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The Prevalence of Psychiatric Disorders in Children and Adolescents in Hormozgan Province of Iran

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Abstract

Objectives: The current cross-sectional study aimed to investigate the prevalence of psychiatric disorders in children and adolescents in the Hormozgan province in Iran.

Methods: 1005 children and adolescents aged 6 to 18 years who were living in Hormozgan province participated in this community-based study. Participants were selected using the stratified random cluster sampling and were instructed to fill the Persian version of Kiddie-Sads-Present and Lifetime Version (K-SADS-PL). Demographic data were also collected (i.e., gender, age, education, parents' education, and socioeconomic status). Descriptive analysis and 95% confidence interval were used to investigate the relationship between the scores of the K-SADS-PL questionnaire and the demographic factors. Logistic regression was used to calculate the OR of the diagnosis with a psychiatric disorder according to sex, age, and socioeconomic status.

Results: The overall prevalence in children and adolescents was 16.01%. No statistically significant difference was found concerning gender in regards to the frequency of psychiatric disorders. The most prevalent psychiatric disorders were separation anxiety disorder (4.2%), attention-deficit/hyperactivity disorder (2.5%), and oppositional defiant disorder (2.5%), while anorexia nervosa (0.1%) had the lowest prevalence.

Conclusions: The frequency of psychiatric disorders in adolescents in Hormozgan province is comparable to the reports from other countries. The results of this study can be used to develop more specific preventive and therapeutic measures, focused on the highest risk subgroups.

Keywords: Children, Adolescents, Mental Disorders, Prevalence, Epidemiology

1. Background

The history of the description of psychiatric symptoms and diagnosis of psychiatric disorders goes back to thousand years ago (1, 2). However, it was in the twentieth century that statistical methods were first administered to investigate the distribution of these disorders (3). During the 1960s, studies on the prevalence of behavioral disorders in children were expanded (4). These studies that are defined as prevalence studies are carried out using valid instruments (5, 6).

Children and adolescents are as vulnerable as adults and sometimes more vulnerable than them. And according to their socioeconomic status, this vulnerability changes. According to the latest available estimates, the prevalence of children's psychiatric disorders in large cities of developing countries ranges from 10 to 20 percent, which is equal to, and in some cases greater than, the rate of developed countries (7-9). In Iran, epidemiological studies reported a prevalence of 11% for psychiatric disorders. While the prevalence of such disorders among children and adolescents is 10.55%.

This study was conducted in five provinces of Iran (cluster sampling techniques was used to select the provinces). According to the results, ODD (3.96%) and ADHD (5.03%) were the most prevalent disorders. ADHD was found to be the most common disorder among male participants (5.03%), while for female ODD was the most prevalent (4.05%) (49).

A study conducted on adolescents of Tehran (capital)

reported a prevalence of 14.2% for psychiatric disorders, with ADHD as the most common disorder (8.3%), followed by ODD (7.2%) (46). Another study reported a prevalence of 17.6% for psychiatric disorders among children aged 6 - 11 in Tehran (10).

Hence, it can be argued that all previous studies are conducted on samples from Tehran province or on clustered samples located in five provinces, as mentioned before. No such study is conducted in Hormozgan province. Since purposeful planning for every intervention on different levels requires precise information, Hormozgan University of Medical Sciences, that is proxy to the ministry of health and medical education concerning the provision of optimal mental health for children and adolescents, intended to estimate the prevalence of mental disorders through conducting prevalence studies and to make an outline of the mental health status of the population. The results of this study could be used by the policymakers and officials in regards to macro- and executive planning.

2. Methods

This study is a part of the international PACRI project that was conducted in all provinces of Iran to investigate the prevalence of psychiatric disorders among children and adolescents (11). Hormozgan is located in the south of Iran, and according to the latest census, the number of children and adolescents aged 6 to 18 years is estimated to be 459,697. This is a cross-sectional study that was conducted on 1005 who were selected from both urban and rural areas using the cluster sampling technique. Subjects were identified and interviewed based on designated blocks and available postal codes.

