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Prevalence, Demographic Characteristics and Comorbid Psychiatric Disorders in Children and Adolescents with Substance Use Disorder in Iran

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Abstract

Background: The present study aimed to investigate the prevalence of substance use disorder in Iranian children and adolescents and its relationship with demographic characteristics and psychiatric comorbidities.

Methods: The data were taken from a national survey on the prevalence of psychiatric disorders in Iranian children and adolescents. The national survey was conducted on 30,532 children and adolescents aged 6-18 years which were selected using multistage cluster sampling. The psychiatric disorders were assessed by employing k-SADS-PL questionnaire and interviews carried out by 240 clinical psychologists with the participants and their parents. Data were analyzed by Chi-square test and logistic regression.

Results: A total of 277 (0.97%) were diagnosed as people with substance use disorder that were further studied for comorbid disorders. Among the various types of drugs, hypnotic/sedative/anti-anxiety drugs were abused by 84 people (46.15%), cannabis by 68 (37.36%) and stimulants by 43 (23.63%). The variables of gender, place of residence, and father's occupation and parents' education level were identified as predictors of substance use disorder in children and adolescents. At the same time, 42.50% substances and alcohol abusing people had at least one comorbid psychiatric disorder and the highest comorbidity was observed in oppositional defiant disorder, attention deficit and hyperactivity disorder and separation anxiety disorder ($p \leq 0.05$).

Conclusion: The findings can be used in the prevention and treatment of substance use disorder and promotion of mental health in children and adolescents by focusing on the psychiatric comorbidities of people with substance use disorder.

Keywords: Children and adolescents, Comorbidity, Prevalence, Substance use disorder

Introduction

Unhealthy behaviors such as smoking and alcohol/drugs abuse often begin in adolescence (1). These behaviors create a major challenge to the public health since they increase mortality and morbidity rate (2). Despite the prohibition of drug use, evidence suggests that the consumption of alcohol, tobacco, and marijuana is considerable among adolescents aged 12 to 17 years (3). In the United States, about half of 18-year-old adolescents have consumed narcotics at least once in their lives (4). In Europe, on average, 21% of boys and 15% of girls aged 15 to 16 have used illegal drugs at least once in their lives (5). A longitudinal study indicates a high prevalence of alcohol, marijuana and cigarette smoking in adolescents in Europe (34.1%) (6). Evidence suggests that drug use among adolescents has increased dramatically in Iran (7-9). The results of Momtazi and Rawson's study on Iranian students showed at least one instance of alcohol use in the lifetime of students (9.90%) and prevalence of substance use disorder about 1.20% and 6.60% in different regions of Iran (10). Mohammadkhani's study indicated that cigarettes (14.70%) and alcoholic beverages (9.80%) were the most prevalent materials used in lifetime of Iranian students and the prevalence of other substances was 2.50% (7).

Another concern of the study is the connection between substance abuse and the existence of psychiatric comorbidities in adolescence. A key factor for understanding the causes, history and treatment of substance abuse is knowing the comorbidities associated with substance abuse (11). Some studies have also shown that drug abuse is associated with psychiatric disorders such as oppositional defiant disorder, hyperactivity and attention deficit disorder, behavioral disorders, depression and anxiety (12-16). Between 55 and 88% of adolescents with substance abuse show the criteria for one of the psychiatric disorders such as functional disorder, depression, anxiety or hyperactivity (17).

Research has suggested that comorbid psychiatric disorders in adolescents is related to higher levels of functional disorder including legal problems, mental health issues, family functioning problems, mixed abuse of drugs, and poor outcome of treatment (18,19).

