

Prevalence of Attention Deficit Hyperactivity Disorder (ADHD) Among School Children of Kolhapur, India

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Abstract: ***Background:** Attention deficit hyperactivity disorder (ADHD) is a most common psychiatric disorder. The average lifetime global prevalence of any mental morbidity is estimated to be 13.67%, however, the current prevalence is 10.56%. In India, the prevalence of ADHD lies between the range of 2% and 17%. **Aim:** To assess the prevalence of ADHD and to evaluate if any association exists between preselected socio - demographic variables and ADHD among the school children from selected schools in Kolhapur, India. **Methods:** A cross - sectional study was performed among 100 children aged between 10 and 12 years. Multistage sampling method was adopted for this study. Collection of baseline data obtained from the study participants and the data were recorded after obtaining informed consent from respective parents and their school principals. **Results:** During the survey, 100 children aged 10 - 12 years were recruited, out of which 51 children were boys. The prevalence of ADHD was found to be 6% (6/100). There was higher prevalence of ADHD in boys (83.3%) as compared to girls (16.6%). The results revealed that 83.3% (5/6) students suffering from ADHD were residing in joint family. No family history of ADHD was recorded in all the 6 children. Fifty percent (50%, 3/6) children were of 12 years of age. The prevalence of ADHD among the students from a lower monthly income family was higher (66.6%) as compared to the students from a higher monthly income family (16.6%). **Conclusion:** Prevalence of ADHD was 6% (6/100). A higher prevalence of ADHD in boys was recorded. Demographic characteristics observed in children with ADHD were from joint family set - up and lower income group.*

Key Words: Attention deficit disorder with hyperactivity, prevalence, students, child.

1. Introduction

Mental health disorders are one of the leading causes of disability around the world. Prevalence of neurological and mental disorders accounts for around 14% of diseases worldwide and are profound to impact various communities across different cultures and social and economic backgrounds. [1] The average lifetime global prevalence of any mental illness was estimated to be 13.67%; however, the current prevalence is 10.56%. [2] The mental and behavioral issues may be due to mood disorders, stress - related disorders, and psychoactive substance use. The overall prevalence of mental illness was estimated to be higher in men, urban - metros, middle - aged individuals, less educated people, and households with lower income. [3]

Attention deficit hyperactivity disorder (ADHD) is characterized with symptoms of inappropriate hyperactivity, lack of attention, and impulsive behavior. It is a widespread psychiatric disorder, predominant in the pediatric population. Children with ADHD have trouble with impulse - control, focusing, and organization. [4] ADHD has been classified into three major clinical subtypes that include predominantly hyperactive/impulsive (ADHD - H/I), predominantly inattentive (ADHD - IA), or a combination of these two subtypes (ADHD - C). [5, 6] There are several effective management strategies available for ADHD, but if left untreated, it may lead to impairment of academic, occupational, and social functioning. [7] Previous studies

have reported that the affected students are more likely to repeat a grade, get suspended from school, lower occupational status, poor social relationship, develop substance abuse, or commit motoring offences. [8]

The prevalence of ADHD is highly variable throughout the world, ranging between 1% and 20%. In India, the prevalence has been reported between 1.6 - 17.9%. [9] Mental illness is ignored due to lack of awareness in India. Most of the mental health disorders remain unidentified due to this ignorance and negligence. There is a large deficit in data on ADHD due to lack of population - based studies. Therefore, this study was planned with an objective to assess the prevalence of ADHD and to find an association between the selected socio - demographic variable and ADHD among students from selected schools in Kolhapur, India.

2. Methods

A descriptive cross - sectional exploratory research design was chosen for this study. The primary data was collected from parents and school children, at selected high schools of Kolhapur, Rajaram High School, Koregonkar High School, Mazi School, New Model English School, and Shahu High School.

Sampling method

Multistage sampling method was adopted for this study. Initially, a list of all high schools of North Kolhapur was

acquired. From the list, 5 schools were chosen by randomized table method, 20 samples were selected from each school by systematic random sampling (with replacement method). The study recruited total of 100 school children. The study included students between the age group of 10 - 12 years, who were willing to participate in the study and students who could read and write English and Marathi languages and parents who gave consent for the study were recruited for the study.

