

## Screening of School Children for Attention Deficit Hyperactivity Disorder using Vanderbilt ADHD Diagnostic Teacher Rating Scale

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### Abstract

**Objective:** To screen the school children aged 10-14 years for Attention Deficit Hyperactivity Disorder using Vanderbilt ADHD Diagnostic Teacher Rating Scale. **Method:** This was a cross-sectional observational study. Total 2114 students of three schools between the age group of 10-14 yrs studying in 5<sup>th</sup>-9<sup>th</sup> standard were surveyed. Pre-study, the class teachers were trained in a half day workshop about ADHD disease and how to fill up forms. From each class suspected students of ADHD were selected by the teachers and then ADHD symptom scale self report form was filled by the teachers for these students. The filled up forms were analyzed by us. **Result:** Prevalence of ADHD in present study was 65/2114 (3.07%), out of which 27.27% and 14.54% were of hyperactive and inattentive ADHD type respectively, while 58.16% were suffering from mixed ADHD type. Most affected age was 12 years, and male to female ratio was 5.5. Most common symptom of ADHD was, excessive talking (96.62%); most common behavioral problem was, not following rules (70.7%); and most common affected area was, mathematics. **Conclusion:** The self report tool filled up by teachers after training them is able to detect cases of suspected ADHD in 10 to 14 year studying in 5 to 9 standard. There is a 3% predicted prevalence of ADHD by this survey tool in upper-middle class schools.

**Keywords:** ADHD; Vanderbilt Scale; School Children; Screen; Teacher Rating Scale; Prevalence.

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### Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common childhood brain disorders and can continue through adolescence and adulthood. Symptoms include difficulty staying focused and paying attention, difficulty controlling behavior, and hyperactivity (over-activity). To be diagnosed with the disorder, a child must have symptoms for six or more months and more than or equal to six symptoms of each domain. Parents and teachers can miss the fact that children with symptoms of inattention may have ADHD because they are often quiet and less likely to act out. They may sit quietly, seeming to work, but they are often not paying attention to what they are doing. They may get along well with other children, whereas children who have more symptoms of hyperactivity or impulsivity tend to have social problems. However, children with the inattentive kind of ADHD are not

the only ones whose disorders can be missed. For example, adults may think that children with the hyperactive and impulsive symptoms just have disciplinary problems.

ADHD impacts each child's brain differently, so each child may look quite different in the classroom. Children with ADHD exhibit a range of symptoms: some seem to bounce off the walls, some daydream constantly, and others just can't seem to follow the rules. The American Academy of Pediatrics (AAP) guidelines for ADHD assessment advise: DSM- IV-TR (Diagnostic and Statistical Manual of Mental Disorders Text Revision) criteria, evaluating for comorbid conditions, and a neurological examination; subjectivity arises in recognition of symptoms and degree of functional impairment. In the West, studies have shown that ADHD can be reliably diagnosed by various clinicians. However, this may not be true in India and other similar settings due to low levels of awareness and expertise about ADHD

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in community clinicians. Clinically, International Classification of Disease-10 (ICD-10) and the DSM-IV-TR criteria are used for diagnosis.

Teachers are often the first ones to recognize or suspect ADHD in children; as ADHD symptoms can affect school performance- and in some cases, disrupt the rest of the class- and because teachers are with children day in and day out.

However, teachers cannot diagnose ADHD hence professional intervention is necessary to consider all cases of the noticed abnormal behavior.

The purpose of the ADHD screening is to separate those students who are suspected of having ADHD from children who do not have any disorder or who are suspected of having an alternative educationally related disability.

The teacher interview should be completed as an early element of the screening.

ADHD-specific rating scale allows teachers to share their global perceptions of the child by completing items about school performance and behavior that map to DSM-IV diagnostic criteria for ADHD. We used Vanderbilt ADHD Diagnostic Teacher Rating Scale [1].

Through a review of the student's school records, the teacher should look for any observations from past teachers that the child has had, like trouble completing class work, remaining focused, or suppressing inappropriate behaviors. Such teacher comments may help to establish the duration (six months) necessary for the diagnosis of the disorder.

Vanderbilt scale is generally used for 6-12 years age, but we have used this scale in 10-14 years age to assess whether it can be used for older children also. Usually, the incidence of ADHD is higher in preschool children and the incidence decreases with age. This early high incidence may be due to extremes of normal behavior which may be diagnosed as ADHD.

## Methods

This was a cross-sectional observational study.

Development of Appropriateness Criteria and Instrument-

The tool was translated forwards and backwards from *English to Hindi* and *Gujarati* by bilingual translators maintaining conceptual, content, semantic, operational and functional equivalence of the items, and was validated.

A group of two pediatricians first trained the teachers in half a day workshop on how to recognize the symptoms and gave basic knowledge regarding the disease.

Diagnostic modalities of ADHD in children were reviewed, and clinical expertise regarding personal practice was shared. The former included, the Vanderbilt ADHD Teacher Rating Scale.

Section-A of Vanderbilt ADHD Teacher Rating Scale consists of 9 items related to 'inattention' and 'hyperactivity/ impulsiveness' symptoms (9 items each).

Scoring - Frequency Code: 0 = Never; 1 = Occasionally; 2 = Often; 3 = Very Often. Behaviors are counted if they are scored 2 (often) or 3 (very often).

A score of six or more of the 9 items related to 'only inattention', 'only hyperactivity/ impulsiveness' and 'both' indicate 'predominantly inattentive', 'predominantly hyperactive/ impulsive', and 'combined subtypes', respectively.

