

The Prevalence of the Symptoms of Attention Deficit Hyperactivity Disorder in Adults in Urban Population of Amol, Mazandaran Province, Iran

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Abstract

Background: Attention deficit hyperactivity disorder (ADHD) is the most common childhood psychiatric disease that in half of the children remain to adulthood. Given the importance of this disorder, few studies have investigated its prevalence. In Iran, this disorder is almost neglected in clinical works of many colleagues. This study aimed to investigate the prevalence of Adult ADHD in urban population of Amol, Mazandaran.

Methods: This cross-sectional study was performed on 1015 subjects aged between 17 to 60 years in Amol, who were randomly selected using cluster sampling method from the population covered by health centers of Amol in 2011. The study population included 399 females and 616 males. ASRS-V1.1 test (with acceptable reliability and validity) was used for patient screening. Data were analyzed using SPSS statistical software and chi-square test. $P < 0.05$ was considered significant.

Results: The prevalence of adult ADHD symptoms in Amol was 20.2%. In this study, the prevalence of symptoms of this disorder among single ($p = 0.005$) and the unemployed subjects ($p < 0.001$), and age group 20 to 29 years ($p = 0.001$) was significantly higher.

Conclusion: Due to high prevalence of adult ADHD symptoms in urban population of Amol and the high probability of its incidence in many of individuals and its resulting negative impact on the patients, the diagnosis and treatment of these people can help a lot in improving their quality of life.

Keywords: Attention deficit hyperactivity disorder, Adults, ASRS-v1.1, Prevalence.

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Attention deficit hyperactivity disorder (ADHD) is the most common chronic psychiatric disease which affects the school-age children (1). This disorder is characterized by the symptoms of lack of concentration, impulsivity and hyperactivity (2). In recent decades, many studies have been conducted to estimate the prevalence of ADHD in children (3, 4). These studies have offered highly variable Statistical prevalence of this disorder in school-aged children, from 1% to 20%. In general, conservative figure for the prevalence of the disorder in children is around 5-10% (5).

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It has been believed for a long time that the disease affects only children and improves after adolescence (6, 7). But new data suggest that these symptoms, particularly decentralization are remained in 10 to 60% of patients after adolescence (8-11). Based on studies, the prevalence of ADHD in adults is about 4.4% (12-14). Causes and comorbidities of ADHD, impaired neurological function, response to treatment, genetic, and functional and structural imaging findings in adults are similar to children diagnosed with ADHD (15-18). But even with these similarities, evidence showed that less than 20% of adults are diagnosed (19) and mainly in Iran, many physicians and psychiatrists have not thought of this diagnosis. Diagnosis of ADHD in adults is often difficult and challenging for the following reasons:

The mistakes in symptoms of ADHD to comorbidities, unusual symptoms, the absence of all symptoms of ADHD in the DSM-IV-R, unclear profile in some patients, Lack of awareness about the disease and considering the symptoms of ADHD as part of their personal characteristics, will cause not to visit the doctor and specifically ask about these symptoms (19-21). On the other hand, untreated adults with ADHD compared to treated patients and the normal subjects are at higher risk for comorbidities (such as anxiety disorders, mood disorders, suicidal thoughts), academic failure and lower academic level, problems in employment, higher prevalence of layoffs, work accidents, the lower-income, a higher rate of accidents leading to injury and drug abuse (7, 22-25). These issues demonstrate the importance of evaluation, diagnosis and treatment of patients with ADHD. Day by day, the number of articles related to adult ADHD is added, but there are little information available about the prevalence of this disease. Based on our literature review, only one study was conducted in Iran by Arabgol et al. so far in 2004 on the prevalence of adult ADHD among a group of students in dormitory of Fatima Zahra (Shahid Beheshti University of Medical Sciences) (26), but no study has investigated the prevalence of this disorder in the general population. In this regard, we tried to study the prevalence of adult ADHD symptoms in urban population of Amol to make our physicians and psychiatrists consider this diagnosis more than before, and to be diligent later with the early intervention and treatment in order to improve the quality of

life of these patients and reduce the expenses imposed by the society.

Methods

This cross-sectional study was conducted on 1015 subjects aged 17 to 60 in Amol. From 20 health centers in Amol, six centers were randomly chosen and samples were selected using cluster samples method from the list of these six of centers, depending on the proportion of the patients in each center (approximately equal). Then, the data were collected through face to face interviews referring to patients' home and request to complete the test.