The purpose of this study was to determine the status of substance use disorder in children and adolescents related to the demographic characteristics (*e.g.*, age, gender, place of residence, occupation and education of parents) and to investigate the likelihood of associated comorbidities. Childhood and adolescence are the critical periods of life determining the health and well-being of society in future. Due to the fact that Iran is situated in a special geographical area (a potential region for drug trafficking route), the status of substance use disorder particularly in children and adolescence needs to be consistently examined. In addition, there is not adequate information regarding the prevalence of different types of substance abuse in this population. It should be noted that the current study was first of its kind in magnitude and data collection in Iran. Not only it focuses on the prevalence of substance use disorder in children and adolescence, it also targets the comorbid disorders in children and adolescents with substance use disorder. The current study was conducted in two stages. First substance use disorder in children and adolescents was studied in relation to age, gender, place of residence, occupation and education of parents and second, the probability of other psychiatric comorbidities was studied. The results of the study would help us to have better assessment of substance use disorder and the comorbid disorders (particularly in Iranian population) for guiding prevention and treatment policies.

Materials and Methods

Sampling

The national cross-sectional survey was conducted on 30,532 children and adolescents in 29 provinces in Iran. Multistage cluster sampling method was utilized and on average 1000 people were selected from each province. In addition to the main cities, participants from the rural population of each city were randomly selected (using cluster sampling). For this study, the counties and the villages of the subsidiary were divided into 167 clusters based on the postcodes. Then the clusters were divided into blocks of six and in each block one girl and one boy from each age group of 9-6, 10-14, and 15-18 years old were included (20).

Data Collection

Initially, eight clinical psychologists and a total of 240 psychologists were selected from each province. Next, these psychologists were trained how to use Kiddie-SADS-Present and Lifetime Version (K-SADS-PL) questionnaire for the purpose of the study. The trained clinical psychologists identified the eligible people and invited their parents to participate in the study. For being eligible, the participants needed to be within the age ranges of 6-10, 10-14, and 14-18 and number of participants in each age range required to be equal. It should be noted that K-SADS-PL was based on DSM IV criteria. Due to the fact that we considered four criteria for diagnosing substance use disorder, it can be argued that the substance use disorder in the current study was in the range of moderate intensity in terms of DSM V criteria.

After obtaining consent from the parents, demographic data were collected from children and adolescents. To collect demographic data, the participants were asked questions about age, place of residence, parents' occupations, and parents' education level. Afterwards, K-SADS-PL questionnaires were completed on the basis of the interviews with participants. In case of participants under 11 years old, both participants and their parents were interviewed using K-SADS-PL, but for those above 11, the participants were interviewed directly using the same instrument. The location of the interviewers and their place in the designated clusters were monitored every day by the provincial observers *via* the Internet locator (GPS). The provincial observers had been assigned to monitor the data collection process to ensure data are collected in line with data collection procedures.

Instruments

Semi-structured diagnostic interview by the help of Kiddie-SADS-Present and Lifetime Version: This semi-structured interview was designed to assess the current and past episodes of mental illness in children and adolescents. It included 5 groups of diagnosis:

1) mood disorders including depression disorders (major depression and dysthymia), mania, and hypomania 2) psychotic disorders, 3) anxiety disorders including social phobia, agoraphobia, specific phobia, obsessive-compulsive disorder, separation anxiety disorder, general anxiety disorder, panic disorder and post-traumatic stress disorder 4) behavioral disorders including ADHD, conduct disorder, oppositional defiant disorder and 5) drug abuse, tick disorders, eating disorders and elimination disorder (21). The interview questions were based on items of Kiddie-SADS-Present and Lifetime questionnaire**.** This questionnaire bases the diagnosis on the fourth diagnostic manual for mental illness and its third revision. Interviews start with questions about demographic information. In addition, information on previous psychiatric problems can also be obtained (22). The completion of the questionnaires was based on information from interviews with parents and children and all other available resources.

The Persian version of this questionnaire had high sensitivity and indices of 0.81 and 0.69 have been reported for its validity of and test-retest reliability (20). In a study, Kappa coefficient was reported 0.93 ($p<0.001$) for emotional disorders, 0.9 ($p<0.001$) for anxiety disorders, and 0.94 ($p<0.001$) for ADHD and behavioral disorders (23). In the current study, the reliability of instrument was also estimated using internal consistency measure of Cronbach's Alpha which indicated adequate reliability ($\alpha>0.70$).

