

## Original Article

# Epidemiology of Psychiatric Disorders in Children and Adolescents in Chaharmahal and Bakhtiari Province, Iran, 2017

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## Abstract

**Background:** This study aimed to investigate the epidemiology of psychiatric disorders in children and adolescents in Chaharmahal and Bakhtiari Province of Iran.

**Methods:** This community-based cross-sectional study included 1038 children and adolescents aged 6-18 years from Chaharmahal and Bakhtiari province selected by the multistage cluster sampling method. Samples were interviewed using the Schedule for Affective Disorders and Schizophrenia for School-Age Children. Also, demographic data (gender, age, child education, parent education, and economic situation) were obtained. Binary logistic regression was used to analyze the data.

**Results:** A total of 16.1% of participants were diagnosed to have psychiatric disorders. Total psychiatric disorders were significantly more prevalent in boys than in girls ( $P=0.025$ ). Unemployment of fathers was significantly related to increased prevalence of psychiatric disorders in children ( $P=0.016$ ). Other demographic variables had no significant correlation with prevalence of psychiatric disorders in children. Anxiety disorders were highly comorbid with behavioral problems (16.4%). Behavioral disorders also had high comorbidity with elimination disorders (16.7%) and substance use disorders (10%). Enuresis was the most frequent psychiatric disorder (5.8%), followed by epilepsy (3.5%), tobacco use (3.4%), and attention deficit hyperactivity disorder (3%). Total anxiety disorders were the most prevalent group of psychiatric disorders in the sample (21.9%), followed by behavioral disorders (16.3%), elimination disorders (8.2%), and neurodevelopmental disorders (4.5%).

**Conclusion:** Our findings suggest that psychiatric disorders affect a significant number of children and adolescents. Prevalence estimates and identification of sources of heterogeneity have important implications to service providers and modifications are needed in mental health services in the community.

**Keywords:** Children, Epidemiology, Mental disorders, Psychiatric disorders, Prevalence

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## Introduction

Mental disorders affect a significant number of children and adolescents worldwide.<sup>1-4</sup> Studies of prevalence of psychiatric disorders in children and adolescents through the world have yielded different results. A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents included 41 studies conducted in 27 countries from different regions of the world. The results showed that worldwide pooled prevalence of psychiatric disorders was 13.4% that is very similar to the median prevalence rates of 13%,<sup>5</sup>12%,<sup>6</sup> and 12% to 15%.<sup>7</sup> They detected significant heterogeneity for all pooled estimates. Sample representativeness, sample frame, and diagnostic interview were significant moderators of prevalence estimates. Estimates did not vary as a function of geographic location of studies and year of data collection.<sup>8</sup> In another study encompassing

some European countries, the prevalence rates of mental disorders have been reported to be nearly 11%.<sup>9,10</sup> An increase in age-specific prevalence for reported diagnoses of autism spectrum disorder (ASD), hyperkinetic disorder, Tourette's syndrome, and obsessive-compulsive disorder across birth-year cohorts in Denmark, Finland, Sweden, and Western Australia (for ASD) from January 1, 1990 through December 31, 2007 and followed through December 31, 2011 was observed.<sup>11</sup>

In Iran, nationwide epidemiologic studies on psychiatric disorders using Diagnostic and Statistical Manual of Mental Disorders fourth version (DSM-IV) criteria have not been carried out. Previous studies were conducted in limited populations and in limited number of regions that reported prevalence of the disorders varying from 11.9% to 23.8%.<sup>12</sup>

Mohammadi et al, in 2013, investigated the

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epidemiology of psychiatric problems in children and adolescents in 5 provinces of Tehran, Khorasan Razavi, Isfahan, East Azerbaijan, and Fars in Iran. They found that conduct problems had the highest prevalence and social problems the lowest prevalence in the 5 provinces. They also found that males had less emotional problems than females.<sup>13</sup>

There are few epidemiological studies assessing the prevalence of different psychiatric disorders in children and adolescents in Chaharmahal and Bakhtiari Province. A study about the prevalence of attention-deficit hyperactivity disorder in primary school students in Shahrekord in 2013 showed that 17.3% of children were suspected of having ADHD based on child symptom inventory, and prevalence was higher among male students. ADHD prevalence was associated with parents' education and occupation.<sup>14</sup>

This cross sectional study was part of a national project conducted in all 31 provinces of Iran. We aimed to investigate the prevalence of psychiatric disorders in children and adolescents of Chaharmahal and Bakhtiari Province in 2017. The prevalence estimates and the identification of sources of heterogeneity have important implications for providing services, training, and research planning.

