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Frequency of adult attention-deficit hyperactivity disorder among patients with substance use disorder in addiction treatment centers of Babol University of Medical Sciences

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Abstract

Introduction: Substance use disorder (SUD) is one of the serious problems among patients who suffer from Attention-Deficit Hyperactivity Disorder (ADHD) that affects the lifestyle of individuals. Accordingly, the extant study was conducted to examine the frequency of ADHD among patients with SUD.

Materials and Methods: This was a descriptive-analytical study conducted on all patients with SUD referred to addiction treatment centers of Babol University of Medical Sciences during 2018-2019. The required data were collected through Adult ADHD Self-Report Scale (ASRS-1,1) and structured clinical interviews.

Results: In the present research, about 26% of studied statistical populations were women, and 74% were men. After implementing the self-report test and interview, about 28.6% were diagnosed with ADHD. There was a borderline difference between education levels of people with ADHD, so that subjects with diploma degrees had the highest frequency, while subjects with academic degrees had the lowest frequency among ADHD patients compared to healthy people and low level of ADHD ($P<0.05$). There was a borderline difference between ADHD patients and healthy people and low level of ADHD in terms of job ($P<0.05$). The unemployed patients and employees had the highest and lowest frequencies, respectively. There was not any significant difference between ADHD patients and healthy people and low-level of ADHD in terms of substance type and amount of substance.

Conclusion: The findings of the present study showed that about one-third of patients with SUD suffer from ADHD which should be considered by physicians.

Keywords: Attention-Deficit Hyperactivity Disorder (ADHD), substance use disorder (SUD), Neurodevelopmental Disorders, Methadone

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Introduction

Attention deficit hyperactivity disorder (ADHD) is a neurobehavioral, developmental disorder most often diagnosed during childhood, adolescence, and adulthood worldwide marked by the core symptoms of inattention, hyperactivity, and impulsivity (1).

Many references have reported the prevalence of this disorder at 4-10% in the world (2, 3, 4). If the assumption is correct that there is no adult ADHD and if there is an absence of childhood disorder, an approximate estimation will be achieved from the ADHD prevalence among adults. In this case, 1) ADHD prevalence is assessed among children 2) disease process in children is revised, which is disorder prognosis (2).

About 30-70% of children with ADHD suffer from this disorder during their adolescence and experience problems in their relationships with family, society, marriage, and jobs. This disorder destroys the executive function of the patient, making the behaviors requiring self-regulation problematic and making the patient unable to show appropriate behaviors (5). The continuous process of ADHD disorder during adulthood and adolescence may lead to negative consequences, such as substance use disorder (SUD) Many studies have proved the interconnection between SUD and ADHD.

The current findings imply that ADHD causes have mainly genetic origin with about 75% inheritance root. In some cases, factors affecting ADHD occurrence may include toxic materials exposure before birth, prematurity, and pre-birth mechanical injuries to the neural system of the fetus. However, the role of artificial food colors, preservatives, and sugar have not been introduced as ADHD causes. There is not any clear evidence about the effectiveness of omega-3 fatty acids in treating ADHD. In general, ADHD causes can be divided into several groups (6).

On the other hand, SUD is one of the dilemmas in the human community, so governments and international communities assign a major part of their expenditures to fight against this problem. According to death rates caused by SUD, SUD is considered one of the most common reasons for death in the world. SUD causes much somatic, mental, familial, social, and economic harm, which may result in a serious loss in personal and social actions (7).

Comorbidity of ADHD and SUD has been reported between 14 and 23%, while the correlation between undiagnosed or untreated ADHD and SUD has been reported to 56% (8). According to researches, ADHD patients have serious problems with avoidance, which reduces their mental abilities (5) and paces the way for SUD.

In general, people with ADHD may use the substance with two-times greater probability and may use more amounts of materials four- and five-times greater probability (9). ADHD patients are more interested in SUD due to judgment disorder, impulsivity, and risky behaviors. Substance abuse is a kind of self-treatment for ADHD patients (10).

It is appropriate to study the comorbidity of ADHD and SUD because SUD is highly seen in ADHD patients, SUD in adolescence may indicate ADHD symptoms (11), and a high prevalence of ADHD and SUD comorbidity may be seen among patients (12). Therefore, the extant study was conducted using the cross-sectional method to examine the frequency and probability of ADHD disorder among patients with SUD under the treatment in SUD treatment centers of Babol University of Medical Sciences.

