

Attention deficit hyperactivity disorder (ADHD) : subtypes and comorbid behavioral disorders in a school based sample.

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ABSTRACT:

Background : *There have been wide discrepancies in the various epidemiological aspects of ADHD in the reports from all over the world. Data of the same from Asian community samples too are inadequate.*

Aims and Objectives : *To estimate the prevalence of ADHD, distribution of its subtypes and association with various co-morbid behavioral disorders and aggression in various domains in school based study sample.*

Methodology : *A government aided school in Mumbai, familiar to the authors, was selected for the study. After obtaining the appropriate permissions from the authorities, students of grades 5th to 9th were screened, using Vanderbilt's ADHD diagnostic rating scale, both teacher's and parent's versions; for the presence of ADHD and its subtypes, and Children's aggression scale, again teachers and parents version; for aggressive behavior. About 500 translated sets were given to the teachers and parents for reporting, 341 completed sets were received and analyzed by appropriate statistical methods.*

Results : *The point prevalence of reported symptoms consistent with diagnosis of ADHD was found to be 14 percent in our study population, of which most common (70%) were consistent with combined type; and least common were those reported with symptoms suggestive of inattentive subtype (8%). The prevalence was 1.4 times more in boys and it decreased with increasing age in both the sexes. Symptoms suggestive of behavioral problems in form of Oppositional Defiant disorder (28%), Conduct Disorder (10%) and anxiety/depression (6%) were co-reported in population with reported symptomatology of ADHD, all of which were significantly more than those reported in student population without reported symptomatology suggestive of ADHD; suggesting significant co-morbidity. Also, children who had symptomatology suggestive of ADHD, had reported rates of aggressive behavior than those who didn't.*

Conclusions : *Similar studies with larger sample sizes and clinical assessment of individual subjects may yield more accurate data regarding the epidemiology of ADHD that will be useful for early diagnosis and complete assessment of co-existent disorders in patients suffering from ADHD.*

Key words: *Attention Deficit Hyperactivity : Children Aggression*

INTRODUCTION

Historically, the first description of ADHD comes from George Still, who in 1902 described children with restlessness, impulsivity, inattentiveness and severe affect and conduct problems [1]. Since then ADHD has been addressed by various names depending upon the contemporary belief of its causation or the most severe symptom [2].

Attention-deficit/hyperactivity disorder or ADHD is probably the commonest psychiatric disorder diagnosed in children [3]. It is characterized by a persistent pattern of symptoms resulting from impulsivity/hyperactivity and/or inattention [4]. There is a wide range of prevalence of

ADHD, reported from various parts of the world. A range from 3 to 7 percent of prepubertal elementary school children can be considered as a safe estimate of prevalence of the disorder [5-6]. Most of the studies on ADHD have confirmed that the disorder is more prevalent in boys, the sex ratio again displaying a wide range from 1:2 to 1:9 [7-8].

It has also been found that the occurrence of the disorder decreases with age. However, about 40-50 percent of patients continue to have at least some symptoms through adulthood [9-11]. DSM-IV TR presents an ADHD diagnosis with three subtypes: predominantly inattentive (IA), predominantly hyperactive/impulsive (HI), and combined type (C). Some studies have identified

inattention as the commonest subtype while others report that hyperactivity/impulsivity or combined type is commonest [12-15]. The existence of comorbid disorders influences the severity, treatment and prognosis of ADHD. Apart from externalizing behavior disorders such as oppositional defiant disorders and conduct disorders, and internalizing disorders such as anxiety and depression, children suffering from ADHD can have co-existing learning disorders, bipolar disorders, Tourette's syndrome and various other co-morbidities [16-17]. Again there has been a wide discrepancy in the estimated occurrences of comorbid disorders. Some studies have reported the prevalence of comorbid disorders to be as high as 87% in the population affected with ADHD [18].

It has been shown that ADHD and oppositional defiant disorder coexist in 30 to 40 percent of ADHD patients. ADHD and conduct disorder have been reported as co-occurring in 30 to 50 percent of patients [19-22]. However, some recent have found that only 14.3 percent were comorbid for conduct disorder [23]. Earlier studies reported the coexistence of depression in patients with ADHD to range from 9 to 38 percent [21]. Anxiety disorders co-occurring with ADHD have been reported at 25 percent [21].