## Materials and Methods

### Study Design

This analytical cross sectional study was part of the Epidemiology of Psychiatric Disorders in Iranian Children and Adolescents study. Moreover, the National Institute for Medical Research Development (NIMAD) financially supported this project.<sup>13</sup>

### Sampling

In this community-based study, 1,098 children and adolescents aged 6–18 years were selected from Shahrekord, the main city of Chaharmahal and Bakhtiari province and rural areas of the province by multistage cluster sampling method (cluster and stratified random sampling). Assuming the prevalence of psychiatric disorders equal to 0.3 and type one error of 0.05, and accepted error of 0.05, the sample size was calculated to be equal to 825 for the province. We suggested the design effect for cluster sampling as 1.2, so the final sample size increased to 990 (1000). Furthermore, we continued sampling and invited more subjects to compensate for those who rejected to participate. In the next step 170 blocks (6 samples in each) were randomly selected according to postal code. Of each cluster head, 6 cases were selected, with 3 cases of each gender in different age groups (6–9 years, 10–14 years, and 15–18 years). We had samples from urban and rural areas in provinces proportionally. The exact sample size in each cluster and strata can be observed in the Table 1.

### Inclusion and Exclusion Criteria

Inclusion criteria were the following: Being a citizen of Chaharmahal and Bakhtiari province (people who resided at least one year in that province could participate in the project), and age range of 6 to 18 years. Children and adolescents with severe physical illness were excluded.

### Data Collection

The clinical psychologists were instructed to complete the Persian version of Kiddie-SADS- Present and Lifetime Version (K-SADS-PL). Trained psychologists referred to the children's home and interviewed the children and parents using the K-SADS-PL. A multi-informant approach was used and the parents were asked to complete the screening questionnaires simultaneously and independently and the youths themselves were interviewed to complete the questionnaires if they were 11 years or older. The time required to complete the K-SADS was about 30 to 40 minutes. In addition, demographic data (gender, age, education, parent education, and economic situation) were obtained. The interview started with questions about basic demographics. Information about presenting complaints and prior psychiatric problems were also obtained.<sup>15</sup>

### Kiddie-SADS-Present and Lifetime Version

K-SADS-PL, the Schedule for Affective Disorders and Schizophrenia for School-Age Children/Present and Lifetime Version, is a semi-structured psychiatric interview that is based on DSM-IV criteria. It contains 5 diagnostic groups: (1) affective disorders including depression disorders [major depression, dysthymia] and mania, hypomania; (2) psychotic disorders; (3) anxiety disorders including social phobia, agoraphobia, specific phobia, obsessive-compulsive disorder, separation anxiety disorder, generalized anxiety disorder, panic disorder, and posttraumatic stress disorder; (4) disruptive behavioral disorders including ADHD, conduct disorder, oppositional defiant disorder; and (5) substance abuse, tic disorders, eating disorders, and elimination disorders (enuresis/encopresis).<sup>16</sup>

Ghanizadeh et al reported the reliability of the Persian version of this questionnaire 0.81 and the inter-rater reliability 0.69 using test-retest. The sensitivity and specificity of the Persian version of K-SADS is high.<sup>17</sup> In a study of Polanczyk et al kappa coefficients were 0.93 ( $P < 0.001$ ) for affective disorders, 0.9 ( $P < 0.001$ ) for anxiety disorders, and 0.94 ( $P < 0.001$ ) for ADHD and disruptive behavior disorders. The present study assessed the interrater agreement for K-SADS.<sup>18</sup>

## Results

1038 out of 1098 subjects accepted to participate in the semi structured interview K-SADS-PL (response rate ~94.5%). All of the included subjects were interviewed

and included in the analysis (48.5% boys and 51.5% girls). To determine the frequency of psychiatric disorders in children and adolescents, we used descriptive statistics. Of the subjects involved in the study 16.1% were diagnosed to have psychiatric disorders. Frequency of demographic variables in the sample and prevalence of psychiatric disorders in terms of these variables are showed in Table 1. We used the univariate and then multivariate binary logistic regression to assess the probability of psychiatric disorder for each demographic variable by calculating the crude and adjusted ORs and reporting their 95% confidence intervals (Table 2). It shows that gender ( $P = 0.025$ , 95% CI = 0.485–0.952), and father unemployment ( $P = 0.016$ , 95% CI = 1.262–9.620) had significant correlation with psychiatric disorders.

