



## Epidemiology of Psychiatric Disorders in Children and Adolescents in Zanjan Province, Iran during November-February 2016

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### ARTICLE INFO

**Article type:**  
Original article

**Article history:**  
Received: 11 September 2020  
Revised: 14 December 2020  
Accepted: 26 December 2020

DOI: [10.29252/jhehp.6.4.5](https://doi.org/10.29252/jhehp.6.4.5)

**Keywords:**  
Prevalence  
Psychiatric disorders  
Children  
Adolescents  
K-SADS-PL

### ABSTRACT

**Background:** Psychiatric disorders in children and adolescents cause numerous issues in adulthood. Epidemiological data could provide a broad understanding of such issues. However, data are scarce regarding the prevalence of these disorders in Iran. The present study aimed to provide detailed evidence on the prevalence of psychiatric disorders among children and adolescents aged 6-18 years in Zanjan province, Iran during November-February 2016.

**Methods:** In this cross-sectional study, 1,039 children and adolescents were selected via multistage cluster random sampling. Data were collected by face-to-face household surveys using the Persian version of kiddie schedule for affective disorders and schizophrenia-present and lifetime version.

**Results:** The overall prevalence of mental disorders in the children and adolescents in Zanjan was 10.6%. Enuresis (4.8%) was the most common psychiatric issue, followed by anxiety disorders (4.5%), behavioral disorders (3.8%), and neurodevelopmental disorders (1.5%), while mood disorders (0.4%) had the lowest prevalence. Moreover, the children in the rural areas were 1.73 times more likely to develop psychiatric disorders compared to their urban peers.

**Conclusion:** According to the results, approximately 18% of the children and adolescents in Zanjan had at least one psychiatric disorder. Our findings could lay the basis for further research and preventive/therapeutic interventions in this regard.

## 1. Introduction

Psychological problems in children and adolescents cause significant clinical distress and functional impairments. Evidence suggests that these problems could predict the risk of psychiatric disorders in adulthood. A longitudinal study conducted with a 14-year follow-up on children indicated that anxiety, depression, and

internalization problems (somatic complaints, anxiety, and depression) in childhood led to mood disorders in adulthood [1]. Furthermore, adult anxiety disorders are predictable by experiencing social and externalization problems (e.g., criminal behavior and aggressive behavior) [2]. Attention deficit hyperactivity disorder (ADHD) has been reported to be correlated with suicide attempts in adulthood [3]. Evidence also attests to the key role of



externalization and internalization problems in childhood in the development of frustration in adulthood [4]. The prevalence estimation of these disorders is the first step toward the accurate understanding of these problems given the importance of mental issues in children and adolescents and the need for the interventions in this regard.

The prevalence of psychiatric disorders in children and adolescents has been estimated at 13.4% [5]. In a study conducted on 2,000 children aged 9-13 years selected from 11 countries until the age of 16 years, it was reported that 36.7% of the children and adolescents met the criteria of at least one psychiatric disorder [6]. A systematic review of the prevalence of psychiatric disorders in children and adolescents has indicated that 49% of children and adolescents meet the criteria for at least one psychiatric disorder [7]. In addition, almost a quarter of children and teenagers have been reported to experience at least one psychiatric disorder within the past year [8].

Several reports have been published regarding the prevalence of psychiatric disorders in children and adolescents in different communities. For instance, the national study of Norway (2007) on children aged 8-10 years indicates that 7% of the children had at least one psychiatric disorder [9]. Another study performed in Bangladesh also showed that the disorders described in ICD-10 has the prevalence of 15% in children aged 5-10 years living in urban, rural, and slum areas [10]. In a German national study, 14.5% of children and adolescents aged 7-17 years were reported to meet the criteria for one specific mental health disorder [11]. Furthermore, a national study conducted in Austria (2017) indicated that the current and lifetime prevalence of psychiatric disorders in adolescents was 23.9% and 35.8%, respectively [12], while the prevalence of anxiety was estimated at 6.9% and the prevalence of oppositional defiant disorder was 6.8%, and these disorders were followed by ADHD (3.9%), behavioral disorders (1.7%), depressive disorders (1.3%), and substance abuse (1.1%) [13].

