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

Katayoon Razjouyan1, Mojgan Khademi1, Zahara Yazdi Dorandish2, Rozita Davari-Ashtiani1

1Child and Adolescent Psychiatrist, Shahid Beheshty University of Medical Sciences, 2Shahid 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. 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. 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. 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. Accordingly, studies show that children with ADHD have a higher score and degree of addiction to video games. Weinstein (2010) argued that addiction to video games was directly related to stress and depression. Complete inactivation of the cortex causes the stimuli to accumulate and ultimately causes a lack of concentration in children with ADHD. Dopamine secretion during the game, immediate rewards, and rapid response cause children with ADHD to...
be attracted to video games. Children with ADHD are more susceptible to drug abuse due to problems in judgment, impulsive behavior, and tendency to high-risk behaviors. 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. It has also been reported that addiction to the Internet and video games can be one of the predictors of ADHD and vice versa. 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. 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. 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. 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. 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. This has led some researchers to point out video addiction as one of the symptoms of ADHD in children. 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. 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 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

### Table 2: Hypothesis test

|                | Normal children | Children with ADHD |
|----------------|-----------------|--------------------|
| Significance level | 0.000           | 0.001              |

ADHD=attention-deficit hyperactivity disorder
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.

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Conflicts of interest

There are no conflicts of interest.

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