The selection and development of data collection tool were based on an extensive literature review. The tool consisted of two sections: section I (socio - demographic data) and section II (structured Diagnostic and Statistical Manual [DSM] and Vanderbilt scale to assess the prevalence of ADHD).

Formal permission from concerned authority (Principal) of selected high schools of Kolhapur was obtained. The investigators first established a good rapport and introduced themselves and the study topic was discussed. The objectives and purpose of the study was explained to the parents and the teachers. Informed consent was obtained from parents and assent was obtained from children. Time slot was requested from teachers for data collection. The parents and teachers were explained about filling up the

socio - demographic data. They took about 15 minutes to complete the socio - demographic data. By interview method, the DSM and Vanderbilt scale were administered to the study participants and the data were recorded. The recorded data were coded and analyzed.

Statistical analysis

Continuous data were presented as mean± standard deviation (SD) and categorical variables were presented as percentages with absolute numbers. Chi - square test was applied to evaluate association between the variables. Continuous data were compared using *t* - test. *P*<0.05 was considered as statistically significant.

3. Results

During the survey, 100 children of age 10 - 12 years were registered, out of which 51 children were boys. Prevalence of ADHD was 6% (6/100). The results revealed that 83.3% (5/6) of the students suffering from ADHD were residing in joint families and were from lower middle - class families. No family history of ADHD was recorded in all the 6 children. Fifty percent (50%, 3/6) children were 12 years of age. In the present study, aggressive behavior, restlessness and excessive talking was reported (Table 1).

Table 1: Data on ADHD variables and other characteristics obtained after the administration of Vanderbilt scale (n = 6)

Patient no.	Inattention positive scores	Hyperactivity positive scores	Presenting Complaints		Health condition
			Academic performance	Behavior at home	
1	5	7	Average	Aggressive, talkative and restless	Normal
2	8	4	Poor	Aggressive and disturbed	Underweight
3	7	5	Average	Aggressive and disturbed	Normal
4	5	6	Poor	Aggressive and restless	Normal
5	6	4	Average	Restless	Normal
6	5	6	Progressive	Excessive talking	Normal

ADHD, attention deficit hyperactivity disorder

The prevalence of ADHD among students from a lower monthly income family was higher (66.6%) as compared to students from a higher monthly income family (16.6%) (Table 2).

Table 2: Data on socio - demographic factors in children with ADHD (n = 6)

Socio - demographic factors	ADHD positive n (%)	
Type of family	Nuclear family (1)	1 (16.6%)
	Joint Family (5)	5 (83.3%)
Family history of ADHD	Present (0)	0 (0%)
	Absent (6)	6 (100%)
Socio - economic class	Upper monthly income (more than 40K) (1)	1 (16.6%)
	Upper middle monthly income (30K - 40K) (1)	1 (16.6%)
	Middle monthly income (20K - 30K) (0)	0 (0%)
	Lower middle monthly income (10K - 20K) (2)	2 (33.3%)
	Lower monthly income (less than 10K) (2)	2 (33.3%)
Age	10 years (1)	1 (16.6%)
	11 years (2)	2 (33.3%)
	12 years (3)	3 (50%)

ADHD, attention deficit hyperactivity disorder

4. Discussion

ADHD is characterized by symptoms of inappropriate hyperactivity, inattentive and impulsive behaviors. The prevalence of ADHD is highly variable throughout the world, ranging between 5.29% and 7.1%. In India, mental illness is ignored due to lack of awareness on mental health,

but the prevalence of ADHD is estimated between 2% and 17%. [10]Therefore, this study was planned to assess the prevalence of ADHD and to evaluate if any association exists between the preselected sociodemographic variables and ADHD among school students from Kolhapur, India.