Prevalence rate of different types of psychiatric disorders are shown in Table 3. Prevalence of specific psychiatric disorders and classes of disorders are showed in Figures 1 and 2, respectively.

Table 4 shows Comorbidity disorders according to the type of psychiatric disorders in Chaharmahal and

Bakhtiari province.

## Discussion

Prevalence of different psychiatric disorders in the sample was 16.1% which is not much different from the worldwide prevalence of 13.4% for mental disorders in children based on the meta-analysis of Polanczyk et al in 2015.<sup>8</sup> In a study on 879 subjects from Tehran interviewed based on DSM-IV criteria, the prevalence of psychiatric disorders, epilepsy, and mental retardation was estimated at 21.5%.<sup>19</sup> The rates of most types of psychiatric disorders in urban areas are estimated to be higher compared to rural areas,<sup>20,21</sup> but a recent study showed that the difference was not statistically significant.<sup>22</sup> Factors such as age and gender, location, socioeconomic markers, and family conditions have been reported to be associated with development of psychopathological disorders.<sup>13</sup> Farhoudian et al in 2007 showed that even though the pooled prevalence rates of psychiatric disorders are comparable to the rates in many other countries, there is diversity of prevalence rates among different communities in Iran. This diversity was

**Table 1.** Frequency of Demographic Variables in Children and Adolescents (6–18) of Chaharmahal and Bakhtiari Province and Prevalence of Psychiatric Disorders in Terms of these Variables

		Total		With Disorder		95% CI
		Number	%	Number	%	
Sex	Boy	525	48.5	98	18.7	15.6–22.2
	Girl	558	51.5	76	13.6	11–16.7
Age	6–9	361	33.3	60	16.6	13.1–20.8
	10–14	370	34.2	58	15.7	12.3–19.7
	15–18	352	32.5	56	15.9	12.5–20.1
Place of residence	Urban	949	87.6	160	16.9	14.6–19.4
	Rural	134	12.4	14	10.4	6.3–16.8
Father educations	Illiterate	41	3.9	8	19.5	10.2–34
	Primary school	119	11.2	15	12.6	7.8–19.8
	Guidance & high school	212	19.9	37	17.5	12.9–23.1
	Diploma	306	28.8	50	16.3	12.6–21
	Bachelor	268	25.2	39	14.6	10.8–19.3
	MSc or higher	118	11.1	22	18.6	12.6–26.6
Mother educations	Missing	19	—	3		
	Illiterate	42	3.9	6	14.3	6.7–27.8
	Primary school	139	12.9	24	17.3	11.9–24.4
	Guidance & high school	200	18.6	29	14.5	10.3–20
	Diploma	356	33.1	66	18.5	14.8–22.9
	Bachelor	294	27.4	43	14.6	11–19.1
Father jobs	MSc or higher	43	4	5	11.6	5.1–24.5
	Missing	9	—	1		
	Public sector	389	36.5	60	15.4	12.2–19.4
	Private sector	653	61.3	103	15.8	13.2–18.8
Mother jobs	Unemployed	23	2.2	8	34.8	18.8–55.1
	Missing	18	—	3		
	Public sector	193	17.9	30	15.5	11.1–21.3
Mother jobs	Private sector	27	2.5	2	7.4	2.1–23.4
	Unemployed (Housewife)	857	79.6	141	16.5	14.1–19.1
	Missing	6	—	1	—	
Total		1083	100	174	16.1	14–18.4

