

# Epidemiologic Feature of Attention Deficit and Hyperactivity Disorder (ADHD) in Elementary School Children

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## Abstract

Attention Deficit Hyperactivity Disorder (ADHD) is a prevalent psychiatric disorders starting from childhood that has afflicted 3-5% of school children. ADHD has destructive effects on people's social, educational, personality, and behavioural relationships in childhood and adulthood. This cross-sectional school based study included all the students studying in grades one to five at elementary schools in Khorramabad (N=945), Iran. Eight girls and 8 boys schools were selected using a cluster, multi-stage sampling method. The Child Symptom Inventories-4 (CSI4) standardised questionnaire was used to collect the data. The questionnaires were completed by teachers and parents in separate meetings. The cases that showed ADHD underwent clinical examinations by psychiatrists. The results were analysed via descriptive statistics and X<sup>2</sup> tests using the SPSS software. Out of 945 children, 50.7% and 49.3% were girls and boys respectively. Among the people studied, 3.17% suffered from ADHD including 40% from attention deficit, 33.3% from hyperactivity, and 26.6% from the combined type. ADHD was more prevalent in boys than in girls (4.9% vs. 1.5%). There was a significant relationship between children's gender and ADHD ( $p < 0.005$ ). The students in grade 5 showed the lowest, and those in grades 2 and 3 showed the highest ADHD rates. However, no significant relationships were found between parents' age, educational level, occupation, income, grade, and psychiatric problems in family. Identifying behavioral disorders including ADHD in school children and adolescents, due to their high prevalence, seems to be necessary. Therefore, this study was conducted to investigate ADHD prevalence in elementary school students of Khorramabad.

## Key words

Attention Deficit Hyperactivity Disorder; Children; Prevalence; Students

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## Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common psychiatric disorders starting from childhood and an important mental health problem of societies.<sup>1</sup> Its importance is due to its high prevalence.<sup>2</sup> Fifty percent of children with psychiatric disorders are suffering from this disorder and statistics show that 3% to 5% of school children are with ADHD.<sup>3</sup> Prevalence studies conducted all over the world have reported 1% to 20% prevalence rates for disruptive disorders and attention deficit (ADHD) depending on diagnostic criteria used, population of children studied, research methods, and sources of information.<sup>4-7</sup> ADHD is a set of symptoms that are recognisable with hyperactivity, and attention deficit.

ADHD has three types of hyperactivity, attention deficit, and the combined type. The combined type is the most common while the attention deficit disorder is the rarest type.<sup>8</sup>

ADHD is diagnosed with signs such as hyperactivity, attention deficit, reduced learning, and aggressive behaviours in school. The importance of diagnosis and treatment of this disease is due to its probable accompanying with crimes, accidents, drug dependence, and degrading and destructive behaviours.<sup>9,10</sup>

In addition to biological, neurological, and genetic factors as the most important factors of the disorder, environmental causes such as poverty, inappropriate housing, low social-economic status, populous family, numerous conflicts between parents, and aggression in family have to be considered as well.<sup>1,6,11</sup>

ADHD creates abundance of personal, familial, and social problems. Children with this disorder make families, schools, and societies encounter major problems and these children are vulnerable against the mental and social disturbances of adolescence and youth. Students from families with lower social-economic status suffer from more psychological problems because they suffer from various factors such as pregnancy and delivery difficulty, malnutrition, and poisoning which may increase damages in their nervous system.<sup>12-14</sup>

Whereas our society steps towards growth and development, understanding the issues and problems of children as the future hopes is invaluable. Proper understanding of children's problems and helping them to solve their problems are very important in any educational system. Also, providing children and adolescents with mental health care and support will help them to play better social, physical, and psychological roles. Due to the high prevalence of behavioural disorders including ADHD and lack of sufficient attention to the consequences of these disorders in children and adolescents, identifying these disorders seems to be necessary in order to take timely and essential actions. For this reason, this study attempted to investigate the prevalence of this disorder in school level as a small step in planning for larger problems.

## Materials and Methods

This cross-sectional school based study aimed to obtain screening and determine the prevalence of Attention Deficit and Hyperactivity Disorder (ADHD) at elementary schools in Khorramabad city, Iran.

The study protocol was approved by research ethics committee of Lorestan University of Medical Sciences and informed consent was obtained from the children parents before enrollment in the study.

The sampling procedure was carried out after the necessary permissions were taken from Lorestan Education Organization. The study covered all the students in first to fifth grades at elementary schools in the Educational Areas of 1 and 2 including a sample of 945 elementary school students. Considering the sample size and in proportion to the population, 16 states and private schools including 8 boys and 8 girls schools were selected in a cluster and multi-stage sampling method. Firstly, a list of all the elementary schools of the city was obtained from Lorestan Education Organization, including all the boys and girls schools of first to fifth grades in the southern, northern, western, eastern, and central areas of the city. In regard to the equality of both the male and female student populations, equal numbers of boys and girls were selected based on multi-stage sampling so that all the schools in both groups of boys and girls were considered as clusters. Sixteen schools including 8 boys and 8 girls schools were randomly selected considering sizes of the clusters and required number in each school. Then a systematic sampling with triplet intervals was applied to select the samples using the rolls of all the classes from first to fifth grades. Moreover, the sampling size was considered 2.5 times larger in order to be more accurate.