To determine the prevalence of adult ADHD symptoms, ($d=0.02$), $n = z^2 \times P(1-P) / d^2$ formula was used that evaluated the data in terms of 7% prevalence of adults ADHD and a confidence level of 95% and a maximum error ratio of 3% on almost 1,000 subjects. For screening adults ADHD symptoms, standard translated ASRS-v1.1 questionnaire was used (with acceptable reliability and validity). Test-retest was used to evaluate the reliability of the questionnaire in a pilot study on 30 adults by the researcher, and Pearson correlation coefficient was obtained 0.850. Validity of the test was also measured by 3 psychiatrist and a children's psychiatrist which was appropriate. After providing the necessary explanations and after obtaining informed consent, the questionnaires along with demographic information form (including age, sex, marital status, place of birth, season of birth and level of education) were given to the subjects aged 17-60 years and then the completed questionnaires were gathered.

ASRS-v1.1 test is suggested by the WHO as a useful tool for screening the adult ADHD in epidemiological studies. This test consists of 18 questions according to IV DSM-criteria: 6 elementary questions entitled "Part I" and 12 the questions entitled "Part II". Six primary questions are considered as the basis for test and expresses the high prognosis for those who suffer from adults ADHD. In fact, the questions ask people about how much each disease-specific symptoms of adult ADHD happens to them; in reply, they chose one of the options: never, rarely, sometimes, often or always. In different questions, different answers options were designed in colorful frames, 4 or more black frames in "Part I" filled by the subjects indicate the strong symptoms of adults ADHD that advised for further assessment. For "part II", no system or diagnostic rate is

defined. If people in "Part II" choose the colorful frames, it would be special sign of their problem in that area. As a result, "Part II" offers more information about the specific symptoms and has no diagnostic value for screening the adult ADHD patients. The sixth primary questions are the basis for screening. All those who have chosen 4 or more Black frames were considered as positive and those who have chosen less than 4 black frames were considered as negative. All data were analyzed by SPSS. Chi-square and T-test were used to compare variables.

Results

The mean age of the study population was 32.5 ± 10.3 with a median age of 20-29 years. The mean age of patients with symptoms of ADHD was 29.8 ± 9.2 ; and in patients without symptoms of ADHD was reported 33.2 ± 10.5 , in which t-test showed statistically significant difference between the two groups ($p < 0.001$). A youngest subject with adult ADHD symptoms was 17 years old and oldest patient was 60 years old. In the meantime, the prevalence of ADHD symptoms in adults aged 20 to 29 years was significantly ($p = 0.001$) higher than other age groups. In terms of gender, 616 cases (60.69%) were male and 399 cases (39.31%) were female. The prevalence of adult ADHD symptoms in urban population of Amol in 2011 was 20.2% (205 cases). Among the 205 patients with adult ADHD symptoms, 75 cases (36.58%) were females and 130 cases (63.41%) were male; according to the chi-square test, there was no significant relationship between gender and ADHD symptoms in adults ($p = 0.371$). In terms of marital status of the participants, 340 cases (33.5%) were single, 661 cases (65.1%) were married, 11 (1.1%) were divorced, and 3 (0.3%) were widow. The prevalence of adult ADHD symptoms in single individuals was significantly higher (26.5%) ($p = 0.005$). Among the participants 798 cases (78.6%) were born in the city and 217 cases (21.4%) in the village, in which no significant correlation was found between the prevalence of adult ADHD symptoms and place of birth ($p = 0.727$).

Three hundred and three patients (29.9%) were born in the spring, 327 (32.2%) cases in the summer, 192 (18.9%) in autumn and 193 cases (19.0%) in winter. Although in this study the prevalence of ADHD symptoms in adults born in summer was higher than other seasons, but no significant correlation between the prevalence of symptoms of adult

ADHD and season of birth was found ($p = 0.207$). In terms of the level of education among 1015 participants in the study, 39 cases (3.8%) had an elementary school education, 105 (10.3%) cases had secondary education, 94 (9.3%) cases had high school education, 296 (29.2%) cases had diploma, 158 (15.6%) cases had college education, 263 (25.9%) cases had bachelor degree, and 60 (5.9%) cases had higher education. The highest prevalence of adult ADHD symptoms was related to the diplomas educational level with 64 (31.22%) cases. In general, 113 (55.1%) patients with symptoms of ADHD had high school or less educational level, and 92 (44.8%) patients with symptoms of ADHD adults had college degrees or higher; nevertheless, no significant relationship between the prevalence of ADHD symptoms in adults and educational level was observed ($p = 0.234$). Among all subjects, the prevalence of adult ADHD symptoms was higher in unemployed subjects than other cases, this relationship was statistically significant ($p < 0.001$) (Table 1).