Analysis

Data collected from the provinces of Iran were screened by removing the cases with incomplete information. To study the variables related to demographic characteristics, frequency statistics using Chi Square was employed. Logistic regression was also utilized to determine predictors of substance use disorder with a confidence interval of 95%. The independent variables for predicting substance use disorder included demographic characteristics and psychiatric comorbidities. All the statistical analyses were done using SPSS 21.

Ethical considerations

This study is approved by the national institute for medical research development (NIMAD) ethics committee (code of ethics: IR.NIMAD.REC.1395.001 and grant number: 940906). In this study, maximum efforts were put into practice to ensure individuals are treated equally and there is no harm to anyone. All the individuals participated

voluntarily and signed the informed consent form. In addition, all the information from the participants remained confidential and anonymity was observed throughout the study.

Results

A total of 30532 children and adolescents aged 6-18 years participated in this cross-sectional study. Out of 30532 participants, 28,540 people were included in the study, and the rest were excluded due to incomplete information about substance abuse. Furthermore, 13936 (48.80%) were girls and 14604 (51.20%) were boys. With regard to place of residence, 23829 (83.50%) were living in cities and 4711 (16.50%) in villages. The overall prevalence of psychiatric disorders in children and adolescents was 28.2%.

In this study, a total of 277 participants were identified as people with substance use disorder. Table 1 shows the prevalence of any unprescribed use among children and adolescents. The use of hypnotic/sedative/anti-anxiety drugs was seen in 84 cases (46.15%), cannabis in 68 cases (37.36%) and stimulants in 43 cases (23.63%), all of which had the highest prevalence among other drugs.

Demographic characteristics of children and adolescents using alcohol and drugs

The results of the chi square test (Table 2) show the prevalence of substance use disorder in boys (n=193, p=1.6, 95% CI=1.39-1.91) and girls (n=84, p=0.7, 95% CI=0.6-0.9). The results of this study evaluated the prevalence of substance use disorder in urban society (n=251, p=1.2, 95% CI =1.06-1.4) and in the three age groups; the age group 6-9 years old (n=53, p=0.6, 95% CI=0.4-0.8), 10-14 years old (n=67, p=0.9, 95% CI=0.7-1.2), and 15-18 years old, (n=157, p=1.7, 95% CI=1.4-2.1). The prevalence of substance use disorder in rural population was not taken into account as the total number of people with substance use disorder were so small (n=26).

The prevalence of drug and alcohol use in relation to parents' education levels was also measured in six levels of illiteracy, primary school, guidance/ high school, Diploma, bachelor degree, and master

Table 1. The ratio of each drug to the total sample and in people with substance use disorder

Type of drug	N	In the sample (%)	In people with substance use disorder (%)
Cannabis (Marie, Pot, Hash)	68	0.24 (0.19-0.3)	37.36 (30.66-44.58)
Stimulants (Speed, Amphetamine, Crystal, Slimming Pills)	43	0.15 (0.11-0.2)	23.63 (18.04-30.31)
Hypnotic/sedative/antianxiety drugs (Barbiturates, Benzodiazepines, Diazepam, Oxazepam, Lorazepam, Alprazolam (Xanax))	84	0.29 (0.23-0.36)	46.15 (39.06-53.40)
Heroin	21	0.07 (0.05-0.11)	11.54 (7.67-17)
Opioids (Opium/Sheere/Heroin/Morphine/Methadone/ Codeine/Pethidine)	31	0.11 (0.08-0.16)	17.03 (12.26-23.16)
PCP (Phencyclidine)/angel power	20	0.07 (0.05-0.11)	10.99 (7.23-16.36)
Hallucinogenic material (LSD/Acid/Mescaline/Peyote/ Mushroom	26	0.09 (0.06-0.13)	14.29 (9.94-20.11)
Solvents or inhalants materials (Glue/Gasoline/ Chloroform/Ether/Colorants)	14	0.05 (0.03-0.08)	7.69 (4.64-12.49)
Others (Prescribed drugs/Nitrous oxide/Ecstasy/ Methylene/Amphetamine, *etc.*)	30	0.11 (0.08-0.16)	16.48 (11.79-22.55)

