Int J High Risk Behav Addict. 2018 December; 7(4):e69194. doi: 10.5812/ijhrba.69194.

Published online 2018 July 31. **Research Article**

The Prevalence of Attention Deficit-Hyperactivity Disorder Symptoms Among Students and Its Relation with Drug Consumption

Fariba Arabgol [1], Maryam Lashkaripour [2], Nafiseh Shabani [3,*] and Maryam Ziaei [4]

[1] Behavioral Science Research Center, Shahid Beheshti University of Medical Sciences , Tehran, IR Iran
[2] Department of Psychiatry and Clinical Psychology, Baharan Psychiatric Hospital, Zahedan University of Medical Sciences, Zahedan, IR Iran
[3] Students' Scientific Research Center, Department of Psychiatry and Clinical Psychology, School of Medicine, Zahedan University of Medical Sciences, Zahedan, IR Iran
[4] School of Medicine, Zahedan University of Medical Sciences, Zahedan, IR Iran

[*] *Corresponding author*: Students' Scientific Research Center, Department of Psychiatry and Clinical Psychology, Zahedan University of Medical Sciences, Zahedan, IR Iran. Tel: +98-9158485985, Email: nafiseshabany999@gmail.com

Received 2017 April 29; **Revised** 2018 April 08; **Accepted** 2018 June 23.

Abstract

Background: Although Attention Deficit-Hyperactivity Disorder (ADHD) is a common mental disorder among adults, until recently, it was seldom diagnosed in adults. The significance of this disorder as a disease afflicting adults is increasing on a daily basis due to the complications associated with it such as disrupting occupational and educational functionality, as well as increasing the probability of drug abuse among those suffering from it.
Objectives: With due regard to the significance of the subject. This study was conducted with the purpose of investigating the ADHD symptoms exhibited by students at Zahedan University of Medical Sciences.
Patients and Methods: The present investigation is a descriptive-analytical study conducted at Zahedan Universitsy of Medical Sciences. The consensus sampling method was implemented to a sample volume consisting of 1000 persons. Based on the goals set in this research, two questionnaires were presented to the students to be completed arbitrarily: the demographic questionnaire and the Conners Adult ADHD Rating Scale Screening Version (CAARS-O:SV) questionnaire. The obtained information was then fed as input to the SPSS Software for analysis.
Results: Of the 1000 questionnaires, 913 were completely answered by participants: 589 (64.5%) by female and 324 (35.5%) by male students. The average age of the participants was 21.7 $\pm$ 3.2. About 8% of the students reported drug abuse during the previous month. Compared with the symptom-free group, 27.1% in the inattention group, 30.3% in the hyperactivity group, 28.1% in the impulsiveness group, and 36.7% in the self-image problem group mentioned cases of drug abuse.
Conclusions: The obtained results seem to indicate frequent occurrences of ADHD symptoms among the students. This requires further clinical evaluation and, if possible, diagnosis and consequent medical treatment for preventing the loss of educational performance or possible drug abuse, as well as decreasing impulsiveness.

Keywords: Medical Students, Attention Deficit Disorder with Hyperactivity, Substance-Related Disorders

1. Background

ADHD is an evolutionary nervous-behavioral disorder often diagnosed during childhood and characterized by the main symptoms of inattention, hyperactivity, and impulsivity, which could lead to weak occupational, academic, and social performance in the future (1). In spite of the publication of extensive studies about its occurrence in adults since the mid-1970s, the disorder is rarely diagnosed in adults (2). Approximately 30% to 70% of children suffering from the ADHD enter adolescence with their affliction, and doctors prescribe a continuation of therapy for them (3, 4).

Different studies report an ADHD incidence of 0.3% to 6% in adults (1, 5-9). The incidence rate is also high, 30% to 50%, among drug abuse patients (10), which makes responding to therapy difficult for them (6, 11).

ADHD in adults is characterized by hyperactivity in motor function, inattention, strong emotional response, and low stimulation threshold, as well as sudden fits of extreme anger, impulsivity, weak stressful communicational characteristics, instability in personal relationships with others, professional and educational frustration, alcohol abuse, and abnormal response to medication or psychotherapy (2). The disorder and the associated inattention difficulties that afflict adults are particularly problematic for university students. Adults suffering from ADHD have difficulty planning and completing their as-

signments, carrying out their occupational duties in a timely manner, listening to other people, staying focused while reading, taking logical decisions, etc. (7). Such people are very much exposed to the risks associated with failure in their achievements and professional progress (12, 13).

