Original Article

# An investigation into the frequency of addiction to video games in children with attention-deficit hyperactivity disorder

**Katayoon Razjouyan[1], Mojgan Khademi[1], Zahara Yazdi Dorandish[2], Rozita Davari-Ashtiani[1]**

*[1]Child and Adolescent Psychiatrist, Shahid Beheshty University of Medical Sciences, [2]Shahid Beheshty University of Medical Sciences, Tehran, Iran*

## Abstract

**Background and Objective:** Attention-deficit hyperactivity disorder (ADHD) is known as the most common neurological disorder in childhood. Failure to timely diagnose ADHD can lead to harmful effects for the individual and the family. The relationship between this disorder and the addiction to video games has been reported in children. Therefore, this study aimed to investigate the degree of addiction to video games in Iranian children with ADHD, compared with normal children. **Materials and Methods:** In this applied research, 99 children with ADHD referring to Imam Hossein Hospital and 99 normal children in elementary schools of Tehran (control group) were recruited. Data were collected using Conner's Scale and Young's Internet Addiction Test (video games). The data were analyzed using SPSS (version 22). **Results:** In this study, 11% of the children with ADHD and 4% of the normal children had addiction to video games. This difference was significant between the two groups ($P < 0.05$). Moreover, 58% of the children with ADHD and 27% of the normal children were exposed to video games. This difference was also significant between the two groups ($P < 0.05$). **Conclusion:** The results showed that the frequency and prevalence of addiction to video games were higher in children with ADHD than in normal children. Therefore, it can be concluded that timely diagnosis of this disorder leads to better treatment.

**Keywords:** Attention-deficit, attention-deficit hyperactivity disorder (ADHD), addiction to video games, children, hyperactivity disorder

## Introduction

Video games have become popular among children and adolescents because they are exciting.[1] In addition to the positive effects of these games, the subsequent behavioral disorders in children as a result of addiction to them have led to a lot of studies in recent years.[2] Attention-deficit hyperactivity disorder (ADHD) is one of the most common abnormalities in childhood and is characterized by attention-deficit, impulsivity, and hyperactivity. Moreover, 60% of cases also occur in adulthood.[3] Because impulsivity is one of the fundamental components of attention-deficit disorder, it is reported that there is probably a correlation between addiction to video games and attention-deficit symptoms.[4] Accordingly, studies show that children with ADHD have a higher score and degree of addiction to video games.[5,6] Weinstein (2010) argued that addiction to video games was directly related to stress and depression.[7] Complete inactivation of the cortex causes the stimuli to accumulate and ultimately causes a lack of concentration in children with ADHD.[8] Dopamine secretion during the game, immediate rewards, and rapid response cause children with ADHD to

**Address for correspondence:** Dr. Mojgan Khademi, Child and Adolescent Psychiatrist, Shahid Beheshty University of Medical Sciences, Tehran, Iran.
E-mail: mkhademi@sbmu.ac.ir

**Received:** 13-06-2019 **Revised:** 07-01-2020
**Accepted:** 13-01-2020 **Published:** 28-02-2020

Access this article online

Quick Response Code:

Website: www.jfmpc.com

DOI: 10.4103/jfmpc.jfmpc_464_19



**How to cite this article:** Razjouyan K, Khademi M, Dorandish ZY, Davari-Ashtiani R. An investigation into the frequency of addiction to video games in children with attention-deficit hyperactivity disorder. J Family Med Prim Care 2020;9:669-72.

be attracted to video games.[4] Children with ADHD are more susceptible to drug abuse due to problems in judgment, impulsive behavior, and tendency to high-risk behaviors.[9] Given the similarity of physiological mechanisms between people with ADHD and addiction to video games, it is hypothesized that the prevalence of addiction to video games is higher among children with ADHD than normal people.[10] It has also been reported that addiction to the Internet and video games can be one of the predictors of ADHD and vice versa.[11] In spite of numerous studies in the world, limited information is available on the frequency of addiction to video games and its association with ADHD in Iranian children. Therefore, the study of the relationship between the addiction to video games and ADHD in children can play an important role in detecting this disorder and developing a better treatment.