Materials and Methods

Papulation

The extant study was descriptive-analytical research with cross-sectional type. The studied population comprised all patients with SUD referred to addiction treatment centers of Babol University of Medical Sciences in 2018 and 2019. Inclusion criteria were as follows: substance use disorder, satisfaction for participation, lack of psychotic disorder, lack of mental retardation, lack of delirium caused by SUD or quitting, and lack of cognitive disorders. The sampling method was done through complete enumeration (also known as census).

Data collection

In our study, to collect data about the Frequency of ADHD in patients with SUD, ADHD Self-Report Scales (ASRS-1,1) were distributed. The structured

clinical interview was done with participants. The clinical interviews and ASRS-1, 1 were implemented based on diagnostic criteria of DSM-5. The patients who were referred to addiction treatment centers received Adult ADHD Self-Report Scales. After the introduction and appreciation of volunteers, the research explained to participants how to fill out the questionnaire. The patients were to answer the questions accurately and honestly. ASRS-1,1 is an 18-item test that was designed to diagnose ADHD among individuals older than 18. The symptoms checklist is a means that comprises 18 diagnostic criteria of DSM-IV-TR. The scores given to 18 questions are summed up. The minimum and maximum scores equal 18 and 90, respectively. Accordingly, the obtained scores are classified into three groups:

Score 18-36: Low-Level ADHD problems

Score 36-54: Average-Level ADHD problems

Score 54>: High-Level ADHD problems

The patients that obtained scores greater than 36 were interviewed again to be diagnosed with ADHD (15) (Figure 1).

The internal validity coefficient of this scale has been estimated between 0.63 and 0.72 in previous studies. The validity of this scale equaled 0.58-0.77 using the retest method (Pearson correlation). Mashhadi et al. (2011) measured the concurrent criterion validity of this scale with a subscale of ADHD in Cronbach's alpha self-report form and obtained a significant value of 0.74 (P<0.000). According to an Iranian study conducted by Hamid Mokhtar et al., ASRS had proper validity and reliability to evaluate ADHD problems among adults (14). This scale has been validated in 28 countries, such as the USA, Canada, Germany, Japan, South Korea, and France (15). The diagnostic clinical interview with patients was done based on the self-report scale among patients under the supervision of a clinical expert in adult ADHD. In this case, the following options were examined for definite diagnosis: 1) clinical manifestations of ADHD 2) screening 3) diagnosis of current symptoms of patient 4) checking childhood history 5) accurate examination of disorder 6) assessment of psychiatric and physical health history 7) family background 8) separation of overlapping disorders 9) medical considerations.

Finally, central tendency indicators (frequency, percent, mean, standard deviation) were used to analyze data on the initial population and society with ADHD. A chi-squared test was used to examine the relationship between study hypotheses (gender, age group, education, job, type, and the number of substances) in the groups with ADHD and healthy people and low level of ADHD. The confidence coefficient in each test equaled 95% (p<0.05). The SPSS24 was used to analyze data and draw diagrams

Results

Frequency of ADHD

The present study was done on 150 participants by using the ASRS-1,1 questionnaire and structured clinical interview. The distribution of participants' scores in the questionnaire has been reported in figure 1.

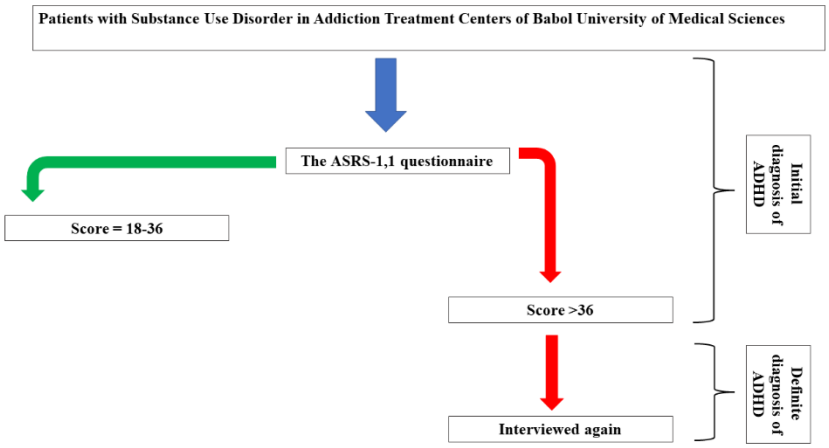

Figure 1. Data collection of research.