Among the first 6 questions in "first part", the key question for screening ADHD adults, the most positive responses belonged to 180 (87.8%) responses in Question 1 (how often do you perform the main parts of a task, but you have trouble finishing details and leave the task unfinished?) which examines the amount of concentration among ADHD patients. Among 180 cases of ADHD in adults who had positive answer to this question, 69 (38.3%) were female and 111 (61.7%) patients were male (Table 2).

The lowest rate of positive response in the "first part", was belonged to question 4 with 120 (58.5%) answers (How often do you avoid performing tasks that need a lot of precision and thinking and you finally decide to postpone it?); the question is also to check the amount of concentration among ADHD patients, in which 44 (36.6%) cases were female and 76 (63.4%) patients were male (Table 2). In 12 questions of "Part II", the highest positive answers belonged to 155 (75.6%) cases to question 9 (how often do you lose your attention to what others are saying in a conversation?) to determine the attention of patients. Among the 155 positive answers to this question, 60 (38.7%) were female and 95 (61.3%) were male (Table 3). The lowest rate of positive response in 12 questions of "Part II" belonged to 50 (24.4%) answers to Question 15 (How often do you feel like talking too much in certain social situations?) to investigate the hyperactivity rate. Among the 50 cases who responded positively to this question, 20 (40%) cases were

female and 30 (60%) cases were male (Table 3). Based on the questions of questionnaire and gender. data analysis, there was no significant correlation between

Table 1. Frequency distribution and percentage of the prevalence of adult ADHD symptoms in urban population of Amol according to demographic characteristics

Variables	Adult ADHD Symptoms		Number (%)	P Value
	Yes	No		
Gender				
Female	75 (18.8)	324(81.2)	399(100)	0.371
Male	130(21.1)	486(78.9)	616(100)	
Age (years)				
>20	130	486	616	0.001
21-29	9(16.7)	45(83.3)	54(100)	
30-39	114(26.3)	320(73.7)	434(100)	
40-49	48(17.9)	220(82.1)	268(100)	
<50	23(14.2)	139(85.8)	162(100)	
<50	11(11.3)	86(88.7)	97(100)	
Marital status				
Single	90(26.5)	250(73.5)	340(100)	0.005
Married	112(16.9)	549(83.1)	661(100)	
Divorced	2(18.2)	9(81.8)	11(100)	
Widow	1(33.3)	2(66.7)	3(100)	
Occupation				
Employed	185(19.2)	781(80.8)	966(100)	<0.001
Unemployed	20(40.8)	29(59.3)	49(100)	
Total	205(20.2)	810(79.8)	1015(100)	

Table 2. Prevalence of disorders of "Part I" in adult ADHD patients according to gender

Variables		Gender		Total N(%)	P Value
		F	M		
1.Impairment to finish what you started	Negative	6(8)	19(14.6)	25(12.2)	0.163
	Positive	69(92)	111(85.4)	180(87.8)	
2.Impairment to remember everyday tasks	Negative	12(16)	27(20.8)	39(19)	0.402
	Positive	63(84)	103(79.2)	166(81)	
3.Impairment to organize relevant tasks	Negative	10(13.3)	22(16.9)	32(15.6)	0.495
	Positive	65(86.7)	108(83.1)	173(84.4)	
4. To delay or avoid tasks requiring sustained mental activity	Negative	31(41.3)	54(41.5)	85(41.5)	0.977
	Positive	44(58.7)	76(58.5)	120(58.5)	
5. Restless limbs when sitting still too long in one place	Negative	14(18.7)	25(19.2)	39(19)	0.921
	Positive	61(81.3)	105(80.8)	166(81)	
6. Having an over-activity like a motor	Negative	29(38.7)	52(40)	81(39.5)	0.851
	Positive	46(61.3)	78(60)	124(60.5)	
Total		75(100%)	130(100%)	205(100%)	