A study conducted on female students in Tehran, Iran, in 2004, reports the incidence of this disorder on the basis of hyperactivity-inattention index as 3.7% (7).

The coincidence of ADHD and its dependency on drugs has recently received much attention in scientific and clinical investigations. ADHD symptoms are considered as a potential risk factor for drug abuse. Persons afflicted with ADHD may start using drugs at an earlier age and show a more aggressive consumption pattern (14-16). For example, a study on a group of American students stresses the significance of controlling ADHD symptoms in preventing a higher risk of drug abuse (17). Tobacco, drug usage, and smoking, are more common among children and adolescents with ADHD (8). A study conducted at Harvard Medical School in 2006 enumerates cigarette smoking in adolescents and young people suffering from ADHD as a prelude for future drug abuse (18). Observations on ADHD patients with a history of constant habitual smoking indicate that they start smoking at a younger age and smoke a higher number of cigarettes. This provides evidence for the existence of a specific relationship between ADHD symptoms and the risk of tobacco consumption (19).

2. Objectives

Considering the characteristics of ADHD and the negative social, domestic, and academic consequences associated with the probable drug abuse by individuals suffering from the disorder, and also considering the fact that few studies on the incidence of ADHD symptoms in adults have so far been conducted in Iran, we conducted the present study to investigate the spread of drug abuse among university students demonstrating ADHD symptoms, in an effort to use the obtained statistics for earlier, more exact diagnosis of the disorder, thus taking a step, however small, towards the prevention of the secondary damages, e.g., loss of academic performance and possible drug abuse, associated with this disorder.

3. Patients and Methods

The Medical University of Zahedan, department of Psychology Ethics Committee, provided ethical approval for this study. Prior to conducting this study, permission and consent were obtained from the students. Due to the fact that the only document linking participants to their data would have been a written consent, it was determined that the best practice to protect participants' privacy and anonymity was verbal consent. Participants provided verbal informed consent to participate in the study. Participation in the study was voluntary and instruments were completed anonymously. No names or any form of identifiers were allowed on the response sheets. Although all students were allowed to participate, they were specifically told at the beginning that they could opt out or alternatively leave the questionnaire blank. Verbal consent was documented on a separate spreadsheet and kept separate from the data.

This is a descriptive-analytic investigation conducted in the first semester of the 2007-2008 academic year at Zahedan University of Medical Sciences. The available sampling method was applied to a sample volume of 913 persons. The investigated population included all the students of Zahedan University of Medical Sciences without any diagnosing of psychological disorders; in addition, they would have been excluded from the study if they had suffered psychiatric disorders or were unsatisfied in taking part in this examination; the uncompleted questionnaires were removed.

Two questionnaires, the demographic characteristics and the Conners' Adult ADHD Rating Scales–Observer: Screening Version (CAARS–O:SV), were made available to the students along with their credit hour selection and registration forms to be answered on a voluntary basis. Both questionnaires have a self-reporting format without mentioning the person's name or family name. CAARS-O: SV (20) questionnaire has a suitable degree of reliability and validity; it includes 30 items scored between 0 and 3 and the following four criteria are considered when evaluating it:

A. Inattention/ Memory Problems

B. Restlessness/ Hyperactivity

C. Emotional Instability/ Impulsiveness

D. Difficulty in Portraying a General Image of Oneself

The raw scores obtained for each sub-scale have been converted into t-scores through the use of appropriate normalization tables (the t-scores in this scale have the mean and the standard deviation values of 50 and 10, respectively). T-scores above 65 are clinically significant, T-scores between 66 and 70 are considered as above average, T-scores above 70 are seen as well above average, and T-scores above 80 reflect the severity of problems and pathology in the studied domain. Arabgol et al. (2004) used the Alpha-Cronbach Method to calculate reliability and validity, obtaining a value equal to 0.81. In addition, in references (7,

21), a suitable content validity has been reported. Having collected the preliminary data, data evaluation was done by using SPSS 16 Software.

4. Results

The research was initially conducted on 913 university students; however, the data for 87 students was incomplete and consequently omitted. Of the 913 individuals, 589 (64.5%) were female and 324 (35.5%) were male. The participants' age group was 18 - 44 and their average age was 21.7 $\pm$ 3.2 (Table 1).