Initial diagnosis of ADHD

According to figure 2, in the first interview with patients based on the ASRS-1,1 questionnaire under the supervision of a clinical expert, 41 members (27.33%) obtained 18-36 scores and had low-level ADHD problems. Moreover, 74 members (49.33%) obtained 36-54 scores, so had average-level ADHD problems. These patients diagnosed with probable ADHD were interviewed again, and 8 members were diagnosed with ADHD. On the other hand, 35 members (23.33%) obtained scores above 54 so had high-level ADHD problems. The researcher interviewed these patients to make sure they had ADHD, and all 35 members were diagnosed with ADHD.

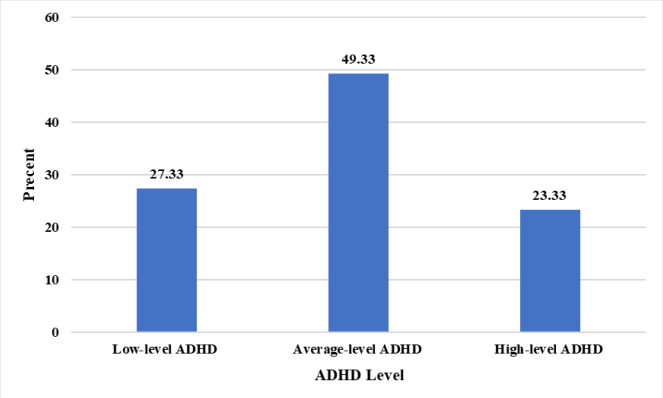

Figure 2. Frequency distribution of ADHD level in patients with substance use disorder based on the score of self-report ADHD scale.

Definite diagnosis of ADHD

In total, those participants who obtained scores greater than 36 could be diagnosed with ADHD, so they were interviewed again for a definite diagnosis. Of them, 43 members (28.6%) had ADHD (Figure 3).

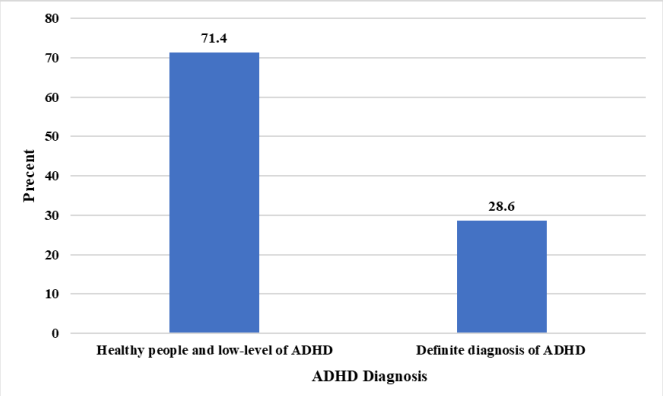

Figure 3. Definite frequency distribution of ADHD patients with substance use disorder based on the score of self-report ADHD scale.

Demographic characteristics of the sample

The extant study comprised 150 participants of which 111 members (74%) were men, and 39 members (26%) were women. In terms of age, 61 members (40%) were younger than 30, 51 members (34%) were in the range of 30-50, and 38 members (25.3%) were older than 80. The majority of studied participants were men younger than 30. In terms of education degree, 41 members (27.3%) had a high-school education, 87 members (58%) had diplomas, and 22 members (14.6%) had academic education. In the case of a job, 80 members (53.3%) were unemployed, 30 members (20%) were self-employed, 3 members (22.7%) were students, and 6 members (4%) were employees. Most of the participants had a diploma and were unemployed. In terms of the number of substances, 13 members (8.7%) only used one type of substance, 31 members (20.7%) used two substances, 47 members (31.3%) used three substances, and 59 members (39.9%) used more than three substances. Moreover, 85 members (56.67%) used opium, 29 members (19.33%) used heroin, 19 members (12.67%) used cannabis or bud, and 17 members (11.33%) used methamphetamine. Most of the participants used opium and more than three substances (Table 1).

Table 1. Demographic characteristics of participants.