2.1. Data Collection Tools and Procedure

K-SADS-PL Interview is a semi-structured approach to interview with children aged 6 to 18 years, based on DSM-IV. Interviews were designed to evaluate the current and past episodes of psychiatric disorders in children and adolescents based on objective measures. Questionnaires were filled based on information provided by both the child and parents. Besides, other sources were used, if necessary. K-SADS can help in the diagnosis of major depression, dysthymia, mania, hypomania, cyclothymia, bipolar disorder, schizoaffective disorder, schizophrenia, schizophreniform disorder, acute reactive psychosis, agoraphobia, separation anxiety disorder, the avoidant disorder in children and adolescents, simple phobia, social phobia, generalized anxiety disorder, obsessive-compulsive disorder, attention deficit and hyperactivity disorder, conduct disorder, oppositional defiant disorder, nocturnal enuresis, anorexia nervosa, and bulimia nervosa, transient tick disorder, Tourette syndrome, chronic motor or vocal tic disorder, alcohol abuse, post-traumatic stress disorder, and adjustment disorders (12).

The questionnaire had six sections: (1) the unstructured introductory interview; (2) the screen interview; (3) supplement completion checklist; (4) diagnostic supplements; (5) the summary lifetime diagnostics checklist; and (6) Children's Global Assessment Scale (SAG-C).

Initially, questionnaires were filled individually, and after summarizing the information and resolving inconsistencies, the Lifetime Diagnosis Summary Checklist and the Child's General Assessment Scale were completed. The validity and reliability of the Persian version of this interview are investigated and verified (13).

Inclusion criteria consisted of (1) being from Iran, (2) living in Hormozgan province for at least one year, and (3) being aged 6 to 18 years.

Exclusion criteria consisted of (1) suffering from severe physical illnesses, and (2) suffering from severe brain injuries.

2.2. Ethical Considerations

Written informed consent was taken from all participants (for children under 15 years parents' consent was taken, and for adolescents above 15 years, written consent was taken from both the adolescent and their parents). Participants were assured about the confidentiality of the information, and they were told that collected information will solely be used for scientific purposes. In line with these issues, a document of commitment was prepared and registered in Nimad. The document included ethical codes and was devised with the support of the National Institute for Medical Research Development (NIMAD; Grant No.: 940906).

2.3. Statistical Tests

Data were analyzed by SPSS version 21, using descriptive statistics, logistic regression, and linear and bar graphs.

3. Results

1005 children and adolescents aged 6 - 18 years who were living in Hormozgan province in the solar year of 1396 participated in the current study. According to the findings, 161 children or adolescents (16.01% (95% CI: 13.88 - 18.42)) had at least one psychiatric disorder. 50.8% of the participants were male, and 49.2% were female, with an age distribution of 6 - 9 years (35.7% of participants), 10 - 14 years (47.1% of participants), and 15 - 18 years (17.2% of participants) (Table 1).

Table 1. Demographics of Participants and the Prevalence of Psychiatric Disorders