In view of the wide discrepancies in the available reports and dearth of Indian data on various aspects of ADHD, this study was undertaken with the following aims

1. To estimate the prevalence of ADHD
2. To assess the distribution of its subtypes
3. To establish and measure the rates of comorbid disorders with ADHD
4. To measure the frequency of aggression in ADHD.

METHODOLOGY

The students of a government aided vernacular medium belonging to 5th to 9th grades were screened using standard rating scales for ADHD, its co-morbidities and patterns of aggressive behavior. After obtaining the appropriate permission from the school authorities, the sets of questionnaire containing parents' version were distributed to the students of the above grades, in each of the sections, to be given to their parents at home. The teachers' version sets were given to the class-teachers.

Teachers and parents were counseled and educated about the study in groups. Apprehensions that might have biased reporting by them were addressed and parents as well as teachers were assured that there will be no change in attitude towards participating students, should they qualify for the diagnosis of behavioral disorders under consideration, as complete anonymity will be maintained.

Each completed set was studied by the authors and only those sets that had consistent reporting by both teacher and parent were considered for further analysis. 341 students were thus found to be eligible for inclusion in the study.

The following rating scales were used –

a) **Vanderbilt's ADHD Diagnostic Rating Scale (VADRS)** : This is a scale designed to assess disruptive problems in ADHD and is modeled on DSM-IV criteria. The scale includes all 18 criteria for ADHD, and also includes items representing DSM-IV criteria for Oppositional Defiant Disorder (ODD), Conduct disorder (CD) as well as Anxiety and Depression. The items are rated on 4 point scale with response-options never, occasionally, often and very often. It also includes performance items in 8 areas, reporting and evaluation of these were not incorporated in the study due to inadequate reporting. The scale has a reliability rate according to the Cronbach's alphas, for both parents and teachers versions and in all domains ranging from 0.79 for anxiety and depression to 0.91 for ADHD. High degree of correlation was found between diagnosis based on VADPRS/VADTRS and diagnosis by structured clinical interview proving its validity. The scale has two versions – a parent's version to be completed by parents made up of 47 items and a teachers version to be completed by the class teacher which is a 35 item questionnaire [24-25].

a) **Children's aggression scale (CAS)** : This is a scale designed on the Overt Aggression Scale for Adults for assessment of aggressive behavior in children. It is also available in two versions i.e a parent and a teacher version. The items are rated on 5 point scale with responses. The items are recorded on 5 subscales viz. verbal aggression, aggression against animals and objects, provoked physical aggression, initiated physical aggression and use of weapons. It has good reliability between 0.62 for individual subscales to 0.90 for the total scale. There's good correlation between reported symptoms on CAS-P and CAS-T [26-27].

The scales were translated into Marathi, as it is the language spoken and understood by the majority of teachers and guardians of the population to be studied. The translated versions were rechecked by independent language experts for their correctness. Both sets contained instructions regarding completion of the items. Data such gathered was analyzed using appropriate statistical methods to calculate prevalence of ADHD with its

subtypes and record behaviors suggestive of various comorbidities which can be screened using Vanderbilt's diagnostic scale and prevalence of aggression in various domains and its association with diagnosis of ADHD.

RESULTS

There was not much differences in the number of boys and girls across various age groups. There was a total of 341 students who were a part of the study of which 177 i.e. 52% were girls. The total number of students fell from 80 in grade 5 to 57 in grade 9. Out of the 341 students enrolled for the study, 50 (14.66%) had a diagnosis of ADHD. The prevalence of ADHD was higher i.e. 20% in fifth and sixth grade (16 out of 80 in each group) and declined as the grade went higher till the ninth grade reaching just 2% (1 out of 57). Out of the 50 children diagnosed with ADHD, 28 (56%) were boys.

According to our analysis of data, combined type of ADHD was the most prevalent accounting for 70% of cases (35 out of 50). Symptoms of pure inattentive type were found to be reported the least, in only 8 percent of symptomatic children, as shown in the following table and chart. We found that almost 40% of children symptomatic for ADHD had at least one comorbid psychiatric disorder. In our study, about 10 percent of ADHD patients were found to be having conduct disorder. We found symptoms of oppositional defiant disorders to be present in 28 percent patients in our study. The prevalence of anxiety-depression symptoms was found to be 6 percent in our study. Nearly 40% percent of students having ADHD had significant aggressive behavior as a symptom. Prevalence of all comorbid disorders were higher in the group having ADHD than a non ADHD population (table 1). Comorbidity was also reported to be greater in boys than girls with ADHD (table 2). It was also noted that prevalence of reported aggressive behaviour in all three domains; namely verbal, towards animals and object as well as physical aggression were significantly higher in students reported to have significant ADHD symptoms. Also these students were reported to have aggression in more than one domain more commonly than those students without reported symptoms of ADHD (table 3).