Table 1. The Frequency of Participating Students Based on Demographic Characteristics

Demographic Characteristics Frequency	Number	Percentage	Total[a]
Gender			913 (100)
Female	589	64.5	
Male	324	35.5	
Age			913 (100)
< 20	402	44.03	
20 - 25	374	40.9	
> 25	137	15	
Course of Study			913 (100)
Medicine	223	24.4	
Dentistry	111	12.2	
Paramedical science	235	25.7	
Midwifery (obstetrics)	81	8.9	
Nursing	102	11.2	
Hygienics	159	17.4	
Unspecified	2	0.2	

[a]Values are presented as No. (%).

The students were screened for ADHD symptoms through the use of the Conners Adult ADHD Rating Scale. The results showed above-average scores for the inattention index in 107 persons (11.7%), for the hyperactivity index in 109 persons, for the impulsiveness index in 121 persons (13.2%), and for the self- image index in 30 persons (3.3%).

The participants were mostly below 30 years old (44.03%). In this age group, the frequency of ADHD symptoms in all subscales, i.e., the inattention subscale (11.2%), the hyperactivity subscale (11.2%), the impulsiveness subscale (14.5%), and the self-image problem subscale, was obtained as above average or well above average.

In the 20 - 25 years age group, the frequency of ADHD symptoms was also obtained as above average or well above average as follows: in the inattention subscale, in the hyperactivity subscale in 31.9%, in the impulsiveness subscale in 14.2%, and in the self-image problem subscale in 2.7% of the studied cases.

In the above-25-years age group, the frequency of ADHD symptoms was obtained as above average or well above average in the following manner: in the inattention subscale in 9.4%, in the hyperactivity subscale in 8.7%, in the impulsiveness subscale in 7.3%, and in the self-image problem subscale in 3.7% of the studied cases (Table 3).

With regard to ADHD symptoms frequency based on gender, the results indicate above average or well above average values in the inattention, hyperactivity, impulsiveness, and self-image problem indices as follows: in the male gender, 19.7%, 18.2%, 21%, and 2.4%, and in the female gender 7.3%, 8.5%, 21%, and 3.7%, respectively (Table 3).

A comparison of the mean scores based on gender obtained by students for inattention, hyperactivity, impulsiveness, and self-image problem indices indicated that men have higher scores in all subscales except the self-image subscale, and that the difference in these scores is significant ($P = 0.001$). However, in the self-image problem subscale, no significant difference was observed.

Overall, 8% of the students mentioned having abused drugs in the previous month. In addition, results showed that in about 27.1% of above average cases in the inattention subgroup, 30.3% of above average cases in the hyperactivity subgroup, 28.1% of above average cases in the impulsiveness subgroup, and 36.7% of the cases in the self-image problem subgroup, drug abuse had been reported. Generally, the score difference between the drug-abuse group and the non-drug-abuse group is significant ($P \leq 0.05$).

5. Discussion

In this study, ADHD adult symptoms were observed in 15.4% of the students, which is in agreement with the rates of incidence reported in similar studies, though somewhat higher than those obtained in some other studies, which report the adult rate of incidence as between 0.3% and 6% (1, 6-9). In a study conducted on 409 female students in Iran in 2004, the incidence of the disorder based on the Inattention-Hyperactvity Index was reported to be 3.7% (7). Studies indicate that such symptoms create disruptions in students' academic performance, leading to retardation in academic progress and prolonging the duration of academic studies. The symptoms can even create problems in the students' progress as well as their achievements in terms of continuation of their studies at higher postgraduate levels (2, 20, 22).

The incidence of this disorder in the general population, without a university education, is greater and students suffering from the symptoms rarely manage to com-

Table 2. The Frequency of ADHD Symptoms Based on Inattention, Hyperactivity, Impulsiveness, and Self-Image Problem Indices

Index	Frequency					
	Above Average (T = 66 - 70)		Well Above Average (T > 70)		Normal	
	Number	Percent	Number	Percent	Number	Percent
Inattention	47	5.1	60	6.6	806	88.3
Hyperactivity	51	5.6	58	6.4	804	88.1
Impulsiveness	36	3.9	85	9.3	792	86.8
Self-image problem	19	2.1	11	1.2	883	96.7

Table 3. The Frequency of ADHD Symptoms in Terms of Age and Gender in Inattention, Hyperactivity, Impulsiveness, and Self-Image Problems