* There is overlap across different types of substance abuse

Table 2. Distribution of substance and alcohol abuse based on socio-demographic characteristics

Socio-demographic	Characteristics	Total		With disorders		
		N	%	n	Crude %	% (95% CI)
Gender	Boy	13936	48.8	193	1.4	1.6 (1.39-1.91)
	Girl	14604	51.2	84	0.6	0.7 (0.6-.09)
Age	6-9	9804	34.4	53	0.5	0.6 (0.4-0.8)
	10-14	9993	35	67	0.7	0.9 (0.7-1.2)
	15-18	8735	30.6	157	1.8	1.7 (1.4-2.1)
Types of residence	Urban	23829	83.5	251	1.1	1.2 (1.06-1.4)
	Rural	4711	16.5	26	0.6	0.8 (0.46-1.25)
Father educations	Illiterate	1222	4.5	18	1.5	2.3 (1.43-3.73)
	Primary school	4332	15.9	53	1.2	1.6 (1.1-2.1)
	Guidance & high school	6113	22.4	66	1.1	1.4 (1.07-1.81)
	Diploma	8010	29.3	68	0.8	1 (0.74-1.25)
	Bachelor	5763	21.1	34	0.6	0.6 (0.44-1)
	MSc or higher	1888	6.9	11	0.6	0.5 (0.26-1.1)
	Missing	1212	5.9	27	1.8	2.4 (1.6-3.6))
Mother educations	Illiterate	1620	18.7	29	1.1	1.5 (1.1-2)
	Primary school	5162	19.3	58	1	1.4 (1-1.9)
	Guidance & high school	5324	33.2	54	0.7	0.8 (0.6-1)
	Diploma	9176	19.4	60	0.8	0.8 (0.6-1.2)
	Bachelor	5367	3.5	42	0.8	1.2 (0.6-2.3)
	MSc or higher	969		8		
	Missing	922		26		
Father occupation*	Unemployed	924	3.4	29	3.1	3.9 (2.6-5.7)
	Laborer	15776	57.6	146	0.9	1.1 (0.9-1.34)
	Farmer	924	3.4	4	0.4	0.7 (0.2-1.9)
	Businessman	1005	3.7	13	1.3	1.7 (1-3)
	Retired	1564	5.7	12	0.8	0.5 (0.24-1.28)
	Public sector	6261	22.9	42	0.7	0.7 (0.5-1)
	Teacher	767	2.8	5	0.7	1 (0.4-2.5)
	Faculty member	169	0.6	-	-	
	Missing	1150		26		
Mother occupation**	Housewife	23574	85	224	1	1.2 (1-1.4)
	Laborer	962	3.5	4	0.3	0.2 (0.03-0.9)
	Businessman	218	0.8	3	1.4	1.6 (0.5-5.7)
	Retired	208	0.8	5	2.4	4.8 (2.24-10.16)
	public sector	1604	5.8	8	0.5	0.5 (0.2-1.1)
	Teacher	1089	3.9	8	0.7	0.8 (0.3-1.7)
	Faculty member	72	0.3	-	-	
	Missing	813	-	25		
Total		28540	100	277	1	143 (1-1.3)

X^2*=60.969, p-value<0.0001, **X^2=12.855, p-value<0.045

degree using chi square. The results of chi square test indicated a significant relationship between substance/alcohol abuse and father's occupation (p value <0.0001) and between substance/alcohol abuse and mother's occupation (p value <0.045) (Table 2). In other words, the parents' type of occupation was significantly related to substance/alcohol abuse in children and adolescence (see discussion section for more details).

