

Original Article

The Prevalence of Attention Deficit Hyperactivity Disorder in Preschool-Age Children in Mashhad, North-East of Iran

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Background: Attention deficit hyperactivity disorder (ADHD) is one of the most common childhood-onset psychiatric disorders. Although the onset of ADHD is frequently prior to the age of seven years, there is a paucity of data on the prevalence of the disorder in preschool-age children. This study was performed to determine the prevalence rate of ADHD in preschool-age children in kindergartens of Mashhad, North-East of Iran.

Methods: One thousand eighty-three (553 males and 530 females) children aged between five and six years, were selected at random from 155 kindergartens in ten districts of Mashhad. The ten-item Conner's Index questionnaire was completed for each child by teachers and parents. Parents of children whose scores were positive for ADHD (>15) were interviewed by a psychiatrist and the ADHD was diagnosed based on DSM-IV diagnostic criteria and the Schedule for Affective Disorders and Schizophrenia for School-Age Children Present and Lifetime Version.

Results: One hundred thirty-three (12.3%; CI95%: 10.3 –14.2%) children were diagnosed to have ADHD.

Conclusion: The prevalence of ADHD in preschool-age children in North-East of Iran is consistent with previous studies in other countries. This study recommends the need for diagnosis and treatment of ADHD in preschool-age children.

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Keywords: Attention deficit hyperactivity disorder • preschool age • prevalence

Introduction

Attention deficit hyperactivity disorder (ADHD) is one of the most common childhood-onset psychiatric disorders¹ that affects 2 – 14% of school-age children.^{1 – 14} Boys are more commonly affected by ADHD than girls and the male:female ratio is approximately 3:1 to 4:1.^{1, 15} Based on DSM-IV TR criteria, it has been estimated that one-third of children referred to psychiatric clinics are diagnosed as having ADHD. Conservative estimates evaluate the prevalence of ADHD to be 2% to 6% in the United States, with some studies reporting a prevalence of up to 17%. By the year 1987, a total of 6% of all

public elementary school children in the United States were receiving stimulant medications.¹⁶ The prevalence of hyperkinetic disorder in United Kingdom is lower than United States and is approximately 2%.¹⁶

Although the onset of ADHD is usually prior to the age of seven years, there is a paucity of data on the prevalence of disorder in preschool children.^{17–20} According to previous studies, the prevalence of this condition in preschool-age children is between 2% and 18.2%.^{20 – 23} Recent reports highlight behavioral, social, familial, and academic difficulties in preschool-age children with ADHD as compared to their counterparts without ADHD.²⁴ Likewise, others have reported working memory deficits, mother-child disruption, and comorbid disruptive disorders in preschool-age children with ADHD.^{25 – 27}

Evaluation of the prevalence of ADHD in preschool-age children can help clinicians to

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consider the diagnosis of ADHD and related psychiatric disorders in these children. Early intervention minimizes negative impact of the disorder and chronic failure and demoralization. On the other hand, delay in the diagnosis and treatment of ADHD in preschool children may result in developmental problems, comorbid psychopathology, disturbances in family functioning, and other psychiatric problems such as substance abuse.²⁸⁻³²

The purpose of this study was to determine the prevalence of ADHD in the general preschool population in Mashhad — the second largest city of the country located in North-East of Iran.

Patients and Methods

Thirty-four daycare kindergartens were selected at random from ten districts of Mashhad. One thousand and eighty-three (553 males and 530 females) children aged between five and six years were selected at random from 4,143 children of the selected kindergartens. Teachers and parents of these children were asked to complete a ten-item Conner's Index questionnaire for each of these children. Score 15 was assumed as the cut-off point and those with scores >15 were considered positive.

Parents of children with positive screening tests were invited to participate in the next step during which parents and their children were interviewed directly in a semi-structured interview according to the Schedule for Affective Disorders and Schizophrenia for School-Age Children, Present and Lifetime Version (K-SADS-PL) ADHD section.³³ The diagnosis for ADHD was also made by a direct interview based on DSM-IV diagnostic criteria. A psychiatrist or a highly-trained interviewer with extensive experience conducted all interviews. Data were analyzed by SPSS 11. To compare the prevalence of ADHD in boys and girls, χ^2 test was used. Statistical significance criteria was set at $P < 0.05$.

Results

We found 133 children with ADHD, which translates to a prevalence rate of 12.3% (CI95%:

10.3 – 14.2%) in general population of preschool-age children. The prevalence was 18.1% ($n = 96$) in boys and 6.7% ($n = 37$) in girls ($P < 0.0001$) (Table 1).

Figure 1 shows the distribution of probands with ADHD in different districts of Mashhad.