Some studies have investigated the prevalence of psychiatric disorders in Iranian children and adolescents, demonstrating no significant difference in the prevalence of various psychiatric disorders (except ADHD) between male and female adolescents aged 12-17 years. Notably, the highest prevalence rates have been attributed to ADHD, oppositional defiant disorder, depression, and anxiety (8.3%, 7.1%, 4.9%, and 4.8%, respectively) [14]. A prevalence study conducted in North Khorasan province (Iran) showed that the overall prevalence of psychiatric disorders among children and adolescents was 16.3%, and the prevalence of mood disorders was reported to be 0.6%, followed by psychosis disorders (0.1%), anxiety disorders (14.2%), neurodevelopmental disorders (7.9%), behavioral disorders (4.3%), and substance abuse (0.7%) [15]. In addition, 34% of the children and adolescents aged 6-18 years in Mashhad city (Iran) have been reported to have at least one psychiatric disorder [16]. In Tabriz city (Iran), 14.8% of the children and adolescents aged 5-16 years have been reported to have various psychiatric disorders [17], and it seems that nocturnal enuresis (18.7%) and daytime

incontinence (5.5%) are also prevalent in school-age children (~10%) [18]. In this regard, the findings of Mohammadi *et al.* (2016) indicated that the overall prevalence of psychiatric disorders in Iranian children and adolescents is 10.55%. In the mentioned study, oppositional defiant disorder (4.45%) was observed to be the most common psychiatric disorder in the sample population [19].

Provincial studies regarding the prevalence of psychiatric disorders have aimed to address the lack of evidence-based research to determine the prevalence of psychiatric disorders in children and adolescents. The review of the studies in this regard also revealed that no comprehensive research has been carried out in Zanjan province (Iran), and no definite evidence is currently available.

The present study aimed to investigate the prevalence of psychiatric disorders among children and adolescents aged 6-18 year, in Zanjan province, Iran during November-February 2016.

## 2. Materials and Methods

This study was part of a national cross-sectional project aiming to assess psychiatric disorders in children and adolescents in Iran. The sample population included children and adolescents aged 6-18 years living in the urban and rural areas of Zanjan province. The participants were classified into three age ranges of 6-9 years, 10-14 years, and 15-18 years (Table 1). The subjects were selected via multistage cluster sampling based on their postal code. The sample size included 1,039 children and adolescents (502 boys and 537 girls) aged 6-18 years who lived in Zanjan province.

Data were collected using the kiddie schedule for affective disorders and schizophrenia -present and lifetime version (K-SADS-PL) via face-to-face interviews. The interviewers included six clinical psychologists who were qualified to perform K-SADS-PL and used tables based on the K-SADS-PL for data collection via interviewing the children and their parents. For the children aged less than 11 years, the interview was conducted with the parents, while the others answered the questions in person.

The study protocol was approved by the Ethics Committee of the National Institute for Medical Research Development (code: IR.NIMAD.REC.1395.001).

Data analysis was performed in SPSS version 20, and the prevalence of psychiatric disorders was determined using descriptive statistics at 95% confidence interval (CI) and the significance level of  $P < 0.05$ . In addition, logistic regression analysis was used to determine the odds ratio (OR) and significance of the difference in the prevalence of mental disorders.

Kiddie Schedule for Affective Disorders and Schizophrenia -Present and Lifetime Version (K-SADS-PL)

In the present study, structured interviews were designed for the children and adolescents aged 6-18 years and conducted to assess the current and previous episodes of psychiatric disorders [20]. The inter-rater agreement of the K-SADS-PL has been estimated at 93-100%.

