

# A study of prevalence and factors affecting prevalence of attention deficit hyperactivity disorder(ADHD) among primary school children in urban schools

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## Abstract

**Background:** Attention deficit hyperactivity disorder is the most common neurobehavioral disorder in children which manifests with hyperactivity, impulsivity and or inattention. With a wide range of involvement in various domains like Cognitive, Academic, Behavioural, Emotional and social, these children even qualify for special health care needs. **Methods:** We did a retrospective study of 1150 school children in the age group of 7-12 years over a duration of 1.5 years from December 2014 to May 2016 using Conner's Parent and Teacher Rating scale with 27 and 28 set of questionnaire respectively. Children screened positive with Conner's were interviewed using DSM IV Criteria. **Results:** The prevalence rate is 5.04%. In our study. Processed foods, younger maternal age, low maternal educational status, prematurity, were more in children diagnosed with ADHD.

**Key Word:** ADHD, Conners, DSM IV, Children.

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## INTRODUCTION

Attention deficit hyperactivity disorder is one of the most common childhood onset psychiatric disorders<sup>1-14</sup> that affects 2-17 % of school children. Boys are more commonly affected than girls by ADHD and the male to female ratio is 3:1 to 4:1.<sup>1,15</sup> In order to establish the criteria for diagnosis, it is important that the symptoms must appear in at least two contexts, for duration of at least 6 months, have an onset before the age of 7 years, and cause significant functional impairment. Evaluation of prevalence of ADHD in school age children can help the

clinicians to minimise negative impact of the disorder in academic and social settings and also help the family to be spared of the trauma of handling the child at an advanced stage. Also, the features may be brushed aside as normal for age undermining the seriousness of the illness. School based studies go a long way in detecting the disease which may otherwise be neglected for want of proper diagnosis. ADHD is a syndrome with two categories of core symptoms - Inattention, Hyperactivity - Impulsivity. The former is typically observed by the time child reaches 4 years of age, while the latter is not apparent until the child is 8-9 years of age. The clinical subtypes can be described as:

1. 1. Predominantly Hyperactive - Impulsive(HI)
2. Predominantly Inattentive(I)
3. Combined

Symptoms of Hyperactive - Impulsive( HI) Type(DSM 5):

1. Excessive fidgetiness( Squirming in seat, tapping the hands or feet)
2. Difficulty remaining seated when sitting is required( At school, work etc)

3. Feelings of restlessness( in adolescents) or inappropriate running around or climbing( in preschool children)
4. Difficulty playing quietly
5. Difficulty to keep up with, seeming to always be “ on the go”
6. Excessive talking
7. Difficulty waiting turns
8. Blurting out answers too quickly
9. Interruption or intrusion of others

#### Features of Hyperactivity

1. Excessive motor activity
  - a. Excessive fidgeting
  - b. Taps hands or feet or squirms in seat
  - c. Leaves seat in situations when remaining seated is expected e.g., leaves school, classroom, workplace
  - d. Runs about or climbs in situations where it is inappropriate.
  - e. Unable to play or engage in leisure activities
  - f. Acting as if driven by a motor and may be experienced by others as if restless., e.g.,unable to be /uncomfortable being still for extended time in place where quietness is required
2. Talks excessively and incessantly

#### Features of Impulsivity:

##### Hasty actions

1. That occur in the Moment without forethought
- g. Speech related : Blurting out an answer before a question has been completed,completing people’s sentences / butting into the conversation and difficulty waiting for his or her turn / wants to be first
2. May have high potential for harm / accidents to the child( darting into the streets without looking)
3. May manifest as social intrusiveness( interrupting others excessively)
4. Making important decision without consideration of long-term consequences( taking up responsibility /job without adequate consideration)
5. Difficulty waiting her or his turn( while waiting in line)
6. Interrupts or intrudes on others on others( butts into conversations, games or activities ; may start using other people’s things without asking permission)

#### Inattention:

1. The predominantly inattentive subtype of ADHD is characterised by
  - a. Reduced ability to focus attention
  - b. Reduced speed of cognitive processing and responding.