Discussion

This study examined the prevalence of ADHD in a community sample of 1,083 preschool-age children in Mashhad, North-East of Iran. Although a prevalence of 12.3% is consistent with some previous studies on community samples of preschool-age children in some countries, it is different with others.^{22, 24, 34}

According to the studies, the prevalence of ADHD preschool children varies from 2% to 5% in the United States.^{2, 20, 35-37}

In India, it was found that the prevalence of ADHD increases with age; the prevalence at the age of three to four years was 5.2%.²³ In Germany, researchers reported a prevalence of 9.6% at the age of five years.²⁴ Shealy estimated a prevalence between 3% and 20%, depending on the age, the criteria and the instruments used for evaluation of ADHD.³⁴ In Colombia, ADHD was found in 18.2% of preschool children.²²

According to Kurtzke, epidemiological studies report in a higher prevalence, which should be considered as estimated or screening prevalence; many false positives may be included.³⁸ That may explain parts of differences observed between the results obtained from different studies.

ADHD may be culture-dependent; what is considered abnormal in one culture may be acceptable in another. For instance, "to talk excessively;" intuitively, parents decide what "excessively" means according to their own culture.^{39, 40} So, the lower rates of ADHD may be attributed to under-recognition and delay of parents in seeking treatment for their preschool children or to the hesitance of some clinicians in diagnosing children in this age group.²

The prevalence of ADHD symptoms, and probably ADHD, was indeed high in our sample. There is no question that many more epidemiological studies on developmental

Table 1. Prevalence rate of ADHD by gender.

	ADHD		Non-ADHD		P value
	n	%	n	%	
Male	96	18.1	434	81.9	<0.001
Female	37	6.2	516	93.3	

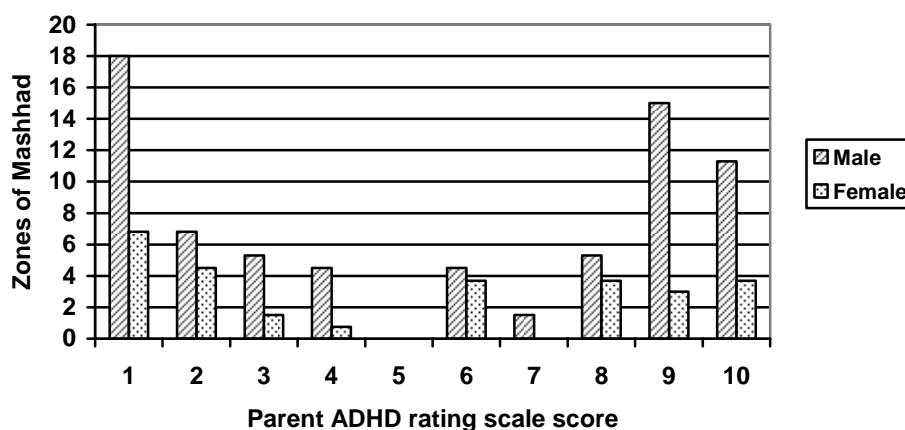


Figure 1. Distribution of ADHD in probands of the children with ADHD in different districts of Mashhad.

disorders are required to advance our understanding of these disorders. Cross-national comparisons can be particularly useful for a comprehensive understanding of different developmental disorders.

Despite the lower rates of impairment in academic achievement, ADHD in preschool age is a severe disorder associated with impairment in multiple domains of functioning. Patients may have high rates of psychiatric comorbidity, morbidity, and impairment.² Thus, there is no reason to assume that treatment of preschool-age children with ADHD should be any less aggressive than school-age children.^{26, 41, 42} Since little is known about the age specific response to treatment, clinicians should consider all options until further research results are available. Our results also propose the need for national schedules for screening, early diagnosis, and treatment of ADHD in preschool-age children before standing in elementary school.

Our results must be interpreted in the context of their methodological limitations. In this study, we had interview with only one parent — usually the mother — and relied on maternal reports, which might have led to a bias. Moreover, a temperamental constellation consisting of high activity level and short attention span, though in the normal range of expectation for a child's age, should be considered. Differentiating these temperamental characteristics from cardinal symptoms of ADHD in preschool-age children is difficult mainly because of the overlapping features of a normally-immature nervous system. So, some of these children probably won't later fulfill all of the criteria for ADHD. Despite these

limitations, our results showed that the prevalence of ADHD in preschool-age children is as high as in the school age and clinicians should consider it to preventing the morbidity of the disorder earlier.

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The Tomb of Saadi, poet and distinguished thinker of the 13th century A.D. (7th century A.H.), Shiraz, Iran

His verses on the value of health

None knows the value of the day of happiness
Until a day befalls to suffer hardship;
The sound man who never a while lay down and groaned
Never spoke thanks to his Lord for health.
That person recognizes fitness' worth
Who for a while's been helpless, fused in fever!
How should the murky night seem long to you,
As you from one side, softly, to the other roll?
Think of the one who falls and rises, fevered-
He in affliction knows the night's full length!

(Quoted from *Bustan of Saadi*, Chapter 8, P: 207, translated by G. M. Wickns, No. 46, Iranian National Commission for UNESCO, Amir Kabir Publication, 3rd edition, 1987)

