

Prevalence of Attention Deficit Hyperactivity Disorder (ADHD) among children of a primary school in Pune: A community based cross-sectional study

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Abstract

Background: Attention Deficit Hyperactivity Disorder (ADHD) is described as a persistent condition of decreased attention span, hyperactivity, and impulsivity at a level that is considered inappropriate for the developmental age of the child. The aim of the study is to determine the prevalence of ADHD and its subtype and associated comorbid illness using Vanderbilt ADHD Diagnostic Parents and Teachers Rating Scales in children aged 6-11 years taken from a primary school of Pune. **Materials and Methods:** 100 children aged 6 to 11 years were taken from a primary school of Pimpri, Pune after getting informed consent from school authorities and parents. The presence of ADHD was assessed using Vanderbilt Scale which was filled by both parents and teachers. Appropriate Data was collected, tabulated and Statistical Package for the Social Science (SPSS) – Window Version 17 was used for Statistical analysis in this Cross-sectional Descriptive Study. **Result:** The prevalence of ADHD in our study was 12%. Among the subtypes of ADHD, Combined subtype (50%) was the most common followed by Inattentive subtype (41.67%). Hyperactivity/ Impulsivity was observed in only one (8.33%) child. Conduct disorder was seen in 16% children while Oppositional defiant disorder and Anxiety/ depression were present in 15% and 11% children respectively. **Conclusion:** The prevalence of ADHD is high among primary school children.

Key words: Vanderbilt scale, parents, teachers, subtype, comorbidity

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INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is the most common neurobehavioral disorder of the childhood that can persist into adolescence and adulthood as well.^{1,2}

It is one of the chronic health condition affecting school-going children³. In 2008, ADHD was defined as “a persistent pattern of symptoms of hyperactivity, impulsiveness and/or lack of attention; the symptoms are more frequent and severe that cannot be considered usual for that age and are causing a significant impairment in school or work performance and in the activities of daily life”.^{4,5,6} The onset of symptoms must be before 12 years of age, should have been persistent for more than 6 months and are seen in two or more settings. Diagnostic and Statistical Manual of Mental Disorders-V (DSM-V) describes three subtypes of ADHD - Predominantly inattentive subtype, predominantly hyperactive-impulsive subtype and combined subtype⁷. The prevalence of ADHD in India has been reported between 1.6% and 17.9%.^{8,9} A study conducted in Southwest Mumbai

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reported a prevalence rate of 12.2% with a prevalence of 19.03% in boys and 5.8% in girls¹⁰. A prevalence of 17.7% and boy to girl ratio of 3:1 was found in children referred to a tertiary care centre in Delhi based on DSM-IV criteria¹¹. The overall prevalence of ADHD in selected schools of Kanchipuram district was assessed using CARS (Conners' Abbreviated Rating Scale) and was found to be 8.8% of which 43.3% were inattentive subtype, 43.3% were hyperactive subtype while 13.2% were combined subtype¹². The affected child faces many functional impairments such as adjusting in school environment, reading and writing difficulties, academic underachievement, trouble in maintaining interpersonal relationships with peers and family along with scores of behavioural issues. The prevalence of comorbid conditions in ADHD appears to be high. Cohen and co-workers¹³ used child and parent Diagnostic Interview Schedule for Children (DISC) and reported in their study that 56% had comorbid conduct disorders, 54% had oppositional defiant disorder, 23% had overanxious disorder, 24% had separation anxiety and 13% had major depressive disorder. Vanderbilt ADHD Diagnostic Rating Scale (VADRS) is based on DSM-V criteria of ADHD diagnosis and has 2 versions – Parents Rating Scales (VADPRS) and Teachers Rating Scales (VADTRS). This scale effectively confirms the diagnosis of ADHD and also determines the subtype of ADHD and associated comorbidity, if any¹⁴.

AIMS AND OBJECTIVES

1. To study the prevalence of ADHD on the basis of Vanderbilt ADHD Diagnostic Parents and Teachers Rating Scales.
2. To assess the subtype of ADHD and to identify the comorbid illness present.

