low family support, protective parenting style, low marks in university, poor interpersonal communication skills can be confounding factors that can affect the relationship between IA and ADHD and create different results. (36)

In summary, the findings of the present study indicated a positive relationship between IA and ADHD. Among the limitations of this research, we can point out the small number of samples, the non-cooperation of some students in filling out the questionnaires, which makes us unable to generalize the results of this research to the students of other universities. On the other hand, despite the results obtained, evidence supporting a causal relationship between IA and ADHD is still lacking.

Based on the findings of this study, most of the students had moderate internet addiction, and ADHD had a significant relationship with internet addiction. In addition, the most used cases of using the Internet among the students participating in the study were, respectively, chatting and social communication, watching clips and movies, and playing online games.

Conflict of interest

All authors declare that they have no conflicts of interest.

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