The relationship between demographic characteristics and drug and alcohol consumption in children and adolescents

Logistic regression analysis was used to identify the relationship between demographic characteristics and drug/alcohol consumption among children and adolescents. Table 3 shows that there is a significant relationship between the substance use disorder and sex (p=0.001). The odds ratio (OR) observed in relation to sex for girls was 0.41, which indicates

Table 3. Odds ratios (95% CI) for substance and alcohol abuse based on socio-demographic characteristics

Variables and their categories			Univariate			Multivariate		
			OR (adjusted)	CI (95%)	p-value	OR (adjusted)	CI (95%)	p-value
Demographic variables	Sex	Male	1.00 Baseline					
		Female	0.430	0.322-0.574	<0.0001	0.416	0.306-0.566	0.001
	Age group	6-9	1.00 Baseline					
		10-14	1.52	1.02-2.26	.042	1.359	.884-2.09	0.166
		15-18	3.61	2.51-5.20	<0.0001	3.392	2.302-4.997	<0.0001
	Place of residence	Urban	1.00 Baseline					
		Rural	0.643	0.382-1.082	0.096	0.479	0.277-0.827	0.008
	Father education	Illiterate	1.00 Baseline					
		primary school	0.671	0.373-1.204	0.181	0.879	0.465-1.662	0.692
		High school	0.594	0.339-1.042	0.069	0.829	0.430-1.597	0.575
		Diploma	0.403	0.230-0.707	0.002	0.588	0.291-1.188	0.139
		Bachelor	0.272	0.145-0.512	<0.0001	0.331	0.148-0.742	0.007
		MSc or higher	0.217	0.088-0.534	0.001	0.203	0.068-0.602	0.004
	Mother education	Illiterate	1.00 Baseline					
		Primary school	0.615	0.366-1.034	0.067	0.689	0.391-1.216	0.199
		High school	0.570	0.341-0.952	0.032	0.637	0.347-1.167	0.144
		Diploma	0.322	0.195-0.531	<0.0001	0.496	0.263-0.934	0.030
		Bachelor	0.338	0.196-0.584	<0.0001	0.713	0.344-1.479	0.363
		MSc or higher	0.512	0.235-1.118	0.093	1.506	0.575-3.944	0.405

OR adjusted: Odds Ratio, CI: Confidence Interval

that the risk of substance use disorder in girls is lower than boys (95%, CI=0.306-0.566). There was also a significant relationship between substance use disorder (p<0.0001) and age group. The age range of 15 to 18 years old with a prevalence of 1.7% and OR=3.39 had the highest probability rate of substance use disorder (95%, CI=2.302-4.997). Another variable that was significantly associated with substance use disorder was parents' level of education. The rate of substance use disorder is lowered when parents' education level is increased. The rate of substance use disorder when fathers have education level higher than bachelor degree was OR=0.20 (p=0.004, 95%, CI=0.068-0.602) fathers with bachelor degree OR=0.33 (p=0.007, 95%, CI=2.302-4.997), and mothers with high school diploma OR=0.49 (p=0.030, 95%, CI=0.263-0.934)) (Table 3).

Psychiatric comorbidities in children and adolescents consuming substances and alcohol

The investigation of comorbidities in children and adolescents consuming alcohol and substance showed that in general, 42.5% of children and adolescents were suffering from comorbid disorders (Table 4). Based on the statistics, substance use disorder had the highest comorbidity with behavioral disorders (p=22, 95% CI=17-28) and among the behavioral disorders, oppositional defiant disorder had the highest prevalence (p=13.7, 95% CI=9.8-18.9). The

Table 4. Prevalence of Psychiatric Disorders in Children and Adolescents with Substance and Alcohol Abuse *(N:356)*

Psychiatric disorders		Number	Percent (CI 95%)
Mood disorders	Depression	13	3.2 (1.6-6.5)
	Mania	3	2 (0.7-4.6)
	Hypomania	4	3.2 (1.6-6.5)
	Total mood disorders	16	5.9 (3.5-9.9)
Psychosis		5	1.7 (0.7-4.6)
Anxiety disorders	Panic disorder	2	0.5 (0.08-2.5)
	Separation anxiety	18	7.9 (4.9-12.1)
	Social phobia	10	2.2 (1-5.2)
	Specific phobias	9	5.1 (2.8-8.8)
	Agoraphobia	8	4 (2.2-7.6)
	Generalized anxiety	14	3.2 (1.6-6.5)
	Obsessive compulsive	13	3.2 (1.6-6.5)
	Post-traumatic stress	12	3.2 (1.6-6.5)
	Total anxiety disorders	51	18.8 (14.2-24.5)
Behavioral disorders	Conduct disorder	25	10.1 (6.8-14.8)
	ADHD	20	6.3 (3.8-10.4)
	ODD	38	13.7 (9.8-18.9)
	Tic disorder	5	4 (2.1-7.6)
	Total behavioral disorders	57	22 (17-28)
Neurodevelopmental disorders	Mental retardation	21	8.2 (5.3-12.6)
	Epilepsy	11	3.6 (1.9-7)
	Total neurodevelopmental disorders	30	11.5 (7.9-16.4)
Enuresis disorder		23	6.3 (3.9-10.5)
Total comorbid disorders		112	42.5 (36.3-49.3)