MATERIALS AND METHODS

Study was conducted in D.Y. Patil School, Pimpri, Pune on 100 students over a period of 2 years after getting clearance from ethical committee of Dr. D.Y. Patil Medical College.

Inclusion Criteria-

1. All children in the age group of 6 to 11 years.

Exclusion Criteria-

1. Child less than 6 years or more than 11 years.
2. Presence of vision and/or hearing impairment.
3. Presence of any learning disorder.
4. Children on some drug therapy e.g. phenytoin, phenobarbitone.

Statistical analysis was done using Statistical Package for the Social Science (SPSS) – Window Version 17. The demographic variable, prevalence, subtype and comorbidity were calculated with number and percentage.

Methodology-

Consent was taken from the Principal of the school and parents to participate in the study after explaining the details of the study and its significance. Instructions on how to fill the Vanderbilt Diagnostic Rating Scale were given to the parents and teachers separately. Later the Rating Scales were collected from both the Parents and Teachers and were analysed. Students getting a score of 6 or more in either of the subtype of ADHD on both parents as well as teachers rating scales were considered as having ADHD. Those with ADHD were analysed further for the presence of any comorbidities. The children meeting the criteria of ADHD as per Vanderbilt Diagnostic Rating Scales were subjected to detailed physical and neurological examination.

Study Tool-Vanderbilt ADHD Diagnostic Parents and Teachers Rating Scales –

The Vanderbilt Scales were developed by Mark L. Wolraich and his colleagues at the University of Oklahoma Health Sciences at the city of Oklahoma¹⁵ on the basis of DSM-5 (Diagnostic and Statistical Manual – 5) criteria. It also includes items to identify the disorders comorbid with ADHD such as conduct disorder, oppositional defiant disorder, anxiety or depression. The scale has two versions – a parents scale and a teachers scale that consists of 55 questions and 43 questions respectively. Both the rating scales assess the child on the symptoms relevant to inattentive and hyperactivity/impulsivity and impairment in performance. A scale of 1-5 is then used by the respondent to rate the child according to his/her academic performance and interpersonal peer relationship. Although there is a limited data on reliability and validity of VADRS, its psychometric properties and clinical utility has been assessed in various studies^{16,17}.

OBSERVATION AND RESULTS

Table 1: Distribution of cases in study group according to age

Age (Years)	No of cases	Percentage
6 – 7	41	41
8 – 9	30	30
10 – 11	29	29
Total	100	100

It was seen that majority of the children in the present study were in the age group of 6-7 years (41%) followed by 8-9 years (30%) and 10-11 years (29%).

Table 2: Distribution of cases in study group according to Sex

Sex	No of cases	Percentage
Male	51	51
Female	49	49
Total	100	100

There were 51% male and 49% female children in the present study.

Table 3: Prevalence of ADHD in study group

ADHD	No of cases	Percentage
Yes	12	12
No	88	88
Total	100	100

The prevalence of ADHD in the present study was 12%.

Table 4: Distribution of cases according to the subtype of ADHD:

Subtype	No of cases	Percentage
Combined	6	50
Inattentive	5	41.67
Hyperactivity/ Impulsivity	1	8.33
Total	12	100

Among the subtypes of ADHD, Combined subtype (50%) was the most common closely followed by Inattentive subtype (41.67%). Hyperactivity/ Impulsivity was observed in only one (8.33%) child.

Table 5: Distribution of cases in study group according to the co-morbidity

Co-morbidity in ADHD	No of cases	Percentage (n=100)
Oppositional defiant	15	15
Conduct disorder	16	16
Anxiety/ depression	11	11

While studying the co-morbidities in the study subjects, Conduct disorder was observed in 16% children while Oppositional defiant disorder and Anxiety/ depression were observed in 15% and 11% children respectively.