DISCUSSION

The prevalence estimates of ADHD have varied significantly from study to study despite the latest DSM diagnostic criteria being very popular and comprehensive. The discrepancies arise probably due to the differences in the settings of the studies, the methodology used for

screening, varying population structures and other variables [28]. Most studies have reported a prevalence range of 5-10 percent [29-30]. Our study has reported a rather higher prevalence of ADHD compared to most studies. The symptoms on the basis of which the diagnosis of ADHD was given were reported by teachers and parents. Some symptoms may be present due to problems faced by the children in other domains. Also, reporting biases based on their academic performances cannot be ruled out. A clinical assessment of the children who were distinctly reported to be having the symptoms may have decreased the estimated prevalence [31].

The natural course of ADHD follows a declining severity with age [32-33]. This may be ascribed to the natural neurochemical and neurobiological changes occurring in the brain, the effect of environmental learning, personality development, puberty and maturity or a combination of all the factors [34]. Our study too reports a decline with age in the prevalence of ADHD. It has been confirmed time and again that this disorder is commoner in males, owing to genetic factors, neurobiological differences, environmental differences, differences in the pattern of parenting, cultural factors and a combination of these factors [35]. ADHD has been found to be 2 to 9 times commoner in boys [36-37]. In our study, ADHD were reported 1.4 times more commonly in boys. Girl students were in a slightly higher proportion in our study sample. Also, the cultural biases in the reporting of symptoms cannot be ignored. Correcting such factors may give a more accurate idea about sex differences.

There has been a wide controversy in the reports of frequency of subtypes of ADHD. Data of distribution of the subtypes in an older age group, as in our study, are lacking. There have been reports that inattentive type is the commonest followed by combined type in 5-18 years old [38]. Our study however reports the combined type to be more prevalent. Oppositional defiant disorder is the commonest comorbid psychiatric comorbidity reported in our study followed by anxiety and mood disorders. This is in keeping with comorbidity studies worldwide [39-40]. It is also well known that comorbidity of conduct problems and oppositional defiant disorder that complicates ADHD in childhood may lead to substance abuse disorder or antisocial personality disorder in adult life over a longitudinal course [41]. This is a study that has been restricted to a school population rather than a community based population. Hence discrepancies in the findings compared to community based studies may arise [42].

CONCLUSION

Although the observations in the study have been similar to the existing international data in many findings, a large-scale community based study across various centres with better objective and clinical assessment of the children is warranted for more accurate data. The study however adds to the dearth of data as far as prevalence studies on ADHD in the Indian subcontinent are concerned.

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TABLE 1 – PREVALENCE OF COMORBID DISORDERS

DISORDER IN ADHD	PREVALENCE IN NON-ADHD	PREVALENCE IN TOTAL	PREVALENCE
ODD	26%	3%	7%
CONDUCT DISORDER	10%	1%	2.3%
DEPRESSION-ANXIETY	6%	1.7%	2.4%
AGGRESSION	40%	2.7%	8.2%

TABLE 2 : SEX-WISE PREVALENCE OF COMORBID DISORDERS

DISORDER	PREVALENCE IN BOYS	PREVALENCE IN GIRLS
ODD	7.9%	5.6%
CONDUCT DISORDER	4.2%	0.6%
DEPRESSION-ANXIETY	1.8%	2.8%
AGGRESSION	11%	5.65%

TABLE 3 : OVERLAPPING SYMPTOMS IN DOMAINS OF AGGRESSION AND ADHD

NUMBER OF DOMAINS WITH SYMPTOMS	ADHD POPULATION (TOTAL PERCENTAGE)	NON-ADHD POPULATION (TOTAL PERCENTAGE)	TOTAL POPULATION (TOTAL PERCENTAGE)
ONE DOMAIN	9 (18%)	7 (5.4%)	16(4.7%)
2-3 DOMAINS	4 (8%)	1 (0.34%)	5(1.5%)
> 3 DOMAINS	6 (12%)	0(0%)	6(1.8%)

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