## Materials and Methods

This descriptive study (case–control) was carried out on 99 children and adolescents with ADHD referring to Imam Hossein Hospital and 99 normal children and adolescents in elementary schools of Tehran (control group). All patients filled out informed consent application forms and data were kept confidential in all stages of the study. The sampling was performed randomly. In this study, Conner's Scale and Young's Internet Addiction Test were used to collect data. The items of Conner's Scale Conner included the following: (1) hyperactivity, (2) irritability, (3) harassing other children, (4) low attention, (5) fidgeting, (6) attention-deficit, (7) immediate fulfillment of demand and the feeling of deprivation, (8) crying, (9) quick change of emotional states, and (10) anger and unpredictable nervous behavior.

Young's Addiction Test: This test was designed by Kimberly Young (2009) with 20 items and scored by Likert's method (4). The scores for this test range from 0 to 100. Accordingly, a higher score indicates a greater dependence on video games and the problems that arise from it. According to the scores obtained, individuals are divided into the following groups: (1) normal Internet users (score: 20–49) and (2) addicted users who need treatment (score: 80–100). Young (2009) reported that the internal validity of the questionnaire was higher than 0.92 (4). Using the Young's Addiction Test, Alavi *et al.* (2010) reported that the Cronbach's alpha coefficient for the whole questionnaire was 0.88.[12] The questionnaires were standardized and used in various studies, enjoying a good validity and reliability. The normalization of the data was done using Kolmogorov–Smirnov (K-S) test. To investigate the relationship between qualitative variables and ADHD, *T*-test was used. Data were analyzed by SPSS (version 22). The significance level was 0.05 in all tests.

## Results

In this study, approximately 67% of the children with ADHD were boys and 33% were girls. The number of boys and girls was almost equal among the normal children.

**Table 1: Normality test of samples**

| | Normal children | Children with ADHD |
|---|---|---|
| Number | 99 | 99 |
| Mean | 33.62 | 47.56 |
| Standard deviation | 14.093 | 13.436 |
| Statistic | 0.167 | 0.124 |
| Significance level | 0.000 | 0.001 |

ADHD=attention-deficit hyperactivity disorder

Regarding the normalization test of the samples, as shown in Table 1, the significance level in both variables was less than 0.05. Therefore, the null hypothesis is verified, and it can be said that both variables have normal distributions. In this case, T-test can be used to compare the means of the two variables.

As shown in Table 2, the significance level of the Fisher's test is greater than 0.05. Therefore, the null hypothesis is not rejected. The results of the *T*-test should be analyzed. In the *T*-test, assuming that the two variables have equal levels of significance (0.000), the null hypothesis of the *T*-test is rejected. There is a significant difference between the two variables. According to the results, the first hypothesis of the research states that the prevalence of addiction to video game in the children with ADHD is higher than that of the normal children [Table 2].

According to the second hypothesis, in children with ADHD, the prevalence of addiction to video games in boys is higher than in girls. As shown in Table 2, the significance level of the Fisher's test is greater than 0.05. Therefore, the null hypothesis is not rejected. In this case, the results of the *T*-test in the case of equality of two variables should be analyzed. In the *T*-test, assuming that the two variables have equal levels of significance (0.001), the level of significance is less than 0.05. Therefore, the null hypothesis of the *T*-test is rejected. Furthermore, there is a significant difference between the variables. According to these results, the first hypothesis states that the addiction to video games is higher in boys with ADHD than in girls [Table 3].