	Total		Patient		CI (95%)
	N	P	N	P	
Sex					
Male	511	50.8	89	17.4	20.95 - 14.38
Female	494	49.2	72	14.6	17.95 - 11.73
Age					
6 - 9	359	35.7	63	17.5	21.82 - 13.96
10 - 14	473	47.1	61	12.9	16.22 - 10.18
15 - 18	173	17.2	37	21.4	28.09 - 15.94
Place of residence					
Urban area	864	86	145	16.8	19.42 - 14.44
Rural area	141	14	16	11.3	17.64 - 7.11
Father's education					
Uneducated	26	2.6	5	19.2	37.88 - 8.51
Elementary education	135	13.3	18	13.3	20.09 - 8.6
High school education	304	30.6	59	19.4	24.23 - 15.39
Diploma	341	34.3	50	14.7	18.81 - 11.3
Undergraduate	155	15.6	22	14.2	20.55 - 9.56
Graduate school	33	3.3	7	21.2	37.75 - 10.65
Notresponded	11	3.3			
Mother's education					
Uneducated	39	3.9	5	12.8	26.71 - 5.6
Elementary education	194	19.4	32	16.5	22.35 - 11.93
High school education	256	25.6	53	20.7	26.08 - 16.19
Diploma	337	33.7	50	14.8	19.03 - 1144
Undergraduate	156	15.6	118	11.5	17.5 - 7.43
Graduate school	19	1.9	3	15.8	37.57 - 5.52
Notresponded	4				
Father's occupation					
Public sector	366	36.8	68	18.6	22.88 - 14.93
Private sector	618	62.1	90	14.6	17.56 - 12
Unemployed	11	1.1	3	27.3	56.56 - 9.74
Notresponded	10				
Mother's occupation					
Public sector	112	11.2	12	10.7	17.79 - 6.23
Private sector	45	4.5	8	17.8	31.33 - 9.3
Unemployed	847	84.4	141	16.6	19.31 - 14.29
Notresponded	1				
	1005	100	161	16	18.42 - 13.88

17.4% of male participants (95% CI: 14.38 - 20.95) and 14.6% of female participants (95% CI: 11.73 - 17.95) had at least one psychiatric disorder. There was no significant difference between the two groups concerning gender (P = 0.22, OR = 0.74).

The highest prevalence of psychiatric disorders was found in the group of 15 - 18 years (21.4%), followed by those aged 6 - 9-year-olds (17.5%), and the group of 10 - 14-year olds (12.9%). There was a significant difference between the age group of 10 - 14-year olds and the two other groups (P = 0.06, OR = 0.59).

86% (864) of participants were living in urban areas, 16.8% of whom (95% CI: 14.44 - 19.42) were suffering from psychiatric disorders, while 11.3% of participants who were living in rural areas (95% CI: 7.11 - 17.64) were diagnosed with psychiatric disorders. There was no significant difference between the rate of psychiatric disorders in participants from urban and rural areas (P = 0.11, OR = 0.59).

Concerning father's education, the highest and lowest frequency of psychiatric disorders was found among children whose father had a postgraduate degree (21.2%) and an elementary school degree (13.3%), respectively. No significant relationship was found between the rate of psychiatric disorders and the father's education (P > 0.05).

Concerning the mother's education, the highest and lowest frequency of psychiatric disorders was found among children whose mothers had a high school degree (20.7%). There was no significant association between the rate of psychiatric disorders and the mother's education level (P > 0.05).

Concerning the father's occupation, the highest and lowest frequency of psychiatric disorders was found among children whose father was unemployed (27.3%) and those who their father was employed (14.6%), respectively. There was no significant relationship between the rate of psychiatric disorders and the father's occupation (P > 0.05).

Concerning the mother's occupation, the highest and lowest frequency of psychiatric disorders was among children whose mother was unemployed (17.8%) and those whose mother was employed in the public sector

(10.7%). There was no significant relationship between the rate of psychiatric disorders and the mother's occupation (P > 0.05). Information on participants' demographic data are presented in Tables 1 and 2.

The most prevalent psychiatric disorder was separation anxiety disorder (4.2%; 95% CI: 3.11 - 5.6), followed by ADHD, ODD, and nocturnal enuresis (2.5%). Other common disorders were OCD (2%), GAD (1.9%), smoking (1.6%), and depression (1.5%) (Table 3 and Figure 1).

In the group of psychiatric disorders, the highest prevalence was for anxiety disorders (9%), followed by behavioral disorders (5.4%). The least prevalent disorders were eating disorders (0.1%) and psychotic disorders (0.2%) (Table 3 and Figure 2).

Behavioral disorders had the highest number of comorbidities with other disorders, particularly with anxiety disorders (22.2%) (Table 4).