**Table 1:** Frequency of demographic variables and prevalence of psychiatric disorders

Variables		Total		With disorder		CI (95%)
		N	%	n	%	
Sex	Boy	502	48.3	55	11	8.52-13.99
	Girl	537	51.7	55	10.2	7.95-13.09
Age	6-9	346	33.3	38	11	8.1-14.71
	10-14	349	33.6	43	12.3	9.28-16.18
	15-18	344	33.1	29	8.4	5.93-11.84
Place of residence	Urban	777	74.8	72	9.3	7.43-11.51
	Rural	262	25.2	38	14.5	10.75-19.28
Father educations	Illiterate	60	5.9	8	13.3	6.91-24.16
	Primary school	351	34.3	36	10.3	7.5-13.88
	High school	226	22.1	31	13.7	9.84-18.82
	Diploma	215	21	22	10.2	6.85-15
	Bachelor	123	12	8	6.5	3.33-12.31
	Master or higher	47	4.6	4	8.5	3.36-19.93
	Missing	17	-	1	-	
Mother educations	Illiterate	89	8.6	7	7.9	3.87-15.36
	Primary school	352	34.1	45	12.8	9.69-16.67
	High school	209	20.2	24	11.5	7.84-16.51
	Diploma	249	24.1	23	9.2	6.24-13.48
	Bachelor	119	11.5	10	8.4	4.63-14.78
	Master or higher	15	1.5	1	6.7	1.19-29.82
	Missing	6	-	0	-	
Father jobs	Public job	255	25	18	7.1	4.51-10.88
	Private job	752	73.7	89	11.8	9.72-14.35
	unemployed	14	1.4	2	14.3	4.01-39.95
	Missing	18	-	1	-	
Mother jobs	Public job	62	6	4	6.5	2.54-15.45
	Private job	32	3.1	3	9.4	3.24-24.22
	unemployed (Housewife)	941	90.9	103	10.9	9.11-13.11
	Missing	4	-	0	-	
<b>Total</b>		<b>1039</b>	<b>100</b>	<b>110</b>	<b>10.6</b>	<b>8.86-12.61</b>

In addition, the test-retest reliability of the current and lifetime diagnoses of major depressive disorder, bipolar disorder, generalized anxiety, conduct, and oppositional defiant disorder has been reported to be 0.77-1.00, while it has been estimated to be 0.63-0.67 for the current diagnosis of posttraumatic stress disorder, hyperactivity, and ADHD [21]. In addition, the internal consistency of the Persian version of K-SADS PL has been determined to be 0.81 with the test-retest reliability of 0.69 [22].

In terms of the paternal education level of the children in the current research, 60 (5.9%) were illiterate, 351 (34.3%) had elementary education, 226 (22.1%) had secondary/high school education, 215 (21%) had high school diploma, 123 (12%) were undergraduate, and 47 (4.6%) had a 0 master's degree (or higher). As for the maternal education level, 89 (8.6%) were illiterate, 352 (34.1%) had elementary education, 209 (20.2%) had secondary/high school education, 249 (24.1%) had high school diploma, 119 (11.5%) were undergraduate, and 15 (1.5%) had a master's degree (or higher).

With regard to the occupation status, 73.7% of the fathers were self-employed, 25% worked in the public sector, and 1.4% were unemployed. On the other hand, 90.9% of the mothers were unemployed, 3.1% were self-employed, and 6% worked in the public sector. The initial analysis indicated that 11% of the boys and 10.2% of the girls met the minimum criteria for one psychiatric disorder.

### 3. Results and Discussion

The present study was conducted on 1,039 children and adolescents aged 6-18 years, including 537 females (51.7%). The three study groups had relatively equal distribution. In total, 777 subjects (74.8%) were from urban areas, and 262 (25.2%) were from rural areas. In addition, 12.3% of the children and adolescents with psychiatric disorders were aged 10-14 years, 11% were aged 6-9 years, and 8.4% were aged 15-18 years (Table 1).

Our findings indicated no significant difference in the OR of psychiatric disorders between the male and female subjects, which showed that both groups had almost equal susceptibility to psychiatric disorders. The age of the subjects and their parental education level and occupation status had no significant effects on the probability of developing psychiatric disorders. However, a significant difference was observed between the urban and rural residents in this regard as the children living in rural areas were 1.731 times more likely than their urban peers to experience psychiatric disorders ( $P = 0.027$ ).