2. These symptoms are not due to defiance( disobedience or rebelliousness) or lack of comprehension Symptoms of Inattention( DSM 5)

1. Failure to provide close attention to detail careless mistakes
2. Difficulty maintaining attention in play, school, or home activities
3. Seems to listen, even when directly addressed
4. Fails to follow through( homework, chores etc)
5. Difficulty organising tasks, activities,and belongings
6. Avoids tasks that require consistent mental effort
7. Loses objects required for tasks or activities( school books, sports equipment, etc)
8. Easily distracted by irrelevant stimuli
9. Forgetfulness in routine activities( homework, chores etc)

#### DIAGNOSIS OF ADHD( DSM 5)

1. For children < 17 years  
>= 6 symptoms of hyperactivity and impulsivity or  
>= 6 symptoms of inattention  
For adolescents >=17 years and adults  
>= 5 symptoms of hyperactivity and impulsivity or  
>= 5 symptoms of inattention are required
2. Persisting for 6 months
3. Negatively impacts
  - A. Psychological
  - B. Social
  - C. Academic
  - D. Occupational Activities
4. Inconsistent with developmental level of child
5. Symptoms of Inattention /Hyperactivity Impulsivity start before 12 years
6. Symptoms of pervasive Inattention / Hyperactivity Impulsivity in 2 or more settings( Home / School / Work / Playground / neighbour’s home)
7. Type of subtype to be specified( I /HI / Combined). The subtype of ADHD in a given patient can change from one to another over time.
8. Severity of the condition can be determined based on impairment in social, Occupational, Academic functioning.
9. Rule out other causes of core symptoms.

#### METHODOLOGY

Study Design - Cross sectional descriptive study

Study Duration - December 2014 to May 2016

Study Setting - 2 English medium Urban schools

Sample size - 1150

Inclusion Criteria - All school children aged 7 to 12 years

Exclusion criteria - Children of parents who refused to participate in the study.

2 largest private English medium schools were randomly selected. Informed written consent was taken from parents of all selected children before undertaking the study. Teachers and parents were asked to complete a Conner Teacher and Parent Rating Scale questionnaire for each of children. Score of equal to and more than 65 was taken as cut off point and those with scores equal to and more than 65 were considered positive. Teachers and parents of children with scores equal to and more than 65 were invited

to participate in the next step during which they were interviewed directly by applying DSM -4 criteria and the diagnosis of ADHD made. Also physical examination and systemic examination was carried out.

Statistical methods - Descriptive and Inferential statistics analysis has been carried out. Student's T test has been used to find significance of the study parameters on categorical scale between two or more groups. The statistical software used was SAS 9.2, SPSS 15.0, stata 10.1, Medcale 9.0.1, Systat 12.0 and R environment version 2.11.1 were used.

## RESULTS

Out of 1150 children, 588(51.13%) were male and 562( 48.87 %) were females.

7.82 % of the males and 3.38 % of the females were positive for ADHD by Conner's teacher and Parent rating scale shown in table 1.

**Table 1:** Cases screened positive using Conner's teacher and parent rating scale

	Number of positive cases	Percentage
Male	46	7.82%
Female	19	3.38%
<b>Total</b>	<b>65</b>	<b>5.65%</b>

Of these, 12 children( 11 male and 1 female) were positive by Conner's teacher rating scale, 26 children( 21 male and 5 female) qualified for Conners parents rating scale and 20 children( 14 male and 13 female) screened positive for Conner's teacher and parent rating scale, which is statistically significant p value, as shown in table 2. The maximum prevalence was around 8 years of age, as seen in table 3. There is no statistical difference noted for age. Among the 65 cases who screened positive for Conner's, when interviewed with DSM criteria, as seen in table 4, 58 were positive, of these 28(19 male and 9 female) were hyperactive /impulsive, 17 children(10 male and 3 female) were combined type, which has statistical significance.

**Table 2:** Children screened positive using Conner's teacher and parent rating scale

	Teachers positive scale		Parents positive scale		combined	
	No.	Percent	No.	Percent	No.	Percent
Male	11	91.66	21	80.76	14	51.85
Female	1	8.44	5	19.24	13	48.15
Total	12	100	26	100	27	100
Mean ±SD	5.99±3.52		13±7.6		13.4±7.9	

$\chi^2=8.46$ ;  $p < 0.05$ ; significant

The mean equalised income for households with an ADHD child was less than Rs 500000 per annum as opposed to > Rs 500000 per annum for families without a child with ADHD. The mean age of mother at delivery was 22 years for children who would later have a diagnosis of ADHD, and 24 years for the rest of the population. Mothers with no education were more than twice as likely to have children with ADHD than those with degrees. There was no association between ADHD and birth weight or family structure.