next highest prevalent comorbid disorder was anxiety disorder (p=18.8, 95% CI=14.2-24.5) and among the anxiety disorders, separation anxiety disorder had the highest prevalence (p=7.9, 95% CI=4.9-12.1).

Discussion

The aim of this study was to investigate the demographic characteristics of children and adolescents abusing alcohol and drugs and the degree of comorbid psychiatric disorders in Iranian children and adolescents. A total of 277 children and adolescents with substance use disorders were identified. Among this number of children and adolescents, 174 people (0.73%) consumed alcohol and 182 people (0.8%) had substance use disorders. The results of the previous studies conducted in different regions of Iran, represent the prevalence of 1.2-6.8% drug abuse and 9.9% alcohol abuse (10). Accordingly, we can argue that prevalence of substance use disorder has reduced in Iranian context. Studies conducted around the world show a higher prevalence of substance use disorder than the one in the present study (24-26). The observed differences with regard to the prevalence of substance use disorder between the studies conducted inside and outside the country can be associated with different factors including increased awareness of the Iranian people through mass media, social media, and formal education. Recently, there is a boost in the use of the social medial applications which has accelerated the rate of information exchanges both in young and adult populations. Furthermore, local mass media frequently warns the parents about the prevalence of substance use disorder in children and adolescence. All these information exchanging vehicles might have heighted the parents and children's awareness about the devastating effects of substance use disorder leading to lower prevalence of substance abuse in Iranian children compared to children in other countries. In other words, the increased awareness about the substance use disorder in children and adolescence can decrease the risk of neglect in children. Previous studies consistently show that negligence put the children at increased risk of substance abuse (27).

The current study showed that anti-anxiety and hypnotic drugs (46.15%), cannabis (37.36%) and stimulants (23.63%) had the highest consumption by children and adolescents. In the study by Gattamorta (14) on Spanish adolescents, the prevalence of marijuana (97%) was much higher than that of the present study. However, with regard to the prevalence of anti-anxiety drugs and stimulants, Gattamorta's findings were similar to the findings of the present study. Mesic *et al* (25) also reported that the marijuana was the most abused drug among students in Sarajevo and Granica. The study by Mohammadkhani (7) in Iran, which was conducted on 2,537 secondary students, showed that cannabis and ecstasy had the highest prevalence rate in the last month of their study. The differences observed in various studies in the prevalence of different types of substances can be associated with the amount of use or accessibility of substances in different regions, and also to different attitudes toward various types of substances in different cultural and ethnic contexts. Gibbons *et al* (28) have pointed to the availability of substances as a variable affecting substance use and Rahimian Boogar *et al* (29) found that certain personality traits are connected with positive attitudes and more inclination toward substance abuse. The existence of risk factors in Iranian society (*e.g.*, economical factor, family problems, community disorganization, *etc*.) could pave the way for the formation of positive attitudes toward substance and alcohol abuse as a way to get away from such pressures.