	Frequency					
	Above Average		Well Above Average		Normal	
	Number	Percent	Number	Percent	Number	Percent
Age						
< 20						
Inattention	18	4.5	27	6.7	357	88.8
Impulsiveness	18	4.5	40	10	344	85.6
Hyperactivity	21	5.2	24	6	357	88.8
Self-image problem	10	2.5	5	1.2	387	96.3
20 - 25						
Inattention	24	6.4	25	6.7	325	86.9
Impulsiveness	15	4	38	10.2	321	85.8
Hyperactivity	25	6.7	27	7.2	322	86.1
Self-image problem	7	1/9	3	0.8	364	97.3
> 25						
Inattention	5	3.6	8	5.8	124	90.5
Impulsiveness	3	2.2	7	5.1	127	92.7
Hyperactivity	5	3.6	7	5.1	125	91.2
Self-image problem	2	1.5	3	2.2	132	96.4
Gender						
Male						
Inattention	28	8.6	36	11.1	260	80.2
Impulsiveness	24	7.4	35	10.8	265	81.8
Hyperactivity	18	5.6	50	15.4	256	79
Self-image problem	3	0.9	5	1.5	316	97.5
Female						
Inattention	19	3.2	24	4.1	546	92.7
Impulsiveness	27	4.6	23	3.9	539	91.5
Hyperactivity	18	3.1	35	5.9	536	91
Self-image problem	16	2.7	6	1	567	96.3

plete their university education (7). In regards to the impulsiveness subscale, which indicates a considerable incidence of 13.2%, it should be mentioned that this subscale is the most severe aspect of ADHD during the lifetime of the afflicted person since it causes disruptions in performance and makes treatment more difficult (23). By causing marital conflict, impulsiveness can create problems in relationships between spouses and lead to disturbances in the professional performance. In a study conducted in Tehran, in 4.9% of cases, the Impulsiveness Index was above average or well above average. In the present study, the incidence of the mentioned index was higher (7). The least percentage for ADHD symptoms, 3.3%, was obtained for the self-image problem index in men. In a different study, the highest frequency was obtained as 7.8% for subscale B (hyperactivity-restlessness), and the least frequency was 2% for subscale D (self-image problem) and subscale A (inattentiveness-memory problem) (7), which was not in agreement with our results.

A significant difference was observed in the inatten-

tiveness, hyperactivity, and impulsiveness symptoms between men and women (P = 0.0001), while in the case of self-image problem, no significant difference was found (P = 0.679). In a study conducted in Tehran (7), no significant difference was reported between the two groups (those scoring above 65 and those scoring below 65), and no statistically significant difference was observed between the same groups in terms of academic level, which agrees with our results. Overall, the greatest percentage of ADHD symptoms relates to the impulsiveness subscale (13.2%) and the smallest percentage to the self-image problem subscale (3.3%). In the study conducted by Arabgol et al. the highest frequency corresponds to hyperactivity and the least to the subscale D (problems with a general image of self) (2%), which agrees with our study only in the case of the least frequency of symptoms. Also, the severity of symptoms in subscales A, B, and C refers to well above average, and only in subscale D were symptoms with above-average severity observed.

The highest percentage for frequency of impulsiveness symptoms was observed in the students of hygienics to be 17.7% and the least corresponding value was 5% for the students of midwifery. Moreover, the most and the lowest frequencies for inattention symptoms were observed to be 14.4% in students of hygienics and 1.2% for the students of midwifery, respectively.

The most and the least frequently observed hyperactivity symptoms were 17.6%, which was observed in the students of hygienics, and 5% was observed in the students of midwifery, respectively. The most self-image problem symptoms were observed in the students of dentistry (5.4%) and the least corresponding symptoms in the students of midwifery (1.2%). In Arabgol and Hadid's study (7), the most and the least corresponding frequencies were reported among BS. and PhD. academic levels, respectively.

In the present study, the incidence of drug abuse among students exhibiting ADHD symptoms is much higher than those without these symptoms. We can say that ADHD could be considered as a possible prelude for drug abuse, and a cause of tendency towards consumption of drug (16). It is also mentioned that the illegal consumption and abuse of stimulants has recently increased among university students, which could be due to the existence of undiagnosed hyperactivity-inattention symptoms in these students (24). Also, impulsivity may predispose individuals in addition with ADHD to do risky behaviors (25). Therefore, controlling ADHD symptoms is important in that it would lower the risk of disruptions caused by drug abuse (17).