Table 2. Odds Ratios for Psychiatric Disorders Based on Demographics (95% CI)

Demographic Data	OR (Crude)	CI (95%)	P Value	OR (Adjusted)	CI (95%)	P Value
Sex						
Male	Baseline 1:00					
Female	0.211	1.13 - 0.58	0.22	0.74	1.05 - 0.52	
Age						
6 - 9	Baseline 1:00					
10 - 14	0.69	1.02 - 0.47	0.06	0.59	0.89 - 0.40	0.012
15 - 18	1.27	2.01 - 0.81	0.29	1.12	1.81 - 0.70	0.62
Place of residence						
Urban area	Baseline 1:00					
Rural area	0.64	1.1 - 0.37	0.11	0.59	1.04 - 0.33	0.07
Father's education						
Uneducated	Baseline 1:00					
Elementary education	0.65	1.93 - 0.21	0.43	0.37	1.31 - 0.10	0.12
High school education	1.01	2.79 - 0.36	0.98	0.61	2.08 - 0.18	0.43
Diploma	0.72	2.00 - 0.26	0.53	0.44	1.55 - 0.12	0.20
Undergraduate	0.69	2.03 - 0.23	0.51	0.43	1.66 - 0.11	0.22
Graduate school	1.13	4.08 - 0.31	0.85	0.84	4.01 - 0.17	0.83
Mother's education						
Notrespanded	Baseline 1:00					
Uneducated	1.34	3.69 - 0.48	0.57	1.62	5.26 - 0.49	0.42
Elementary education	1.77	4.76 - 0.66	0.26	1.87	6.06 - 0.57	0.29
High school education	1.18	3.17 - 0.44	0.74	1.26	4.21 - 0.38	0.69
Diploma	0.88	2.55 - 0.30	0.83	0.94	3.54 - 0.25	0.93
Undergraduate	1.27	6.00 - 0.27	0.76	1.44	9.00 - 0.23	0.69
Father's occupation						
Graduate school	Baseline 1:00					
Notrespanded	0.74	1.05 - 0.52	0.10	0.63	0.95 - 0.42	0.31
Public sector	1.64	6.35 - 0.42	0.48	1.19	4.93 - 0.28	0.81
Mother's occupation						
Private sector	Baseline 1:00					
Unemployed	1.80	4.76 - 0.68	0.23	1.69	4.94 - 0.58	0.33
Notrespanded	1.66	3.11 - 0.89	0.11	1.61	3.45 - 0.75	0.22

4. Discussion

Due to the importance of accessibility of the epidemiological information on the prevalence of psychiatric disorders and lack of previous studies in this field in Hormozgan province, 1005 children and adolescents aged 6 to 18 years were studied to estimate the prevalence of psychiatric disorders.

No significant difference was found between participants concerning gender (P = 0.22, OR = 0.74). Thus, the gender of participants did not act as a confounding factor.

According to the results, the prevalence of psychiatric disorders was 16.01%, almost equal to the global prevalence of these disorders, as reported by a systematic review (2014) (14) and a meta-analysis carried out in 2015 (15). The prevalence of psychiatric disorders is reported to be 17% in South Africa (16), 15.8% in Vietnam (17), 13.9% in Australia, and 17.6% in Tehran, according to Alavi and colleagues (10). The prevalence of psychological disorders is quite lower