Variable		Frequency	%
Gender	Male	111	74
	Female	39	26
Education	High school	41	3.27
	Diploma	87	58
	Academic	22	14.6
Number of substances	One	13	7.8
	Two	31	7.20
	Three	47	3.31
	More than three	59	3.39
	Opium	85	67.56

Type of substance	Heroin	29	33.19
	Cannabis or bud	19	67.12
	Methamphetamine	17	33.11
Job	Unemployed	80	3.53
	Self-employed	30	20
	Student	34	7.22
	Employee	6	4
Age	<30	61	7.40
	30-50	51	34
	>50	38	3.25

The relationship between demographic characteristics and ADHD

Gender: in terms of the relationship between gender and ADHD, 33 members (76.7%) of ADHD patients were men, and 10 members (23.3%) were women. The significance level of gender equaled 0.62, which was not statistically a significant difference rage compared to healthy people and low-level ADHD. Therefore, there was not any significant correlation between gender and ADHD (Table 2).

Age: in the groups of ADHD patients, 12 members (27.9%) were younger than 30, 19 members (44.2%) were 30-50 years old, and 12 members (12.9%) were older than 50. The significance level of age was 0.11 which was not significant statistically. Therefore, there was not any significant difference in age rate compared to healthy people and low-level ADHD (Table 2).

Education: in terms of people with ADHD, 7 members (16.3%) had high-school degrees, 31 members (72.1%) had diplomas, and 5 members (11.6%) had academic degrees. The significance level equaled 0.05 which is considered a borderline difference compared to healthy people and low levels of ADHD. Education degree or diploma and academic degree had the highest and lowest frequencies, respectively (Table 2).

Job: among ADHD patients, 27 members (62.8%) were unemployed, 11 members (25.6%) were self-employed, 4 members (9.3%) were students, and 1 member (2.3%) were employed. The significance level was 0.05; accordingly, there was statistically a borderline relationship between the job of patients and ADHD compared to healthy people and low-level ADHD. The highest and lowest frequency of ADHD was seen in unemployed and employed groups, respectively (Table 2).

Number and type of substance: in terms of the type of substance consumed by ADHD patients, 6 members (14%) used opium, 19 members (44.1%) used heroin, 10 members (23.3%) used cannabis, and 8 members (18.6%) used methamphetamine. The significance level equaled 0.19, which did not indicate any significant difference compared to healthy people and low-level ADHD. In terms of the number of substances used by ADHD patients, 6 members (14%) used one substance, 9 members (20.9%) used two substances, 9 members (20.9%) used three substances, and 19 members (44.2%) used more than three substances. The significance level equaled 0.22 which had no significant difference between healthy people and low level ADHD. Therefore, there was not any significant association between type and number of substances and ADHD (Table 2).

Table 2. The relationship between demographic characteristics among ADHD patients and normal individuals.

ADHD Variable		Have	Does not have	Sig.	Chi-squared values
Gender	Male	33(7.76)	78(9.72)	62.0	0.236
	Female	10(3.23)	29(1.27)		
	High-school degree	7(16.3)	34(31.8)		
	Diploma	31(72.1)	56(52.3)		

Education	Academic degree	5(11.6)	17(15.9)	0.049*	9.914
Number of substances	One	7(6.5)	6(14)	0.22	16.543
	Two	9(20.9)	22(20.6)		
	Three	9(20.9)	38(35.5)		
	>3	19(44.2)	40(37.4)		
Type of substance	Opium	6(14)	79(73.83)	0.19	16.25
	Heroin	19(44.1)	10(9.34)		
	Cannabis or bud	10(23.3)	9(8.4)		
	Methamphetamine	8(18.6)	9(4.8)		
Job	Unemployed	27(62.8)	53(49.5)	0.048*	19.97
	Self-employed	11(25.6)	19(17.8)		
	Student	4(9.3)	30(28)		
	Employee	1(2.3)	5(4.7)		
Age	<30	12(27.9)	49(45.8)	0.11	4.410
	30-50	19(44.2)	32(29.9)		
	>50	12(27.9)	26(24.3)		

* Chi-squared test

Discussion

The extant study was conducted to examine the relationship between ADHD and SUD among patients referred to addiction treatment centers of Babol University of Medical Sciences. The results indicated that among 150 clients studied based on the ASRS questionnaire and structured clinical interview, 43 members (28.6%) were diagnosed with ADHD. According to the results, the relatively good sensitivity of adult ADHD screening tests makes it a diagnostic test used in psychiatric studies to diagnose ADHD.