## Discussion

The results indicated that addiction to video games among children and adolescents with ADHD was higher than that of normal children. Carli *et al.* (2013) observed that there was a direct correlation between addiction to video games and ADHD in children with this disorder.[10] Similarly, Walther *et al.* (2012) reported that the prevalence of ADHD, low-profile, anxiety, violence, and low self-esteem in addicted children was directly associated with video games.[13] This has led some researchers to point out video addiction as one of the symptoms of ADHD in children.[14] ADHD may potentially increase the frequency of addiction to video games. Accordingly, the severity of the ADHD may be directly associated with an increase in the degree of addiction to video games.[5] Further research is required to prove the correlation between ADHD and addiction to video games. In contrast, Bioulac *et al.* (2008) reported that there was no significant difference between two groups of

**Table 2: Results of the T-test for comparison of the two groups (normal vs. ADHD) in the first hypothesis**

| Groups | Status of variances | Obs. | Mean | Std. dev. | Levene's test for equality of variances | | *T* | Df | Sig. (two-tailed) | Mean diff. | Std. error diff. | 95% Conf. interval of the diff. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | *F* | Sig. | | | | | | Lower | Upper |
| Children - normal | With equal | 99 | 33.62 | 14.09 | 1.243 | 0.266 | −7.123 | 196 | 0.000 | −13.339 | 1.956 | −17.798 | −10.079 |
| Children - ADHD | variances | 99 | 47.56 | 13.43 | | | | | | | | | |
| Children - normal | With unequal | 99 | 33.62 | 14.09 | | | −7.123 | 195.55 | 0.000 | −13.339 | 1.956 | −17.798 | −10.079 |
| Children - ADHD | variances | 99 | 47.56 | 13.43 | | | | | | | | | |

ADHD=attention-deficit hyperactivity disorder

**Table 3: Results of the *T*-test for comparison of the two groups with ADHD (female vs. male) in the first hypothesis**

| Groups | Status of variances | Obs. | Mean | Std. dev. | Levene's test for equality of variances | | *T* | df | Sig. (two-tailed) | Mean diff. | Std. error diff. | 95% Conf. interval of the diff. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | *F* | Sig. | | | | | | Lower | Upper |
| ADHD - male | With equal | 66 | 50.61 | 13.69 | 0.807 | 0.371 | 3.358 | 97 | 0.001 | 9.152 | 2.725 | 3.743 | 14.560 |
| ADHD - female | variances | 33 | 41.45 | 10.68 | | | | | | | | | |
| ADHD - male | With unequal | 66 | 50.61 | 13.69 | | | 3.646 | 79.73 | 0.000 | 9.152 | 2.510 | 4.156 | 14.147 |
| ADHD - female | variances | 33 | 41.45 | 10.68 | | | | | | | | | |

ADHD=attention-deficit hyperactivity disorder

children in terms of addiction to video games.[15] This difference in results may be attributed to the low sample size and the use of the nine-item questionnaire in the study carried out by Bioulac *et al.* (2008).[15] Moreover, in a study conducted at Khomeini Shahr, there was no relationship between ADHD and addiction to video games as well as several behaviors related to psychological distress in children.[16] Using a different questionnaire may lead to different results. Various mechanisms have been proposed regarding the relationship between ADHD and addiction to video games, some of which include fear, emotional enhancement, impulsive behavior, and reduced feeling of frustration in children.[7] In this study, the prevalence of addiction to video games in the normal children was 4%, which was in good agreement with the results of the study conducted by Young (2009).[4] Wittek *et al.* (2016) reported that the prevalence of addiction to video games was higher in normal children, which could be due to lower age of the population and the different questionnaire.[17] The prevalence of addiction to video games in boys with ADHD was significantly lower than that of girls suffering from this disorder, which is consistent with the results of previous studies.[17,18] Hyun *et al.* (2015) reported that in addition to psychological factors, other factors such as age and gender may contribute to the addiction to video games.[19]