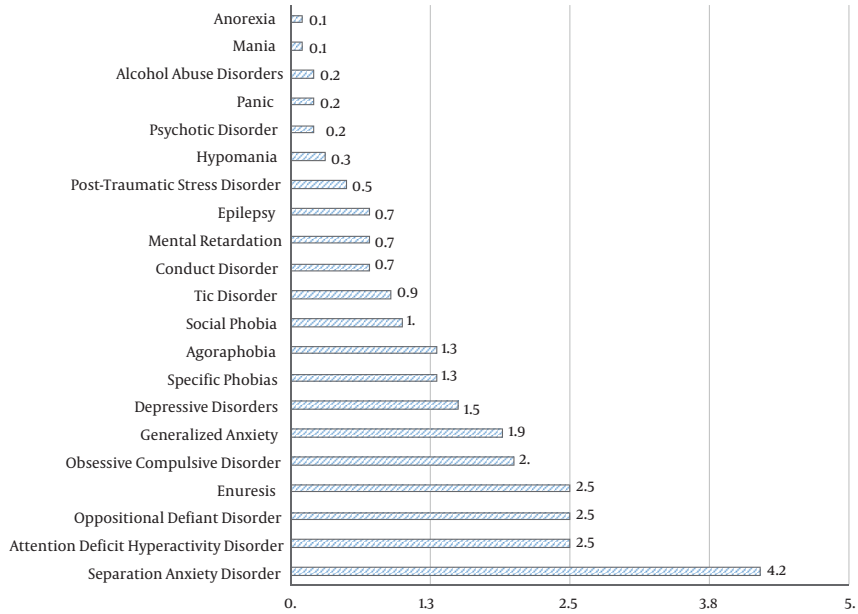

Figure 1. Prevalence of single cases of psychiatric disorders in children and adolescents in Hormozgan province

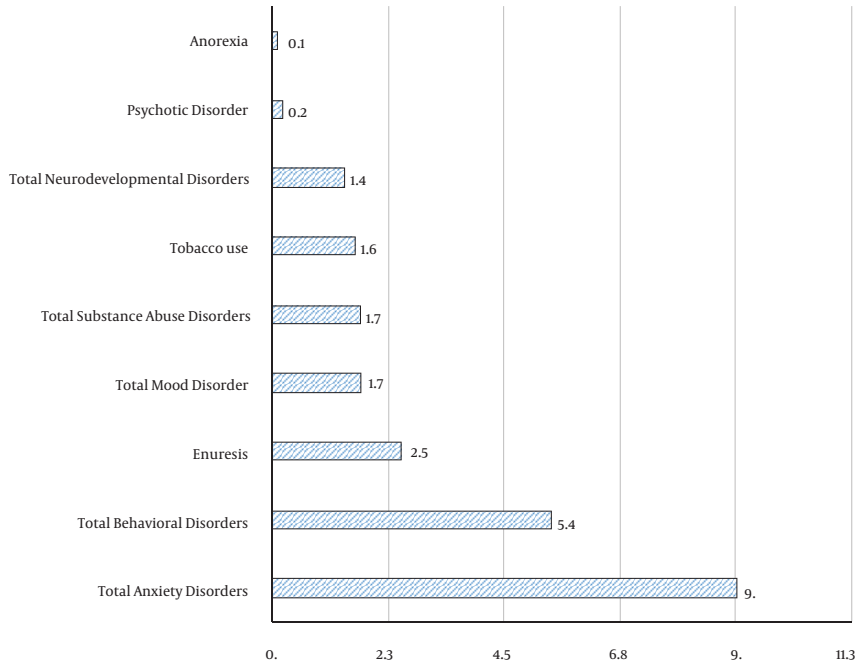

Figure 2. Prevalence of total cases of psychiatric disorders in children and adolescents in Hormozgan province

than that of Saudi Arabia, which is reported to be 36.3% (18). Besides, it was lower than the prevalence of psychological disorders in Brazil (30%) (19). The prevalence of such disorders was found to be 13% in the UK (20), 12.5% in India (21), and 9.49% in China (22), which are lower than the findings of our study that is close to the average global preva-

Table 3. Prevalence of Psychiatric Disorders in Children and Adolescents in Hormozgan Province