According to the results, 28.6% of patients referring to addiction treatment centers had ADHD. The mentioned findings implied the relationship between substance use desire and ADHD symptoms and its components. Farhoodi et al. (2010) found a significant relationship between ADHD symptoms and alcohol addiction (16). Such findings are explained by hereditary causes in some patients who suffer from ADHD due to dopamine or its relevant receptor shortage; in this case, they use substances and drugs that expand dopamine activity in the neural system. Dopamine is a neurotransmitter released in neural cells naturally making the person feel pleasure and comfort (17).

According to the results, there was a significant relationship between age and gender among ADHD patients and normal subjects. However, some studies showed that SUD begins at younger ages among ADHD patients compared to normal people, but the small statistical population of study and fewer number of women compared to men may be the reason for such difference in the present paper. Previous studies believed that some characteristics, such as behavioral impulsivity and interest in activities that receive an instant positive response, as well as desire to acquire new experiences could be factors affecting the differences between SUD patterns among young ADHD patients and young addicts (18).

Although men indicated more ADHD symptoms than women did, there was not any significant difference in gender between ADHD patients and normal

individuals. As mentioned, the asymmetric distribution of individuals' gender in a studied small society was a reason for such observation. Previous studies have indicated higher ADHD prevalence in men compared to women; the reason may stem from the psychological differences between men and women (19). It is essential to carry out further studies on ADHD prevalence among Iranian adults considering their sex due to the lack of such studies in Iran.

In the extant study, different education degrees had borderline differences between ADHD patients and normal individuals. Findings indicated that unemployed individuals with low education levels had more frequency than people with ADHD. Individuals with ADHD experience more education difficulties and cannot continue their education or graduate compared to normal people; hence, this can explain the higher frequency of studied subjects in the group of unemployed individuals with jobs that do not need higher education levels. The results of the present paper were consistent with findings of other studies that showed ADHD prevalence among people who have lower education levels (20).

According to the results of the type and number of substances used by ADHD patients compared to normal individuals, there was not any significant difference between individuals' desires to type and number of substances. In the study conducted by Kousha and colleagues, there was not any significant difference between ADHD patients and normal people in terms of the type of substance. They believed that such an absence of significant difference occurred due to a small sample (21). However, some other studies showed that addicted adults and adolescents with ADHD had severer SUD in the case of cannabis and heroin compared to normal people (22). Although there was not any significant difference between ADHD patients and healthy people in terms of the number of substances they use, other studies showed that those who used several substances had at least one type of personality disorder and a comorbid with ADHD compared to those who only used one or two substances (23, 24).

Conclusions

In general, the results of this study showed that ADHD disorder could have a relationship with SUD in the studied clients referring to addiction treatment centers of Babol University of Medical Sciences. About 28.6% of the studied population (in age groups of young and adults) had ADHD. There was a significant difference between education levels regarding the impulsivity and negligence characteristics of ADHD patients so those with lower education levels had higher frequencies. Moreover, there was a maximum frequency of ADHD patients in job groups of unemployed and self-employed. There was not any significant difference between the type and number of substances among patients with both addiction and ADHD disorders.

It is necessary to diagnose and treat children with ADHD due to the importance of increasing substance abuse problems among adolescents and adults as well as the high prevalence of personality disorders comorbid with addition or ADHD, findings of the effect of timely treatment of ADHD.

Further studies on a wider population range and prospective research for younger patients diagnosed with ADHD to follow-up substance abuse desire provide the field for more comprehensive viewpoints about the causal relationship between ADHD and its comorbidity with SUD.

The extant study examined people with ADHD who were referred to addiction treatment centers (to receive the treatment). Therefore, purposive sampling was used in this research; hence, caution must be taken when generalizing the results to the whole society.

Author contributions

SJK and **FS** did this research and write manuscript, **AM**, **SMZ** and **SJK** Guidance and assisted in data collection and analysis of the results, **HGH** helps and guided in statistical analysis**.**

Conflict of interest

The authors declare no potential conflicts of interest.

Ethical Considerations

This research plan was approved under code 724132207 in the ethics committee in the research council of Babol University of Medical Sciences.

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