ADHD is also related to increased risk of cigarette smoking. Observations of ADHD patients with a constant habitual smoking behavior show that they start smoking at an earlier age and smoke a greater number of cigarettes. This provides further evidence of there being a definitive relationship between ADHD symptoms and the risk of tobacco consumption (8, 19).

Obviously, the widespread incidence of ADHD in adults makes timely treatment and further studies into the problem a necessity, both for the determination of the degree of its incidence in the general population and for the normalization of the available questionnaires. On the other hand, practical solutions such as the psychological evaluation of students at their introductory registration, highlighting the disorder at university counseling centers, and giving more awareness to counselors as well as guidance to the students suffering from ADHD for treatment, would help to lessen the undesirable effects of ADHD on the professional, academic, and domestic life of adults afflicted with it.

The limitations of this study include the small size of the studied sample volume, the non-randomness and availability of the sampling method, and the application of the self-reporting method.

5.1. Conclusion

It seems that ADHD symptoms in adults, which are not rare among students, can be an effective factor in the triggering and continuation of drug abuse, as well as in the loss of academic performance in these persons. Therefore, screening, diagnosis, and timely treatment are necessary for preventing the negative consequences associated with this disorder in students.

Acknowledgments

The authors hereby express their gratitude to the students, academic affairs, and dormitory officials of Zahedan University of Medical Sciences for their cooperation in the study.

Footnotes

Financial Disclosure: The authors have no conflicts of interest.

Funding/Support: This study was supported by Zahedan University of Medical Sciences, Zahedan, IR Iran.

References

1. Kalbag AS, Levin FR. Adult ADHD and substance abuse: diagnostic and treatment issues. *Subst Use Misuse*. 2005;**40**(13-14):1955–81. 2043-8. doi: 10.1080/10826080500294858. [PubMed: 16282088].