	Number	Percentage	CI (95%)
Psychiatric disorders			
Mood disorders			
Depressive disorders	15	1.5	2.4 - 0.9
Mania	1	0.1	0.6 - 0.02
Hypomania	3	0.3	0.9 - 0.1
Total mood disorders	17	1.7	2.69 - 0.06
Psychotic disorders		0.2	0.7 - 0.06
Anxiety disorders			
Panic disorder	2	0.2	0.7 - 0.06
Separation anxiety disorder	42	4.2	5.6 - 3.11
Social anxiety	10	1	1.83 - 0.5
Specific phobia	13	1.3	2.2 - 0.75
Agoraphobia	13	1.3	2.2 - 0.75
Generalized anxiety	19	1.9	2.93 - 1.21
Obsessive - compulsive disorder	20	2	3.11 - 1.29
Post - traumatic stress disorder	5	0.5	1.16 - 0.2
Total anxiety disorders	90	9	10.89 - 7.35
Behavioral disorders			
Attention deficit hyperactivity disorder	25	2.5	3.65 - 1.69
Oppositional defiant disorder	25	2.5	3.65 - 1.69
Conduct disorder	7	0.7	1.44 - 0.34
Tic	9	0.9	1.7 - 0.47
Total behavioral disorders	54	5.4	6.94 - 4.14
Neurodevelopmental disorders			
Mental retardation	7	0.7	1.44 - 0.34
Epilepsy	7	0.7	1.44 - 0.34
Total neurodevelopmental disorders	14	1.4	2.32 - 0.83
Substance abuse disorders			
Cigarette smoking	16	1.6	2.57 - 0.98
Alcohol abuse	2	0.2	0.7 - 0.006
Total substance abuse disorders	17	1.7	2.69 - 0.11
Nocturnal enuresis		2.5	3.65 - 1.69
Anorexia nervosa		0.1	0.56 - 0.02
Total psychiatric disorders		16	18.42 - 13.88

lence and the average prevalence in developing countries (7). Lower prevalence of disorders reported in some studies can be attributed to the level of development of the country which the study is performed (20), performing the study in specific areas with more advanced economies (22), and the methodology of the study, and using different diagnostic criteria (21). The higher prevalence in other studies may also be due to the narrower age range of the participants (19) and the small sample size (18).

The highest prevalence of psychiatric disorders was found among children aged 15 to 18 year olds. The same results are found in studies carried out in Brazil (19) and Saudi Arabia (18), and it was reported that the prevalence of psychiatric disorders was higher in the adolescent group, compared to younger children. Moreover, the significant difference in regards to the low prevalence of psychiatric disorders in the age group of 10 - 14 can be attributed to the higher prevalence of anxiety disorders (especially SAD) in the age group of 6 - 9 and the high prevalence of behavioral disorders in the age group of 14 - 18.

No significant difference was found between the rate of psychiatric disorders among participants from urban and rural areas ($P = 0.11$, $OR = 0.59$). Similar results are reported in Brazil (19), USA (23), and India (21). A study conducted in Australia, however, reported a lower prevalence of psychological disorders in metropolitan areas compared to smaller cities and villages (24).

The most prevalent psychiatric disorders were separation anxiety, ADHD, ODD, and nocturnal enuresis, respectively.

Anxiety disorders (9%) had the highest prevalence among all psychiatric disorders, followed by behavioral disorders. Studies conducted in Brazil (25), China (22), Vietnam (20), and the meta-analysis (15) reported similar results, with the anxiety disorders had the highest prevalence rate of 7.2%, 6.06%, 8.9%, and 6.5% respectively. However, in studies conducted in Saudi Arabia (18), Australia (24), Iran (26, 27), and the study performed by Mohammadi and colleagues in Tehran (10), the most common disorders were ODD, ADHD, ODD, and ADHD. Even in these studies that had different results, anxiety disorders were found to be the second-highest prevalent psychiatric disorders.

The most prevalent psychiatric disorder in regard to father's occupation was observed among children and adolescents whose father was unemployed, while the lowest prevalence was observed among those whose father was working in the private sector. The most prevalent psychiatric disorder in regard to mother's occupation was seen among children whose mother was unemployed, and the lowest prevalence was observed among children of mothers who were working in the public sector. The association, however, was not significant ($P > 0.05$). These findings showed the impact of the family's economic conditions (parent's unemployment) on the child's mental health. Many other studies reported similar results (16, 23, 24).