Table 3. Prevalence of disorders of "Part II" in adult ADHD patients according to gender

Variables		Gender		Gender N (%)	P Value
		F	M		
7. Impairment in the lack of sufficient attention when doing a difficult job	Negative	40(53.3)	80(61.5%)	120(58.5%)	0.251
	Positive	35(46.7)	50(38.5)	85(41.5)	
8. Impairment to focus when doing a difficult job	Negative	36(48)	76(58.5)	112(54.6)	0.147
	Positive	39(52)	54(41.5)	93(45.4)	
9. Impairment in concentration when other people are talking	Negative	15(20)	35(26.9)	50(24.4)	0.266
	Positive	60(80)	95(73.1)	155(75.6)	
10. Impairment in remembering place of things	Negative	46(61.3)	74(56.9)	120(58.5)	0.537
	Positive	29(38.7)	58(43.1)	85(41.5)	
11. Teasing from the environmental noise	Negative	26(34.7)	58(44.6)	84(41)	0.163
	Positive	49(65.3)	72(55.4)	121(59)	
12. Leave a meeting unexpectedly	Negative	49(65.3)	83(63.8)	132(64.4)	0.830
	Positive	26(34.7)	47(36.2)	73(35.6)	
13. Having a sense of fatigue or restlessness	Negative	45(60)	62(47.7)	107(52.2)	0.089
	Positive	30(40)	68(52.3)	98(47.8)	
14. Impairment in relaxation during personal hours	Negative	41(54.7)	81(62.3)	122(59.5)	0.283
	Positive	34(45.3)	49(37.7)	63(40.5)	
15. Talking too much	Negative	55(73.3)	100(76.9)	155(75.6)	0.564
	Positive	20(26.7)	30(23.1)	50(24.4)	
16. Cut the sentences of others talking before finished	Negative	36(50.7)	60(46.2)	98(47.8)	0.533
	Positive	37(49.3)	70(53.8)	107(52.2)	
17. Disability waiting for turns	Negative	43(57.3)	65(52.3)	111(54.1)	0.487
	Positive	32(42.7)	62(47.7)	94(45.9)	
18. To disturb others when they are busy	Negative	51(68)	78(60)	129(62.9)	0.253
	Positive	24(32)	52(40)	76(37.1)	
Total		75(100)	130(100)	205(100)	

Discussion

The prevalence of adult ADHD symptoms in urban population of Amol was 20.2%. In previous studies, the prevalence of adult ADHD was different from one country to another. So that, the average number for the prevalence of the disorder in adults was considered 4.3%, but in some other studies, the prevalence of adult ADHD was reported beyond this. For example, the prevalence of adult ADHD in France was more than 7% (27). This statistical difference indicates the involvement of genetic, geographical, social, cultural and economic factors in the adult ADHD symptoms (28). The use of various diagnostic tools is also another

reason for this difference in Global studies. On the other hand, adult ADHD symptoms are similar to many other

psychiatric diseases and overlaps with them. In this study, as a preliminary study, only the probability of adult ADHD was assessed. These issues can justify the high percentage of adult ADHD symptoms in the urban population of Amol.

In the present study, there was no significant relationship between gender and prevalence of adult ADHD symptoms that is consistent with some other results in this direction (22, 29). But, some studies showed a link between gender and prevalence of adult ADHD. These studies suggest that

the prevalence of ADHD in adults like children is higher in males than females, but its ratio for adults is less than the children (30). ADHD symptoms in adults aged 20 to 29 years compared to other age groups was significantly higher, which can represent a far higher prevalence of the disorder among children than generations before. Park et al. in 2010 studied the prevalence of adult ADHD symptoms using the ASRS-v1.1 diagnostic tests in Korea, where the prevalence of adult ADHD was reported 1.1%, which the majority of patients were aged 18 to 29 years, and the prevalence of adult ADHD symptoms was not significantly different in the two sexes (22).