According to the results of the present study, 186 participants experienced at least one psychiatric disorder, and the prevalence of psychiatric disorders in the children and adolescents in Zanjan province was estimated at 18.2%.

In the current research, anxiety disorders were the most common psychiatric problems in children and adolescents

**Table 2:** The prevalence of psychiatric disorders in children and adolescents of Zanjan province

Psychiatric disorders	Diagnosis	Number	(%)	CI (95%)
Mood disorders	Depressive Disorders	3	0.3	0.1-0.8
	Mania	1	0.1	0.02-0.6
	Hypomania	1	0.1	0.02-0.6
	Total mood disorders	5	0.5	0.2-0.9
Anxiety disorders	Panic	1	0.1	0.02-0.6
	Separation Anxiety Disorder	13	1.3	0.7-2.13
	Social Phobia	5	0.5	0.2-1.12
	Specific Phobias	6	0.6	0.3-1.26
	Agoraphobia	5	0.5	0.2-1.12
	Generalized Anxiety	16	1.5	0.9-2.55
	Obsessive Compulsive Disorder	11	1.1	0.6-1.89
	Post-Traumatic Stress Disorder	7	0.7	0.3-1.38
	Total Anxiety Disorders	64	6.3	3.42-5.96
Behavioral disorders	Attention Deficit Hyperactivity Disorder	27	2.6	1.79-3.79
	Oppositional Defiant Disorder	10	1	0.52-1.76
	Conduct Disorder	4	0.4	0.15-0.98
	Tic Disorder	4	0.4	0.15-0.98
Neurodevelopmental disorders	Total Behavioral Disorders	45	4.4	2.84-5.2
	Mental retardation	10	1	0.52-1.76
	Epilepsy	7	0.7	0.32-1.38
	Total Neurodevelopmental disorders	17	1.7	0.95-2.49
	Tobacco use	5	0.5	0.2-1.12
Enuresis		50	4.8	3.67-6.29
<b>Total psychiatric disorders</b>		<b>186</b>	<b>18.2</b>	<b>8.86-12.61</b>

(6.3%), followed by enuresis (4.8%), behavioral disorders (4.4%), neurodegenerative disorders (1.7%), and mood disorders (0.5%) (Table 2). In addition, the comorbidity of mood disorders with the other disorders was considered significant. The comorbidity with anxiety disorders was 50%, while it was 25% with behavioral disorders, and 50% with elimination disorders. Among our subjects, 32.5% of the children and adolescents with behavioral disorders had at least one anxiety disorder, and 22.5% met the criteria for elimination disorders (Table 3).

The results of the present study indicated that 18.2% of the children and adolescents in Zanjan province were affected by psychiatric problems. Anxiety disorders, enuresis, behavioral disorders, neurodevelopmental disorders, and mood disorders had the highest prevalence. Regarding the total prevalence of these disorders, our findings are in line with the results of international and Iranian epidemiological studies reporting the prevalence of psychiatric disorders to be 7-17% [5, 9, 10, 15, 19]. Nevertheless, the estimated prevalence in the present study significantly differed with the previous studies in this regard, which could be due to the differences in the sample populations and evaluation methods. For instance, the prevalence of psychiatric disorders in the children and adolescents covered by children's welfare system has been reported to be 49% [7]. Considering that the prevalence of psychiatric disorders in the children and adolescents under the care of the health welfare system is significantly higher

than the general population, this finding was quite expected since our sample population was selected from the general population.

In another study, the prevalence of psychiatric disorders among immigrants was estimated at 36.7%. Compared to a study conducted on samples selected from 11 nations, the results of the present study showed a lower prevalence, which could be due to the high prevalence of these disorders in immigrants. According to the literature, the prevalence of psychiatric disorders is higher among the children of immigrant families [23]. In the Austrian national study, the prevalence of psychiatric disorders in children and adolescents was estimated at 23.9%, which is higher than the present study. This could be attributed to the use of structured interviews based on DSM-5 [12]. Given the use of various interviews based on DSM-IV and DSM-5, the differences in the reported prevalence rates between these two studies are justified.