**Table 2.** Odds Ratios (95% CI) for Total Psychiatric Disorder in Term of Demographic Variables

Variables and Their Categories			Univariate			Multivariate		
			OR (Crude)	CI (95%)	P Value	OR (Adjusted)	CI (95%)	P Value
Demographic variables	Sex	Male	1.00 Baseline					
		Female	0.687	0.496–0.952	0.024	0.680	0.485–0.952	0.025
	Age group	6–9	1.00 Baseline					
		10–14	0.933	0.629–1.383	0.729	0.909	0.605–1.365	0.644
		15–18	0.949	0.638–1.413	0.797	0.909	0.597–1.385	0.657
	Locus of life	Urban	1.00 Baseline					
		Rural	0.575	0.322–1.027	0.061	0.585	0.317–1.082	0.088
	Father education	Illiterate	1.00 Baseline					
		Primary school	0.595	0.232–1.528	0.281	0.603	0.204–1.786	0.361
		High school	0.872	0.373–2.040	0.752	0.864	0.295–2.525	0.789
		Diploma	0.806	0.351–1.847	.610	0.750	0.252–2.238	0.607
		Bachelor	.7030	0.302–1.633	0.412	0.777	0.242–2.498	0.672
		MSc or higher	0.945	0.384–2.327	0.903	1.230	0.347–4.363	0.749
	Mother education	Illiterate	1.00 Baseline					
		Primary school	1.252	0.475–3.302	0.649	1.483	0.491–4.482	0.485
		High school	1.018	0.394–2.630	0.971	1.325	0.419–4.189	0.631
		Diploma	1.366	0.553–3.374	0.500	1.602	0.508–5.051	0.421
		Bachelor	1.028	0.408–2.587	0.953	1.125	0.330–3.836	0.851
	Father job	MSc or higher	0.789	0.221–2.815	0.716	0.638	0.126–3.216	0.586
		Public sector	1.00 Baseline					
Private sector		1.027	0.726–1.452	0.881	1.219	0.754–1.971	0.420	
Mother job	Unemployed	2.924	1.188–7.201	0.020	3.484	1.262–9.620	0.016	
	Public sector	1.00 Baseline						
	Private sector	0.435	0.098–1.932	0.274	0.352	0.076–1.642	0.184	
		Unemployed (Housewife)	1.070	0.697–1.644	0.757	0.851	0.475–1.524	0.587

**Table 3.** Prevalence of Psychiatric Disorders in the Chaharmahal and Bakhtiari Province children and adolescents (6–18)

Psychiatric Disorders	Number	%	CI (95%)	
Mood disorders	Depressive Disorders	6	0.6	0.25–1.2
	Hypomania	1	0.1	0.02–0.5
	Total mood disorder	6	0.6	0.25–1.2
Psychotic disorders	2	0.2	0.05–0.7	
Anxiety disorders	Panic	1	0.1	0.02–0.5
	Separation anxiety disorder	26	2.4	1.6–3.5
	Social phobia	7	0.6	0.3–1.3
	Specific phobias	19	1.8	1.1–2.7
	Agoraphobia	15	1.4	0.8–2.3
	Generalized anxiety	10	0.9	0.5–1.7
	Obsessive compulsive disorder	14	1.3	0.8–2.1
	Post-traumatic stress disorder	8	0.7	0.4–1.5
	Total anxiety disorders	73	6.7	5.4–8.4
Behavioral disorders	Attention deficit hyperactivity disorder	33	3	2.2–4.3
	Oppositional defiant disorder	21	1.9	1.3–2.9
	Conduct disorder	7	0.6	0.3–1.3
	Tic disorder	16	1.5	0.9–2.4
Total behavioral disorders	60	5.5	4.3–7.1	
Neurodevelopmental disorders	Mental retardation	3	0.3	0.1–0.8
	Epilepsy	38	3.5	3–4.8
	Total neurodevelopmental disorders	39	3.6	2.6–4.9
Substance abuse disorders	Tobacco use	37	3.4	2.5–4.7
	Alcohol abuse	1	0.1	0.02–0.5
	Total substance abuse disorders	37	3.4	2.5–4.7
Elimination disorders	Enuresis	63	5.8	4.6–7.4
	Encopresis	0	0	—
	Total elimination disorders	63	5.8	4.6–7.4
Total psychiatric disorders	174	16.1		