The most prevalent psychiatric disorder in regards to father's education was seen among children whose father had a graduate-level degree, while the lowest prevalence was seen among children whose father had an elementary school degree. The most prevalent psychiatric disor-

Table 4. Comorbidities Based on Type of Psychiatric Disorders in Children and Adolescents in Hormozgan Province

Comorbid Disorder, Main Disorder	Mood Disorders, F (P)	Psychotic Disorders, F (P)	Anxiety Disorders, F (P)	Behavioral Disorders, F (P)	Neurodevelopmental Disorders, F (P)	Substance Abuse Disorders, F (P)	Elimination Disorders, F (P)
Mood Disorders		1 (5.9)	6 (35.3)	6 (35.3)	1 (5.9)	3 (17.6)	1 (5.9)
Psychotic Disorders	1 (50)		2 (100)	1 (50)	0	0	0
Anxiety Disorders	6 (6.7)	2 (2.2)		12 (13.3)	3 (3.3)	1 (1.1)	2 (2.2)
Behavioral Disorders	6 (11.1)	1 (1.9)	12 (22.2)		3 (5.6)	6 (11.1)	4 (7.4)
Neurodevelopmental Disorders	1 (7.1)	0	3 (21.4)	3 (21.4)		1 (7.1)	0
Substance Abuse Disorders	3 (17.6)	0	1 (5.9)	6 (35.3)	1 (5.9)		1 (5.9)
Elimination Disorders	1 (4)	0	2 (8)	4 (16)	0	1 (4)	

der in regards to mother's education was observed among mothers who had a high school degree, while the lowest prevalence belonged to those whose mother had an undergraduate degree. However, this association was not statistically significant ($P > 0.05$). Similar results are obtained in a study performed in India (21). A study conducted in Saudi Arabia (18) showed a negative relationship between the mother's education level and adolescent's rate of psychiatric disorder, while another study performed in Australia reported different results and showed a higher prevalence of psychiatric disorders among children with lower-income and lower-educated families (24). This difference can be attributed to the impacts of more effective factors related to the parents, such as genes, support, and parenting style, compared to the impact of their education level on their children's mental health.

The most common comorbidity was the co-incidence of behavioral disorders with every other group of psychiatric disorders, and the most common comorbidity in the group of behavioral disorders was the comorbidity with anxiety disorders. Similar results are obtained in the two studies conducted in China (22) and the UK (20).

The current study had limitations, including investigating a limited number of familial factors that contribute to the emergence of psychiatric disorders in children and adolescents, as well as a lack of focus on social and environmental factors. Another limitation is not considering the role of racial and ethnic factors that could contribute to the emergence of psychiatric disorders in children and adolescents in Hormozgan province, due to the wide range of ethnic and racial differences among the residents of the province. It is recommended that the abovementioned factors be considered more precisely in future studies.

4.1. Conclusion

The prevalence of psychiatric disorders in children and adolescents who were living in Hormozgan province is 16.01%, approximately similar to the average global prevalence and the prevalence rate reported for developing countries. Consistent with the majority of studies, anxiety disorders are the most common psychiatric disorders in this age range. Given these conditions, further studies are needed to investigate the contributing factors to the emergence of psychiatric disorders in children and adolescents, so that preventive measures and appropriate treatments could be developed, which have a major role in the future of the society.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Footnotes

Authors' Contribution: Study concept and design and critical revision of the manuscript for important intellectual content: A. G.; drafting of the manuscript: S.Y. M.

Conflict of Interests: All authors have no financial interests related to the material in the manuscript.

Ethical Approval: The study protocol was approved by the Ethics Committee of Hormozgan University of Medical Sciences (ethical code: HUMS.REC.1396.33).

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