**Table 3:** Age wise prevalence of ADHD with Conner's teacher and parent rating scale

Age	Male		Female		Total	
	No.	Percent	No.	Percent	No.	Percent
7 years	7	15.55	6	30	13	20
8 years	13	28.88	4	20	17	26.15
9 years	12	26.66	4	20	16	24.61
10 years	7	15.55	3	15	10	15.38
11 years	3	6.66	3	15	6	9.23
12 years	3	6.66	0	0	3	4.63
<b>Total</b>	<b>45</b>	<b>100</b>	<b>20</b>	<b>100</b>	<b>65</b>	<b>100</b>

$\chi^2=4.49$ ;  $p < 0.481$ ; significant

Although the risk group had higher BMI than normal group, there was no significant difference between the two groups ( $P > 0.05$ ) as both fell within normal range of 5th to 85th percentile. Specifically, BMI was measured to be 18.7 kg/m<sup>2</sup>(40th percentile) for boys and 18.4 kg/m<sup>2</sup>(40th percentile) for girls in the normal group and 19.8 kg/m<sup>2</sup>(50th percentile) for boys and 18.8 kg/m<sup>2</sup>(40th percentile) for girls in the risk group.

**Table 4:** Children detected positive with DSM-4 criteria

Age	Male		Female		Total	
	No.	Percent	No.	Percent	No.	Percent
Inattentive	13	30.95	4	25	17	29.31
Hyperactive / Impulsive	19	45.23	9	56.25	28	48.27
Combined	10	23.8	3	18.75	13	22.41
Total	42	100	16	100	58	100
mean±SD	13.99±5.62		5.21±2.14		19.33±7.76	

$\chi^2=0.563$ ;  $p=0.754$ ( $p>0.05$ ); not significant

Out of 58 children screened positive( 42 male and 16 female), mothers of 6 children( 4 Male and 2 female) gave history of pre term delivery, one male child had mild speech delay and 2 children( male) had history of one episode of febrile seizures, one at 14 months and other at 18 months of age, both hadn't received any long term anti epileptics, as shown In Table 5

**Table 5:** Perinatal factors and environmental influence on ADHD in my study

Perinatal and environmental factors	Male	Female
Miscarriage symptoms	0	0
Premature delivery symptoms	4	2
Maternal respiratory viral infection	0	0
Moderate to severe physical illness in the mother during gestation	0	0
Asphyxia or anoxia	0	0
Neonatal seizures	0	0
Mild speech retardation	1	0
Febrile seizures	2	0
Male gender	0	0

$\chi^2=2.96$ ;  $p=0.05$  Not significant, using chi-square test

## DISCUSSION

In our study, the prevalence of ADHD among school children aged 7-12 years is 5.04 %. This is comparable to previous studies which are showing a prevalence rate of 1 percent to 20 percent by various Western<sup>10,11</sup>and Indian workers<sup>13</sup>. Ashraf Tashkori<sup>14</sup> in table 6.

sampling and screening interview were conducted. Among this 4(1.58 %) children had ADHD in table 7.

**Table 6.**

	Ashraf et al. 2011		In our study	
	No	Percent	No	Percent
Total No. of childrens	192		1150	
Total No. children with ADHD	32	16.66	58	5.04

**Table 7.**

	Serkhel et al. 2006		In our study	
	No	Percent	No	Percent
Total No. of childrens	240		1150	
Total No. children with ADHD	4	1.58	58	5.04

In 2011 conducted a study on prevalence of ADHD symptoms among school age children in Ahvaz City, north east of Iran. This cross sectional study selected 192 children. Teachers and parents were given Conner's rating questionnaires. Out of 192 children, 32 were found to be meet DSM - 4 criteria. The prevalence rate was 16.66 %.

**Serkhel et al.(103)** in 2006 conducted a study on ADHD in school children in Central Institute of Psychiatry, Kanke, Ranchi. A total of 240 students selected by random

The prevalence of ADHD in various studies depends on the diagnostic criteria and tools used for evaluation of ADHD. The diagnosis of ADHD is a challenging problem because of difficulty in differentiating cardinal symptoms of ADHD from temperamental characteristics and routine behaviours of school age children. So, both over diagnosis and underdiagnosis occurs. In India, it was found that prevalence of ADHD increases with age<sup>18,19,20</sup>. In our study also, the study prevalence of ADHD at 7 years was 20 %. At 8 years was 26.15 %, at 9 years was 24.61 % and then there was a decline - At 10 years was 15.38 %, at 11 years was 9.23 % and at 12 years was 4.63 %. This shows that the prevalence of ADHD was maximum at 8 years. Our study showed that the risk group consumed more

processed food namely biscuits, Bread and other bakery items. (P < 0.05 %) Finally, to comment on the influence of perinatal factors and pre term delivery was found, and regarding co morbidities mild speech delay and febrile seizures were found as co morbidities.

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