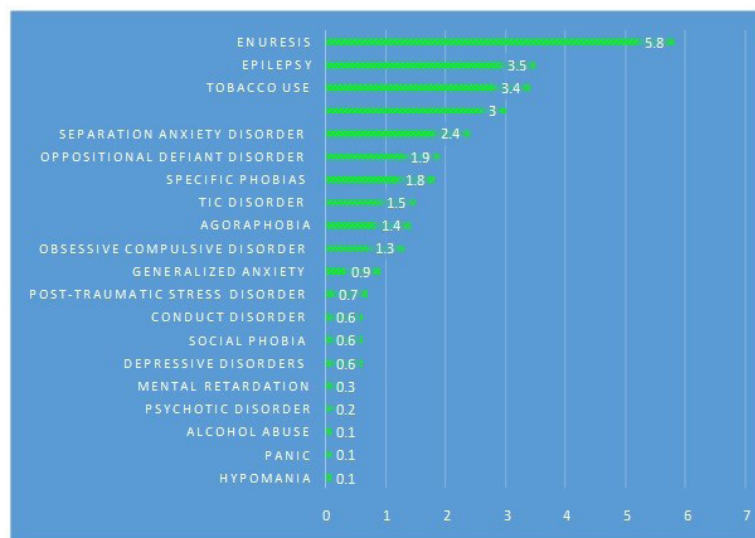


Figure 1. Prevalence of Specific Psychiatric Disorders in Children and Adolescents Chaharmahal and Bakhtiari Province.

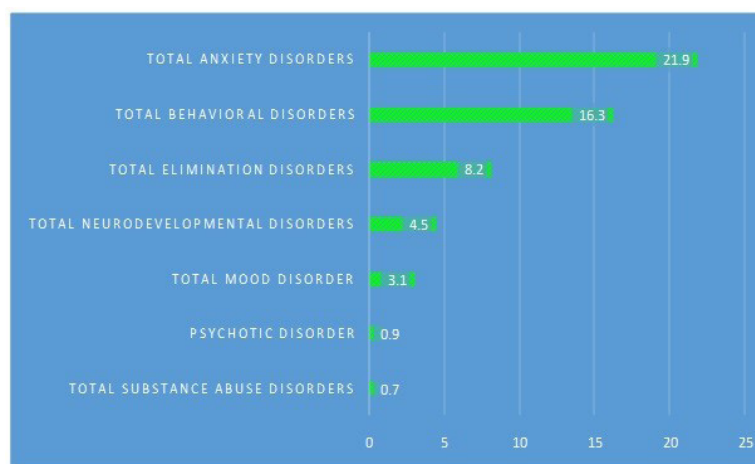


Figure 2. Prevalence of Total Psychiatric Disorders in children and Adolescents Chaharmahal and Bakhtiari Province.

not suggested to be attributed solely to the different time frames and geographical locations of the studies. It might also be a result of differences in methodologies (e.g., using different tools), study procedures and study quality.<sup>23</sup> In the study by Mohammadi et al in 5 major provinces of Iran, the prevalence of psychological problems based on the self-report version of the strengths and difficulties questionnaire<sup>8</sup> in the total population was 14.26%.<sup>24</sup>

The results of our study showed that total psychiatric disorders were significantly more prevalent in boys than in girls. High prevalence of enuresis, tobacco use, and behavior disorders in this study sample may justify this result. In a study by Alavi et al on the prevalence of psychiatric problems in children 6 to 11 years of age in Tehran, the overall prevalence was reported to be 17.9 and no significant difference was observed between two genders; however, bedwetting in boys and anorexia nervosa in girls were reported more than the opposite

sex.<sup>25</sup>

Results also showed that unemployment of fathers was significantly related to increased prevalence of psychiatric disorders in children. A 15-year trend analysis showed that chronic mental illness probability increases as the unemployment rate rises.<sup>26</sup> Thus, the increased rate of psychopathology in children of unemployed fathers may be due to genetic predisposition of these children to psychiatric disorders or the effect of unfavorable family environment. Other demographic variables had no significant correlation with prevalence of psychiatric disorders in the study population.

Enuresis was the most frequent psychiatric disorder in the study sample followed by epilepsy, tobacco use, and attention deficit hyperactivity disorder. In the study of Alavi et al, hyperactivity problems, oppositional defiant problem and separation anxiety accounted for the highest frequency with 8.6%, 7.3% and 5.9%,



**Table 4.** Comorbidity Disorders According to the Type of Psychiatric Disorder in the Chaharmahal and Bakhtiari Province