*Inattention:* Requires six or more counted behaviors from questions 1-9 for indication of the predominantly inattentive subtype.

*Hyperactivity/ Impulsivity:* Requires six or more counted behaviors from questions 10-18 for indication of the predominantly hyperactive/ impulsive subtype.

*Combined Subtype:* Requires six or more counted behaviors each on both the inattention and hyperactivity/ impulsivity dimensions.

The performance section is scored as indicating some impairment if a child scores 1 or 2 on at least one item.

Apart from these, Vanderbilt scale also has symptoms of oppositional defiant disorders, anxiety and depression ranging from 19-35. We have not done the scoring of these symptoms.

*Venue:* A cross-sectional observational study was conducted at three different schools that catered to higher middle class in Bhavnagar. Total 2114 students of these schools with age of 10 to 14 years studying in 5<sup>th</sup>- 9<sup>th</sup> standard were included.

*Training:* The teachers were trained in administration of Vanderbilt ADHD Diagnostic Teacher Rating Scale using a standardized operational manual in a half day structured workshop and were taught how to recognize the symptoms and fill up the forms. Two pediatricians were the trainers.

After training from each class suspected students of ADHD were selected by the teacher and then

ADHD symptom scale self report form (Vanderbilt scale) was filled by teachers for these students. Filled up forms were analyzed by pediatricians later on.

## Results

Total number of schools covered was three and total number of children included was 2114. Out of this, 135 students were suspected by the teachers and for whom the forms were filled. 65 turned out to be positive.

Prevalence of ADHD in present study was 65/2114 (3.07%), out of whom 58.16% were suffering from mixed ADHD type, while 27.27% and 14.54% were of hyperactive and inattentive types respectively. Proportion of score positive students, age wise and school standard wise, is given in Table 1. Most affected age was 12 and 13 years ( $p = 0.0023$ , highly significant).

**Table 1:** Performance in ADHD Vanderbilt teacher rating scale by age group, school standard

Age group (years)	School standard	suspected 135, score positive (65), %	% score positive 65
10	5	21 (3) 14.2	4.6
11	6	9 (5) 55.5	7.7
12	7	32 (25) 78.1	38.46
13	8	37 (23) 62.1	35.38
14	9	36 (9) 25.0	13.86

$p = 0.0023$  highly significant between age group [10,11,14 vs 12,13].

Male to female ratio was 5.5. Out of 65 positive cases, 55 were boys (84.61%) and 10 were girls (15.38%). In both boys and girls mixed type of ADHD was more common followed by hyperactive and inattentive type.

Most common symptom of ADHD was 'excessive talking' 63/65 (96.62%); most common behavioral problem was 'not following rules' (70.7%). Least common was 'loses the thing necessary for work' 30/65 (46.52)

The most common affected area was *mathematics*. 39/65 were poor in mathematics (60%). When further divided, in mixed type of ADHD, 24/38 were poor in mathematics (63.15%), similarly in hyperactive type this ratio was 10/17 (58.82%), and in inattentive type, it was 5/10 (50%).

The confidence interval within which NO ADHD/ Borderline ADHD (few if any, symptoms

beyond those required to make the diagnosis and no more than minor impairment in functioning) should fall is (0.42- 0.64); in our study such students were at 0.53 CI. Cases of Severe ADHD (Severe is reserved for cases with many symptoms in excess of those required for the diagnosis, or several symptoms that are especially severe, or marked impairment resulting from symptoms.) should fall within (0.69- 0.93 CI); in our study such students were at 0.81 CI.

## Discussion

This was the first study done in Bhavnagar, Gujarat to assess the prevalence of ADHD. Prevalence of ADHD in present study was 3.07%, which is lower than worldwide (5.3-7.2%)[2]. Vanderbilt ADHD Diagnostic Teacher Rating scale was used in our study, which is one of the most widely used measures of ADHD in the world today [3].

In our study, male to female ratio was 5.5. In the study done by Al zaben et al, prevalence of ADHD in girls and boys was found to be similar [4]. This higher incidence in girls could have been due to cultural differences in different societies in the perception of expected behavior from girls and so (where) even a slightly more than 'expected normal' is counted as non-confirmity. However, generally[5] and from other studies worldwide[6] boy-girl ratio has varied from 2:1 to 9:1.

We found that the most affected age was 12 and 13 years as compared to lesser age groups such as 10 to 11 years; this is in contrast to what has been reported earlier that ADHD prevalence decreases as the age advances [7]. We are not able to explain the reason for this anomaly. There is a fine line between ADHD and natural adolescent boys defiance behavior.

In other studies prevalence of ADHD is more among pre-school children [8,9], whereas our study was done in 10-14 year age group.

The prevalence of ADHD in present study was 65/2114 (3.07%), out of which 58.16% were suffering from mixed ADHD type while 27.27% and 14.54% were of hyperactive and inattentive ADHD type respectively, which is similar to study by Osman AM et al., in which the prevalence of children with ADHD/ inattentive sub type, ADHD/ hyperactive-impulsive sub type, ADHD/ combined subtype were 3.5%, 6.9 % and 1.0 %, respectively [10,11].

*What this study adds*

This was the first study done in Bhavnagar, Gujarat to predict the prevalence of ADHD in school going children. We did this study in the 10-14 year age group in contrast to most other studies where prevalence in *preschool* children was studied. Prevalence was highest in 12 and 13 years.

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