The present study also revealed that there is a significant difference in the prevalence of drug and alcohol consumption between boys and girls (p=0.001). As table 3 shows, girls are less likely to be affected by substance use disorder than boys (OR=0.430, 95.0, CI =0.306-0.566). In this regard, the Center for Behavioral Health Statistics and Quality (CBHSQ) reported the substance use disorder rate of 4.5% in girls and 4% in boys worldwide in 2016. It should be noted that findings of Ljubotina *et al* and other review studies (24,26) support the impact of the gender factor on the rate and type of substance abuse. The fact of gender as a predictor of drug and alcohol abuse can be attributed to cultural and ethnic factors and social beliefs toward the use of drug and alcohol. According to the results of the current study, the use of drugs and alcohol in the age group of 15-18 years old was significantly different from the two age groups of 6-9 and 10-14 years old (p<0.0001).

The age group of 15-18 years old also had the highest probability of substance and alcohol abuse (OR=3.64, 0.95, C1=1.944-4.068). Sharmat *et al* also confirm a significant positive relationship between the prevalence of drug abuse and age in adolescents (30). They showed that the prevalence of substance abuse among adolescents increases as they get older.

The present study suggested that there is a significant relationship between the level of fathers' education and the prevalence of substance use disorder. The participants whose fathers had a bachelor or higher degree were less likely to be at the risk of drugs and alcohol abuse than others. Table 2 shows the highest prevalence of substance use disorder in families with illiterate parents. A study by Pérez *et al* has shown that low literacy in parents can be a predictor of early substance abuse in adolescents (31). The family and the school are two main social contexts affecting the social development of the adolescents (31). Accordingly, parents' literacy as a family factor can directly influence the way adolescents react to their environement. A literate parent may know more about the parental roles, more systmatically deal with the family problems, and know more sources of infomration. All these elements could avoid negligence and reduce the likelyhood of adolescents' risky behaviors. In addition, parentes' education could be connected with the socioeconomic status of the family as parents with higher education could have jobs with higher saleries. Studies show that poor socioeconomic status of the family is related to the higher prevelence of risk behaviors in adolecence (32).

Table 2 shows that there is a significant relationship between parents' occupation and the prevalence of substance use disorder in children and adolescents participating in the current study (father's occupation with $p<0.0001$) and (mother's occupation with $p< 0.045$). The results of logistic regression analysis indicated that unemployment in fathers can be a predictor of substance use disorder in children and adolescents. Droomers *et al* reported a significant relationship between alcohol consumption and father's occupation in 15-year-old adolescents (33). According to the results of their study, adolescents whose fathers had lower-level occupations were 2 times more likely than other adolescents to be at the risk of alcohol consumption. On the other hand, Vereecken *et al* did not show that parents' occupation is significantly related to alcohol consumption and smoking in adolescents (34). Also, in the study by Richter *et al* in 28 countries, parents' occupation was not found significantly associated with alcohol consumption, smoking and cannabis abuse (35). Richter *et al* further showed that risky behaviors of children and adolescents are rarely affected by income and social status of parents (35). Considering the fact that various studies point to the role of individual and environmental factors in high-risk behaviors (36-38) and also the lack of conclusive findings regarding the role of parents' occupation in alcohol and substance abuse in adolescence, it is concluded that parents' occupation as a predictor of substance use disorder in adolescence has a contextual nature. In other words, the way parents' occupation is related to substance use disorder in children and adolescence could vary in different communities.

The present study indicated a psychiatric comorbidity rate of 42.5% in children and adolescents abusing alcohol and substances (39-41). Various studies have confirmed the high comorbidity of psychiatric disorders in adolescents with substance use disorder. For example, the study of Welsh *et al* on 483 individuals aged 11-24, confirms the significant relationship between the use of alcohol, marijuana, opioids and tobacco and some psychiatric disorders (42). In the same vein, the study of Gattamorta on adolescents referring to treatment centers showed the comorbidity of psychiatric disorders in adolescents with substance use disorder is 83.2%, which is a high rate of psychiatric disorders in adolescents with substance use disorder (14). All these evidences including the current study further support the existence of comorbid disorders in people with substance and alcohol use disorder.