Most of the adults with ADHD were born in the summer, that the results of other studies confirm it. Evidences suggest that September is the peak incidence of births among children with ADHD. These findings suggest the effects of prenatal exposure to winter infections occur in the first trimester of pregnancy in some people predispose to ADHD symptoms (27). In this study, symptoms of adult ADHD were more prevalent among single cases, and a significant correlation between the prevalence of adult ADHD symptoms and celibacy was obtained. The number of divorced or widowed samples was not sufficient and cannot be discussed about the results of these two groups. Due to poor performance caused by inattention and impulsivity, adult ADHD patients are frequently met with a negative reaction from others, which leads to reduced confidence in them. On the other hand, children who grow up without diagnosis and treatment of this disease are very prone to drug addiction and other antisocial functions. Higher prevalence of psychiatric disorders in these patients, in addition to the above mentioned cases, can more exacerbate their rejection and the unsuccessful societal functioning, which may explain the high rate of celibacy and divorce in these people. The most frequent educational levels in patients with adult ADHD symptoms was related to the diploma education level with 64 (31.22%) cases.

Studies showed that patients with adult ADHD have impaired academic performance, and usually do not have high academic education, due to the lack of adequate focus on educational issues and their disinhibition and impulsive mode. A study conducted by Biederman et al., showed that patients with ADHD in most cases have only passed the early years of college education and eventually only 5% of these patients were graduated (31).

The study also showed that the unemployment rate, dismissal from work, a failed marriage and divorce among adult ADHD patients were significantly higher than the control group. Able et al., conducted a study on the functional disorders in adults with ADHD (23). In the meantime, untreated patients with ADHD have comorbidities and higher functional disorders such as depression, interpersonal and emotional problems and had less educational level than those without ADHD.

There was a significant correlation between the prevalence of the symptoms of adults ADHD and the frequency of unemployment in the current study, which means that the prevalence of symptoms of ADHD was reported higher in unemployment individuals than employed ones. Most studies unanimously believe that adult ADHD patients do not have the ability to hire or not to stay too long in a job. These people do not have enough discipline, mostly leave their unfinished tasks, and they are not responsible; in addition to these cases, which are necessary for work and accepting a job, the incidence of disorders such as anxiety disorders, mood disorders and drug and alcohol abuse are significantly higher in these patients than non-sufferers. All of these issues together will cause several problems in communication and employment issues, dissatisfaction at work, and finally firing these patients. De Graaf et al., studied the prevalence of adult ADHD in 10 different nationalities among the employees, and also their functional disorders in their job (30). Based on their findings, the mean prevalence of adult ADHD among employees was 3.5%. In this study, employees with ADHD had higher absenteeism from work due to various reasons during the year and lower quality of work than others. The analysis conducted on the questionnaire indicated that the questions which designed to assess attention and concentration of patients received the most positive responses in both the first and second parts. The results from several studies suggested that adults with ADHD are more likely to have lack of attention and focus than hyperactivity. In fact, with by the transition from childhood to adulthood, their hyperactivity will gradually fade away, but "lack of concentration will remain" and will lead to their failure for the performance in various fields. Biederman et al., examined the changes of ADHD symptoms over the time, during the growth of the patient from childhood to adulthood (32). They concluded that aging is significantly accompanied by reduced ADHD symptoms.

The findings showed that if ADHD still remain after growing up, "negligence" factor will remain more than "hyperactivity" and "impulsivity".

Results obtained in the present study also confirms this. The results showed high prevalence of ADHD symptoms in adults of Amol. The majority of these patients are not aware of their illness and they consider it as part of their characters, while they are at high risk for inappropriate actions of social and economic communication. Given these issues, it is better that our physicians and psychiatric colleagues, especially in Amol town to pay more attention to this disorder and in the patients with adult ADHD symptoms, try to put this diagnosis in their list of differential diagnoses.

One of the strengths of this paper is that for the first time, a massive urban population was examined that its results can be very useful. On the other hand, the diversity of people in jobs, age and different levels were observed in completing the questionnaires and it was not limited to a specific group of society. Since this questionnaire distributed with an emphasis on adult, and basically, adults are reluctant to complete the questionnaires, it can be offered to assign this part to a governmental or independent agencies.

This research was the first study of adult ADHD symptoms in the general population of Iran, and given the high importance of diagnosis and treatment for the individual and for its financial costs on the health system, it is suggested that in further researches, after a screening test, it is better to examine and treat the patients suspected of having adults ADHD by structured clinical interview based on IV DSM-criteria. Also, it is suggested to perform a broader investigation on the prevalence and the associated disorders in Iran.

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