## Conclusion

The results indicated that addiction to video games was higher among children with ADHD than normal children. In the group of children with ADHD, the level and severity of video addiction in boys were higher than that of girls. Due to the relevance of the symptoms of ADHD and addiction to video games in children with this disorder, it can be concluded that early diagnosis of this disorder may offer better treatment.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## References

1. Keser H, Esgi N. An analysis of self-perceptions of elementary school students in terms of computer game addiction. Soc Behav Sci 2012;46:247-51.
2. Caplan SE. Relations among loneliness, social anxiety, and problematic Internet use. Cyberpsychol Behav 2007;10:234-42.
3. Yoon SY, Jain UR, Shapiro CM. Sleep and daytime function in adult with attention deficit/hyperactivity disorder: Subtype differences. Sleep Med 2013;14:648-55.
4. Young K. Internet addiction: Diagnosis and treatment considerations. Contemp Psychother 2009;241-6.
5. Yoo HJ, Cho SC, Ha J, Yune SK, Kim SJ, Hwang J, *et al.* Attention deficit hyperactivity symptoms and internet addiction. Psychiatry Clin Neurosci 2004;58:487-94.
6. Dalbudak E, Evren C. The relationship of internet addiction severity with attention deficit-hyperactivity disorder symptoms in Turkish university students; ADHD of personality traits, depression anxiety. Compr psychiatry 2014;55:497-503.
7. Weinstein AM. Computer and video game addiction – A comparison between game users and non-game users. Am J Drug Alcohol Abuse 2010;36:268-76.
8. Blum K, Chen A-C, Braverman E, Comings D, Chen T, Arcuri V, *et al.* Attention-deficit-hyperactivity disorder

and reward deficiency syndrome. Neuropsychiatr Dis Treat 2008;4:893-918.

9. Abedi Sh, Shirazi A.Hajebi. Is ADHD more prevalent in people who suffer from drug abuse? J Clin Psychol Psychother 2008;227-31.
10. Carli V, Durkee T, Wasserman D, Hadlaczky G, Despalins R, Kramarz E. The association between pathological internet use and comorbid psychopathology: A systematic review. Psychopathology 2013;46:1-13.
11. Weinstein A, Weizman A. Emerging association between addictive gaming and attention-deficit/hyperactivity disorder. Curr Psychiatry Rep 2012;14:590-7.
12. Alavi S, Merati M, Najafi M, Rezapour M. The psychological features of Young's addiction test. J Behav Sci 2009;183-9.
13. Walther B, Morgenstern M, Hanewinkel R. Co-occurrence of addictive behaviors: Personality factors related to substance use, gambling and computer gaming. Eur Addict Res 2012;18:167-74.
14. Ferguson CJ Do angry birds make for angry children? A meta-analysis of video game influences on children's and adolescent's aggression, mental health, prosocial behavior and academic performance. Perspect Psychol Sci 2015;10:646-66.
15. Bioulac S, Arfi L, Bouvard MP. Attention deficit/hyperactivity disorder and video games: A ADHD study of hyperactive and control children. Eur Psychiatry 2008;23:134-41.
16. Haghbin M, Shaterian F, Hasan Zade D, Griffiths MD. A brief report on the relationship between self-control, video game addiction and academic achievement in normal and ADHD students. J Behav Addict 2013;2:239-43.
17. Wittek CT, Finseras TR, Pallesen S, Nentzoni RA, Hanss D, Griffiths MD, *et al*. Prevalence and predictors of video game addiction: A study based on a national representative sample of gamers. Int J Ment Health Addict 2016;14:672-86.
18. Mentzoni RA, Brunborg GS, Molde H, Myrseth H, Skouveroe KJ, Hetland J, *et al*. Problematic video game use estimated prevalence and associations with mental and physical health. Cyberpsychol Behav Soc Netw 2011;14:591-6.
19. Hyun GJ, Han DH, Lee YS, Kang KD, Yoo SK, Chung US, *et al*. Risk factor associated with online game addiction: A hierarchical model. Videos in Hum Behav 2015;706-13.