Table 6: Association between age and ADHD in the study group:

Age (Yrs)	ADHD	Non-ADHD	Total
6 – 7	2 (16.67%)	39 (44.32%)	41
8 – 9	7 (58.33%)	23 (26.14%)	30
10 – 11	3 (25.00%)	26 (29.55%)	29
Total	12 (100.00%)	88 (100.00%)	100

Chi-square = 5.69, P = 0.058

It was seen that majority of the children with ADHD were in the age group of 8-9 years (58.33%) followed by 10-11 years of age (25%) but the difference observed among the age and ADHD in the study group was not significant (P value = 0.058).

Table 7: Association between sex and ADHD in study group

Sex	ADHD	Non-ADHD	Total
Male	7 (58.33%)	44 (50%)	51
Female	5 (41.67%)	44 (50%)	49
Total	12 (100%)	88 (100%)	100

Chi-square = 0.29, P = 0.59

It was seen that among the ADHD children 58.33% were male children while among non ADHD children 50% were male and the difference was not statistically significant (P value = 0.59).

DISCUSSION

In the present study, majority of the children were in the age group of 6-7 years (41%) followed by 8-9 years (30%) and 10-11 years (29%) (Table 1). There were 51% male and 49% female children (Table 2). In the study by Abolhassanzadeh, *et al*¹⁸ (2011), 47% children were male and 53% were female and the mean age of study children was 9.5±1.56yrs. Prevalence of ADHD was 12% in our study. (Table 3) The findings were comparable with the study conducted by Venkata JA, Panicker AS (2013)¹⁹ where the prevalence of ADHD among primary school children was 11.33%. However, the prevalence of ADHD among school children attending Primary Schools in Tirupati, Andhra Pradesh as reported by K. Kiranmayi *et al* (2018)²⁰ was 5.9%. The wide variability between the prevalence of the above-mentioned studies can be due to differences in sample size, diagnostic criteria, validity and reliability of the various tools used and most importantly because of the demographic and cultural variability amongst the populations under study. Among the subtypes of ADHD, Combined subtype (50%) was the most common followed by Inattentive subtype (41.67%). Hyperactivity/ Impulsivity was observed in only one (8.33%) child. (Table 4) Similarly in the study conducted by Ramya HS, Goutham AS, *et al* (2017)²¹ Combined type (56.1%) was most predominant and was followed by Hyperactivity-Impulsivity type (34.1%). To the contrary, Abolhassanzadeh, *et al* (2011)¹⁸ in their study found that out of 257 individuals that were diagnosed with ADHD, 20.23% were inattentive type while 69.65% were hyperactive-impulsive type and 10.12% were combined type. This result can be related to the social and geographical environments of the study subjects. While studying the co morbidities in the study subjects, Conduct disorder was observed in 16% children while Oppositional defiant and Anxiety/ depression were observed in 15% and 11% children respectively (Table 5). Pingali S, Sunderajan J (2016)²² in their retrospective analysis of case reports found the overall rate of co-morbidities to be 52.9% and the most common co-morbidity reported was oppositional defiant disorder followed by anxiety disorder. They also reported that most of the children with ADHD had one co-morbidity (37.9%) while 13.2% of ADHD children had two co-morbidities. It was seen that majority of the children with ADHD were in the age group of 8-9 years (58.33%) followed by 10-11 years of age (25%) but the difference observed between the age and ADHD in study group was not significant (p=0.058). (Table 6) Similarly K. Kiranmayi *et al* (2018)²⁰ also observed in their study that majority of the cases of ADHD were in the age group of 8-9 years (79.2%). It was seen that among the ADHD children 58.33% were male children while among non ADHD children 50% were male and the difference was

not statistically significant ($p=0.59$). (Table 7) In Venkata JA, Panicker AS¹⁹ study also prevalence was found to be higher among the males (66.7%) as compared to that of females (33.3%).

CONCLUSION

The prevalence of ADHD in the present study was 12% and Combined subtype ADHD was the most common subtype. Male predominance was observed with most commonly affected age group of 8-9 years. Conduct disorder was the most common comorbidity associated with ADHD closely followed by Oppositional Defiant Disorder.

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