2. Wender PH. *Adult manifestations of attention-deficit/Hyperactivity disorder. In Kaplan & Sadocks comprehensive textbook of psychiatry*. 7thed ed. 2000.
3. Biederman J, Faraone S, Milberger S, Guite J, Mick E, Chen L, et al. A prospective 4-year follow-up study of attention-deficit hyperactivity and related disorders. *Arch Gen Psychiatry*. 1996;**53**(5):437–46. [PubMed: 8624187].
4. Harpin VA. The effect of ADHD on the life of an individual, their family, and community from preschool to adult life. *Arch Dis Child*. 2005;**90 Suppl 1**:i2–7. doi: 10.1136/adc.2004.059006. [PubMed: 15665153]. [PubMed Central: PMC1765272].
5. Bakhshani NM, Babaei S, Raghibi M. Self-reported ADHD symptoms prevalence in a university student population: using adult self-report-V1.1 screener. *Modern Appl Sci*. 2012;**6**(8):63. doi: 10.5539/mas.v6n8p63.
6. Johann M, Bobbe G, Laufkotter R, Lange K, Wodarz N. [Attention-deficit hyperactivity disorder and alcohol dependence: a risk constellation]. *Psychiatr Prax*. 2004;**31 Suppl 1**:S102–4. German. doi: 10.1055/s-2004-834591. [PubMed: 15570519].
7. Arabgol FHM, Hadid M. Prevalence of adult attention deficit/hyperactivity symptoms in group of students. *New Cogn Sci*. 2004;**6**(1,2):73–7.
8. Bakhshani NM. Attention-deficit/hyperactivity disorder (ADHD) and high risk behaviors. *Int J High Risk Behav Addict*. 2013;**2**(1):1–2. doi: 10.5812/ijhrba.12817. [PubMed: 24971263]. [PubMed Central: PMC4070133].
9. Bayrami M, Alizadeh Goradel J, Hashemi T, Mahmood-Alilu M. Predicting a tendency to use drugs from child and adult attention deficit hyperactivity disorder symptoms in adults. *Int J High Risk Behav Addict*. 2012;**1**(3):104–8. doi: 10.5812/ijhrba.6630. [PubMed: 24971245]. [PubMed Central: PMC4070118].
10. Carpentier PJ, de Jong CA, Dijkstra BA, Verbrugge CA, Krabbe PF. A controlled trial of methylphenidate in adults with attention deficit/hyperactivity disorder and substance use disorders. *Addiction*. 2005;**100**(12):1868–74. doi: 10.1111/j.1360-0443.2005.01272.x. [PubMed: 16367988].
11. Wodarz N, Lange K, Laufkotter R, Johann M. [ADHD and alcohol dependence: a common genetic predisposition?]. *Psychiatr Prax*. 2004;**31 Suppl 1**:S111–3. doi: 10.1055/s-2004-828449. [PubMed: 15570522].
12. Mannuzza S, Klein R, Bessler A, Malloy P, Lapadula M, Schowalter JE. Adult Outcome of Hyperactive Boys: Educational Achievement, Occupational Rank, and Psychiatric Status. *Year Book Psychiatr Appl Mental Health*. 1995;**1995**(3):79–81.
13. Johnston C, Mash EJ. Families of children with attention-deficit/hyperactivity disorder: review and recommendations for future research. *Clin Child Fam Psychol Rev*. 2001;**4**(3):183–207. [PubMed: 11783738].
14. Kawada T. Predictive ability for drug use in sub-clinical students with attention deficit hyperactivity disorder by questionnaire survey. *Int J High Risk Behav Addict*. 2013;**2**(1):43. doi: 10.5812/ijhrba.9578. [PubMed: 24971271]. [PubMed Central: PMC4070139].
15. Davids E, von Bunau U, Specka M, Fischer B, Scherbaum N, Gastpar M. History of attention-deficit hyperactivity disorder symptoms and opioid dependence: a controlled study. *Prog Neuropsychopharmacol Biol Psychiatry*. 2005;**29**(2):291–6. doi: 10.1016/j.pnpbp.2004.11.014. [PubMed: 15694237].
16. Vaiva G, De Chouly De Lenclave MB, Bailly D. Treatment of comorbid opiate addiction and attention-deficit hyperactivity disorder (residual type) with moclobemide. *Progress Neuro Psychopharmacol Biologic Psychiatr*. 2002;**26**(3):609–11. doi: 10.1016/s0278-5846(01)00259-7.
17. Upadhyaya HP, Rose K, Wang W, O'Rourke K, Sullivan B, Deas D, et al. Attention-deficit/hyperactivity disorder, medication treatment, and substance use patterns among adolescents and young adults. *J Child Adolesc Psychopharmacol*. 2005;**15**(5):799–809. doi: 10.1089/cap.2005.15.799. [PubMed: 16262596].
18. Biederman J, Monuteaux MC, Mick E, Wilens TE, Fontanella JA, Poetzl KM, et al. Is cigarette smoking a gateway to alcohol and illicit drug use disorders? A study of youths with and without attention deficit hyperactivity disorder. *Biol Psychiatry*. 2006;**59**(3):258–64. doi: 10.1016/j.biopsych.2005.07.009. [PubMed: 16154546].
19. Kollins SH, McClernon FJ, Fuemmeler BF. Association between smoking and attention-deficit/hyperactivity disorder symptoms in a population-based sample of young adults. *Arch Gen Psychiatry*. 2005;**62**(10):1142–7. doi: 10.1001/archpsyc.62.10.1142. [PubMed: 16203959].
20. Conners C, Erhardt D, Sparrow E. *Conners' adult ADHD rating scales (CAARS) technical manual*. North Tonawanda, NY: Multi-Health Systems. Inc CIT0008; 1999.
21. Sobanski E. Psychiatric comorbidity in adults with attention-deficit/hyperactivity disorder (ADHD). *Eur Arch Psychiatry Clin Neurosci*. 2006;**256 Suppl 1**:i26–31. doi: 10.1007/s00406-006-1004-4. [PubMed: 16977548].
22. Biederman J, Newcorn J, Sprich S. Comorbidity of attention deficit hyperactivity disorder with conduct, depressive, anxiety, and other disorders. *Am J Psychiatry*. 1991;**148**(5):564–77. doi: 10.1176/ajp.148.5.564. [PubMed: 2018156].
23. Heiligenstein E, Guenther G, Levy A, Savino F, Fulwiler J. Psychological and academic functioning in college students with attention deficit hyperactivity disorder. *J Am Coll Health*. 1999;**47**(4):181–5. doi: 10.1080/07448489909595644. [PubMed: 9919849].
24. Klein RG, Mannuzza S. Long-term outcome of hyperactive children: a review. *J Am Acad Child Adolesc Psychiatry*. 1991;**30**(3):383–7. doi: 10.1097/00004583-199105000-00005. [PubMed: 2055874].
25. Bakhshani N. Impulsivity: A predisposition toward risky behaviors. *Int J High Risk Behav Addict*. 2014;**3**(2). 20428. doi: 10.5812/ijhrba.20428.