In the present study, the highest comorbidity was related to behavioral disorders (22%), with the highest association with ODD (13.7%). The study by Gattamorta revealed that substance use disorder in adolescents is highly comorbid with ODD, OCD, and ADHD, which is in line with the findings of the current study (14). Also, Razali and Kliewer's study on 895 adolescents with age average of 17.5 suggested that early appearance of antisocial behaviors is a common

long-term effect of drug abuse (43). Based on Molina *et al*'s study, early use of alcohol, cigarettes, marijuana and other illegal drugs in adolescents with ADHD was 57%, which was more than that of the Non-ADHD people (41%) (15). The early use of alcohol and other illegal substances other than marijuana was also reported in ADHD adolescents (16). The results of the current study and those of the current one further highlight the importance of comorbid disorders in children and adolescents with substance use disorder. Although such disorders could be present before or along with the substance abuse, it is necessary to deal with them for both prevention and treatment of substance use disorder. For example, Swendsen *et al* reported behavioral disorders as significant risk factors of substance use disorder (44). Hence, early diagnosis and treatment of these disorders could have a positive role in preventing later substance use disorder. Additionally, the co-occurrence of comorbid disorders with substance use disorder would hinder the substance use disorder treatment as comorbid disorders could have been the main risk factors for the substance use disorder.

In the present study, after behavioral disorders, substance use disorder in children and adolescents was highly comorbid with anxiety disorders (18.4%). Also, the results of this study showed that separation anxiety was associated with substance use disorder more than other anxiety disorders. What is common in all anxiety disorders is an experience of fear and apprehension coupled with various physical symptoms mediated by the autonomic nervous system (45). Several studies indicate that different types of drug abuse co-occur with anxiety disorders (44,46,47). A study by Legerstee *et al* found that children with anxiety disorders encounter significantly more unpleasant experiences than their peers which can reduce their function and cause secondary increase in their anxiety (48). Their study showed that the intensity of anxiety can lead to inappropriate behavior patterns and the use of ineffective coping strategies to deal with anxiety. In explaining the comorbidity of substance use disorder and anxiety disorders, self-regulation theory can be drawn on. Accordingly, it can be mentioned that when a child or teenager experiences anxiety, it is possible that he/she is not consciously capable of managing his/her behavior, thoughts and emotions to use more effective coping strategies. Such lack of self-regulation capacity may impel the children and adolescents toward harmful and destructive behaviors to control their physical and mental stress. Self-regulation can be defined as one's ability to manage emotions, desires, and impulses and it is suggested that poor self-regulation is connected to risky behaviors (49). Quinn and Fromme found that high self-regulation inversely predicts heavy episodic drinking, alcohol-related problem, and unprotected sex (50).

In the field of mood disorders, several studies have pointed to the comorbidity of mood disorders and substance use disorder between 16% and 54% in various studies (51-53). Such comorbidity rates are more than the one observed in the present study (5.9%). The observed difference may be attributed to the differences in the samples' characteristics, differences in the questionnaire used, and other demographic and socioeconomic characteristics of the groups in the current study.

Limitations

It is probable that only the most severe cases of substance use disorder have been reported in this study due to the use of KSADS questionnaire. Also, families may have reported fewer cases of alcohol and drug abuse due to their social stigma. Therefore, the prevalence of substance use disorder might be higher than the reported levels.

Conclusion

In general, this study showed that the prevalence of substance use disorder in Iranian children and adolescents was lower than the prevalence of substance use disorder in other studies conducted both inside and outside the country. Additionally, gender, place of residence, age, and the level of parents' education and occupation were found to be predictors of substance use disorder in children and adolescents. With regard to comorbidity, it was found that comorbidity of substance use disorder and psychiatric disorders in Iranian children and adolescents is 42.5%. This highlights the importance of comprehensive mental health assessment for clinical care and treatment of people with substance use disorder. It is particularly concluded that early users of alcohol and drugs

need special attention in terms of psychological and psychiatric care and treatment. Since the nature of relationship between psychiatric disorders and substance abuse is not completely known, researchers and therapists are advised to examine how these two categories interact with each other.

Ethics approval

This study was approved by the national institute for medical research development (NIMAD) ethics committee (the ethics code of IR.NIMAD.REC.1395.001 and grant number of 940906).

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Conflict of Interest

The authors declare that they have no conflict of interest.

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