The standardised questionnaire of Child Symptom Inventories-4 (CSI4) was applied to collect the information to screen psychiatric disorders of the children. Previous studies have indicated a relatively appropriate validity and reliability for this questionnaire. A 75% sensitivity and 92% specificity for attention deficit disorder and hyperactivity have been determined.<sup>15,16</sup> The questionnaire has two checklists for parents and teachers. The first part of the questionnaire (questions 1 to 8), that is related to demographic and educational data of children, was completed by the teachers and parents. The second part (questions 1 to 18), related to probable features of ADHD, was completed by the teachers and parents separately. Questions 1 to 9 show the attention deficit disorder, 10 to 18 the hyperactivity, and 1 to 18 the combined type of ADHD. The scoring method of the questionnaire is based on a severity method as follows: never = 0, sometimes = 1, often = 2, and more often = 3. The sum of the obtained scores forms the severity score for each item. The criterion for each score is 6. If the test score of 6 or higher is obtained for attention deficit, the diagnosis will be the attention

deficit type of ADHD, and if the test score of 6 or higher is obtained for hyperactivity in both groups, the diagnosis will be the combined type. Similar oral information was provided in the schools and confidentiality of information was emphasized before the questionnaires were completed. The questionnaires were completed by parents and teachers in separate meetings. Then the children who showed ADHD with regard to their scores were examined clinically by psychiatrists who did not know the accurate scores of the questionnaires. In this kind of interviewing usually conducted with children accompanied by their parents, the psychiatrist completed the checklist of the parents and wrote down the results of interviews and the probable diagnoses based on the DSM-IV codes.<sup>17</sup>

The collected questionnaires were coded and the extracted data was analysed using descriptive statistical procedures and X<sup>2</sup> tests.

**Results**

A total of 945 students were studied in this research including 50.7% of girls and 49.3% of boys, 20% in the first grade of primary school, 17.5% in the second grade, 19% in the third grade, 21.2% in the fourth grade, and 21.3% in the fifth grade. Among the students, 88.3% were studying in state schools. Among the parents, 67.9% were illiterate or had low literacy and 32.1% had high school diplomas or above. Thirty-eight percent were self-employed, 22.8% were workers, 7.3% were in the military, 7.9% were employees, and 6.2% of the fathers were unemployed. Moreover, 96.9% of the students did not have previous history of failing any tests and 1.37% had yearly failure in education. The monthly family incomes of 39.3% of the students were less than 100 US dollars while 8.9% had incomes more than 150 US dollars. In addition, 2.5% of the parents had psychiatric problems.

Among the people studied, 3.17% were ADHD-impaired including 40% for the behavioural disorder of attention deficit, 33.3% for hyperactivity disorder, and 26.6% for the combined type of ADHD. ADHD was seen more in boys than in girls (4.9% vs. 1.5%). Additionally, the fifth grade students had the lowest ADHD disorder while the second and third grades had the highest (Table 1). Seventy percent of the fathers and 80% of the mothers of the children with ADHD were illiterate or had low literacy, 30% of the fathers and 20% of the mothers had high school diplomas or above (Table 2). Among the ADHD children's fathers, 66.6% were self-employed and workers, 26% employees and in the military, and 96.6% of the ADHD children's mothers were housewives (Table 3). None of the patients had any educational problems including failing tests or yearly failure in education. The monthly family incomes of 93.3% of the positive ADHD children were less than 150 US dollars. None of the positive ADHD children's parents had any psychiatric problems, and 86.6% of the children with ADHD were studying in state schools.

Also, there was a significant relationship between ADHD and children's gender (P<0.005), so that the most ADHD cases were seen in boys with 76.6%. However, no significant relationships were found between grade, parents' education, parents' occupation, students' educational status, family economic status, and psychiatric problems in family.

**Discussion**

Studies conducted worldwide on the prevalence of ADHD behavioural disorders have had very different reports. For instance, in these studies the prevalence of attention deficit and hyperactivity disorder differ from 1% to 20% depending on diagnostic criteria used, population of children studied, research methods, and sources of information.<sup>4-7</sup> For this reason, different prevalence rates of this disorder have been

**Table 1** Frequency distribution of elementary students in Khorramabad in terms of health condition and grade

Health condition	ADHD		Without ADHD		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Grade						
First	6	3.2	183	96.8	189	100
Second	8	4.8	158	95.2	166	100
Third	8	4.4	173	95.6	181	100
Fourth	5	2.5	196	97.5	201	100
Fifth	3	1.4	205	98.6	208	100
<b>Total</b>	<b>30</b>	<b>3.2</b>	<b>915</b>	<b>96.8</b>	<b>945</b>	<b>100</b>

reported although the cautious figure is 3% to 5% for primary school children. Nevertheless, the results of many studies confirm the findings of this study.<sup>7,16</sup>

In our study, none of the subjects had any educational failure including failing tests or yearly failure, and this finding is not consistent with the results of other studies which reported a significant relationship between educational failure and ADHD.<sup>12,16,17</sup> Moreover, Tavangar reported no relationship between yearly failure and satisfaction with educational status, and ADHD,<sup>17</sup> and this result is not consistent with our result. This contradictory result emphasizes the importance of doing more researches in this area.