In the present study, enuresis was the most common psychiatric disorder in the children and adolescents. Similar results have been reported in the children in the United States [24], and enuresis with the prevalence rate of 4.45% has been introduced as a highly common mental problem in the children in this country. The findings of the current research demonstrated that enuresis was more significantly prevalent in Zanjan province compared to the reported Iranian prevalence [19].

**Table 3:** Comorbidity disorders according to the type of psychiatric disorder in zanjan province

Psychiatric disorders.	Mood disorders N (%)	Anxiety disorders N (%)	Behavioral disorders N (%)	Neurodevelopmental disorders N (%)	Substance abuse disorders N (%)	Elimination Disorders N (%)
Mood disorders		2(50)	1(25)	0	0	2(50)
Anxiety disorders	2(4.3)		13(27.7)	3(6.4)	0	8(17)
Behavioral disorders	1(2.5)	13(32.5)		4(10)	1(2.5)	9(22.5)
Neurodevelopmental disorders	0	3(18.8)	4(25)		0	1(6.3)
Substance abuse disorders	0	0	1(20)	0		4(80)
Elimination disorders	2(4)	8(16)	9(18)	1(2)	0	

Regarding anxiety disorders, our findings are consistent with the global prevalence rate (6.5%) in children and adolescents [5], as well as the previous evidence reporting the prevalence of anxiety disorders to be within the range of 0.85–6.8% in different cities of Iran [25]. In addition, the prevalence of behavioral disorders in the present study was considered significant, which is consistent with the studies performed in the United States (5.8%) and North Khorasan province (Iran; 3.4%) [5, 15].

With regard to childhood depression, the results of the present study are in line with the studies that estimated its prevalence to be 0.3–3% [15, 9, 26]. Overall, evidence suggests that depression is rare in children [27]. Despite the findings showing the prevalence of depression in adolescents, it seems that adolescents deny depressive symptoms [28], and the low prevalence of depression in the present study may be attributed to the adolescents' reluctance to report their symptoms.

Regarding gender differences in psychiatric disorders, our findings are in line with the National Study of Iran [19], the Study of North Khorasan [15], and the National Study of Austria [12]. In most of the disorders evaluated in the aforementioned studies, no significant difference has been reported in the gender of the children and adolescents. Although the prevalence of some psychiatric disorders varies in terms of gender, each gender is often equally exposed to mental health problems.

One of the limitations of the present study was the lack of cooperation of some parents and children, which mainly occurred due to the absence of the family or adolescents at home. Due to families' fear of social stigma, contradictory information was occasionally provided. It is recommended further investigations be conducted to determine the causes and persistence of psychiatric disorders to promote parental cooperation in urban and rural local health centers.

## 4. Conclusion

According to the results, the prevalence of psychiatric disorders in the children and adolescents entirely overlapped throughout Iran (10.55%) and Zanjan province (18.2%). Therefore, it could be inferred that out of every 100 children in Zanjan, approximately 18 cases may present with at least one psychiatric disorder.

## Acknowledgments

This article was extracted from a research project approved by the National Institute for Medical Research Development (NIMAD) with the ethics code of IR.NIMAD.REC.1395.001. Hereby, we extend our gratitude to the NIMAD for the financial support of this study. We would also like to thank Zanjan University of Medical Sciences, the Psychiatry and Psychology Research Center of Tehran University of Medical Sciences, and all the families for assisting us in this research project.

## Conflict of interest

The Authors declare that there is no conflict of interest.

## Authors' Contributions

A.A.K., designed and supervised the study and edited the manuscript; R.A.Z., designed the study, conducted the literature review and analysis, and drafted the manuscript; M.M., N.A., and Z.H., contributed to data collection and preparation of the manuscript.

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