Main disorder	Comorbid Disorder						
	Psychotic Disorder	Elimination Disorders	Substance Abuse Disorders	Neurodevelopmental Disorders	Behavioral Disorders	Anxiety Disorders	Mood Disorders
	No. (%), CI (95%)	No. (%), CI (95%)	No. (%), CI (95%)	No. (%), CI (95%)	No. (%), CI (95%)	No. (%), CI (95%)	No. (%), CI (95%)
Mood disorders	0	2 (33.3) 9.7–70	0	1 (16.7) 3–56.3	1 (16.7) 3–56.3	3 (50) 18.8–81.2	—
Anxiety disorders	2 (2.7) 0.7–9.5	5 (6.8) 2.96–15.0	4 (5.5) 2.1–13.3	4 (5.5) 2.1–13.3	12 (16.4) 9.7–26.6	—	3 (4.1) 1.41–11.4
Behavioral disorders	2 (3.3) 0.9–11.4	10 (16.7) 9.3–28.0	6 (10) 4.7–20.1	4 (6.7) 2.6–15.9	—	12 (20) 11.8–31.8	1 (1.7) 0.3–8.9
Neurodevelopmental disorders	0	6 (15.4) 7.2–29.7	3 (7.7) 2.7–20.3	—	4 (10.3) 4.1–23.6	4 (10.3) 4.1–23.6	1 (2.6) 0.5–13.2
Substance abuse disorders	1 (2.7) 0.5–13.8	3 (8.1) 2.8–21.3	—	3 (8.1) 2.8–21.3	6 (16.2) 7.7–31.1	4 (10.8) 4.3–24.7	2 (5.4) 1.5–17.7
Elimination disorders	1 (1.6) 0.3–8.5	—	3 (4.8) 1.6–13.1	6 (9.5) 4.4–19.3	10 (15.9) 8.8–26.8	5 (7.9) 3.4–17.3	1 (1.6) 0.3–7.9
Psychotic disorder	—	1	1	0	2	2	0

respectively.<sup>25</sup> Epilepsy was highly frequent in the study population. A meta-analysis and systematic review on prevalence of epilepsy in Iran also estimated prevalence of epilepsy to be around 5%. This result is much higher than rates in other countries.<sup>27</sup> Tobacco use was reported at 3.4% of the study population. Results of a systematic review in Iran showed that the most common drugs among adolescents were hallucinogens, sleeping pills and tranquilizers, hookah, opiates and central nervous system stimulants. Overall, estimates for cigarette smoking, alcohol and chewing tobacco/Pan/Nas were 16.8%, 14.7% and 10.0%, respectively. Use of alcohol and drugs may be underreported in this study.<sup>28</sup>

Regarding the classification of psychiatric disorders based on DSM IV, anxiety disorders were the most prevalent group of psychiatric disorders in the study population, followed by behavioral disorders, elimination disorders, and neurodevelopmental disorders. Prevalence rates based on meta-analysis estimated a worldwide prevalence of mental disorders were estimated as follow: any anxiety disorder, 6.5%; any depressive disorder, 2.6%; major depressive disorder, 1.3%; attention-deficit hyperactivity disorder, 3.4%; any disruptive disorder, 5.7%; oppositional defiant disorder, 3.6%; and conduct disorder, 2.1%. A systematic review on the prevalence of anxiety disorders among children and adolescents in Iran reported high prevalence of anxiety disorders in Iranian children and adolescents. This study reported prevalence rates of 6.8% to 85% for anxiety disorders with considerable heterogeneity in different areas of Iran.<sup>29</sup> The second most frequent group of mental disorders in this study population was behavior disorders including ADHD, oppositional defiant disorder, and conduct disorder which is compatible with worldwide estimates.<sup>8</sup> Comorbidity disorders showed that anxiety disorders were highly comorbid with behavior problems.

Behavioral disorders also had high comorbidity with elimination disorders and substance use disorders.

#### Limitations

This study was conducted mainly in the capital of the province. In case of facilities, this project could also be conducted in other cities of the province to estimate a more accurate prevalence of psychiatric disorders in children and adolescents.

#### Authors' Contribution

PS and KS were generated hypotheses for this study. PS, KS, MRM, Ali Khaleghi, SAM, ST, KS performed the data collection and analysis. PS and KS were a major contributor in writing and editing the manuscript. All authors read and approved the final manuscript.

#### Conflict of Interest Disclosures

The authors have no conflicts of interest.

#### Ethical Statement

Ethics Committee board of the National Institute for Medical Research Development (NIMAD) approved this study with the ethics code: IR.NIMAD.REC.1395.001.

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