The present study showed that the prevalence of attention deficit and hyperactivity disorder in boys was more than in

girls (4.9% vs. 1.5%), which is compatible with the results of other researches that studied gender as the most important risk factor.<sup>1</sup> A survey in Iran revealed that the prevalence of attention deficit disorder and hyperactivity in boys was more than that in girls (21.8% vs. 12.1%).<sup>14</sup> Also, there was a significant relationship between attention deficit and hyperactivity disorder, and gender ( $p < 0.005$ ) showing its compatibility with the above-mentioned results.

Clinical presentations are different in boys and girls. The symptoms of behavioural disorders in boys are more serious and severe than in girls. In girls, cognitive failures, anxiety disorders, depression, and low self-confidence are more noticeable.<sup>6</sup> As, ADHD in girls is presented more with internalising symptoms and in boys more with externalising symptoms, children with more externalising symptoms

**Table 2** Frequency distribution of elementary students in Khorramabad in terms of parents' literacy and health condition

	Health condition Level of education	ADHD		Without ADHD		Total	
		n	Percentage	n	Percentage	n	Percentage
<b>Father</b>	Illiterate	5	3.6	135	96.4	140	100
	Elementary	8	3.2	239	96.8	247	100
	Junior high school	8	4.3	178	95.7	186	100
	High school	6	3.9	148	96.1	154	100
	Above high school	3	1.5	198	98.5	201	100
	<b>Total</b>	<b>30</b>	<b>3.2</b>	<b>899</b>	<b>96.8</b>	<b>929</b>	<b>100</b>
<b>Mother</b>	Illiterate	4	2.4	164	97.6	168	100
	Elementary	10	3.2	303	96.8	313	100
	Junior high school	10	4.8	200	95.2	210	100
	High school	4	2.9	134	97.1	138	100
	Above high school	2	1.9	103	98.1	105	100
	<b>Total</b>	<b>30</b>	<b>3.2</b>	<b>905</b>	<b>96.8</b>	<b>935</b>	<b>100</b>

**Table 3** Frequency distribution of elementary students in Khorramabad in terms of parents' occupation and health condition

	Health condition Parents' occupation	ADHD		Without ADHD		Total	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
<b>Father</b>	Unemployed	0	0	31	100	31	100
	Self-employed	14	3.9	346	96.1	360	100
	Workers	6	2.8	209	97.2	215	100
	Military	1	1.4	68	98.6	69	100
	Employees	7	2.9	234	97.1	241	100
	<b>Total</b>	<b>28</b>	<b>3.1</b>	<b>888</b>	<b>96.9</b>	<b>916</b>	<b>100</b>
<b>Mother</b>	Housewives	29	3.4	8.9	96.6	848	100
	Employees	0	0	17	100	17	100
	Workers	1	1.3	74	98.7	75	100
	<b>Total</b>	<b>30</b>	<b>3.2</b>	<b>910</b>	<b>96.8</b>	<b>940</b>	<b>100</b>

(boys) are referred for treatment.<sup>6</sup>

In our study, there was not a significant relationship between grade and ADHD behavioural disorder. The lowest rates of the behavioural disorder were observed in the children of the ages of 10 and 11 (fourth and fifth grades) while the highest rates were reported in the children of the ages of 8 and 9 (second and third grades). Therefore, the prevalence rate of ADHD behavioural disorder decreased as the age of the children increased. In Tavakolizadeh's study, the disorder increased in the age group of 7-9 years old, decreased in the next age group of 10 to 12, and then it increased again in other age groups.<sup>12</sup> The results of another study showed no relationship between ADHD and children's school grade, and the rate of ADHD prevalence in the children decreased as their age increased.<sup>17</sup> However, in similar studies significant relationships were reported between ADHD, age, and grade,<sup>16,18</sup> so that the prevalence of ADHD in children increased with increasing age.<sup>4,11</sup> No significant relationships were found between parents' literacy, parents' occupation, parents' social-economic status, family history of mental disorders, and ADHD. But other studies reported the highest ADHD in low social-economic status, and for families with psychological disorder history.<sup>12,19-21</sup> Few studies have been carried out on the relationship between parents' educational level and ADHD. However, if we consider parents' social-economic status to be related to their educational level, the effect of parents' educational level on ADHD prevalence can be explained.<sup>6</sup> In our study, lack of a significant relationship between parents' educational level, their occupation, their social-economic status, and ADHD may be attributed to the high percentage of illiteracy and low literacy in both groups of the ADHD and healthy students.

On the other hand, the insignificance of the relationship between psychological disorders history in family and ADHD can be attributed not to lack of any psychological disorders, but to parents' unawareness of attending health centers, so that their disorders cannot be diagnosed.

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