The prevalence of ADHD found in this study (6%) was similar to other studies conducted across different parts of India. [11 - 13] Ahmed et al reported a higher prevalence of around 21.8% and 16.2% of ADHD, which was based on the teacher and parent scales, respectively, among the children aged between 6 - 12 years. [14] Nemr et al and Safavi et al have reported higher prevalence rates of 19.7% and 17.3% in their respective studies. [15, 16] Similarly, Suvarna et al reported higher prevalence of 12.2% among children aged between 4 and 6 years in Southwest Mumbai, India and Suvarna and Kamath, and Sharma et al reported a lower prevalence of 1.3% and 2.35% of ADHD in their respective studies. [17, 18]

Prevalence of ADHD in the present study was found to be high in boys as compared to girls and the ratio was 5: 1. Sharma et al reported higher prevalence in boys (76.9%) as compared to girls (23.1%), which were similar to the prevalence reports in the present study, where 83.3% boys were diagnosed with ADHD as compared to 16.6% girls.¹⁸ ADHD is more commonly diagnosed in boys as compared to girls. Venkata et al.2013, also, reported higher prevalence of ADHD in men (66.7%). [19]

The prevalence of ADHD was higher among lower monthly income families (66.6%) as compared to higher monthly income families, and this was in agreement with other studies on ADHD. [19, 20, 21] Prevalence of ADHD was found to be more (5, 83.3%) in the children living in joint families, where they have siblings as compared to nuclear families with less or no siblings, and similar results have been reported by other studies. [18, 22]

In the present study, 2 out of 100 students screened reported a history of convulsions but these students were not diagnosed with ADHD. ADHD and benign epilepsy with centrotemporal spikes (BECTS or rolandic epilepsy) occur together in high frequency. Miriam et al.2020 conducted a systematic review of 9 case - control and cohort studies and reported that the prevalence of ADHD in patients with BECTS was 60%. Attention impairment in these patients was associated with higher frequency of seizures and discharges during nonrapid eye movement (NREM) sleep. Impairment in selective visual attention was reported by 2 studies and decreased activation of the dorsal attention network was reported by one study. Two studies reported that cognitive and behavioral symptoms such as poor selective visual attention, speech disturbance and impulsivity were associated with altered thickness of cortical and subcortical regions in the frontal lobes, lingual-fusiform cortex, cuneus and precuneus, limbic area and pericalcarine cortex. [23]

In the present study, aggressive behavior, restlessness and excessive talking was reported (Table 1). The present study also reported violent behavior and physical abuse. Gerald et al.1996 reported screening 7231 children for disruptive behavior and found 4.4% (318) to be positive. Sixty seven percent (204) of these patients were diagnosed with ADHD and among these 25 were diagnosed with conduct disorder, 65 with oppositional defiant disorder. [24]

Bjorn et al.2001, examined comorbidities and problems associated with ADHD in 409, 7 - year old, Swedish

children. Oppositional defiant disorder and developmental coordination disorder were the two most commonly reported comorbidities. These patients also reported problems in learning such as letter knowledge, segmentation, and Asperger symptoms. [25] In the present study, learning ability ranged from poor to average (Table 1). Venkata et al.2013, reported poor academic performance (24), poor social behavior (26), difficulty reading (15) and writing (15).

In the present study, no family history of mental illness was observed in the study sample (Table 2). Gerald et al.1996, reported that maternal depression was not related to ADHD in children. [24] Venkat et al.2013 reported presence of a family history of ADHD or other psychiatric illnesses in 8.33%, that is 6 ADHD children. [19] Bhatia et al.1991, reported that family history of mental illness and parental behavior was associated with ADHD. Alcoholism (12), schizophrenia (1), depression (8), mania (2), psychopathy (4) in fathers, and depression (2), hysterical fits (3) in mothers was associated with ADHD in children. [26]

Jaisoorya et al.2018, interviewed 6661 students across 73 schools in Kerala, India, during 2014–2015 to diagnose ADHD and 264 students reported ADHD symptoms and an association with psychological or physical harm due to alcoholism in fathers, neighbours or strangers was observed in these students.²⁷ Jose et al 2020 reported that lifestyle, alcohol dependence, excessive alcohol use, physical, emotional and psychological abuses significantly increased ADHD ($R^2=0.132$). [29]

In the present study 3 patients were the inattentive type while 3 were hyperactive type (Table 1). Catherine et al.2019 reported 124 (43.3%) inattentive type, 124 (43.3%) hyperactive type, and 38 (13.2%) combined type of ADHD. The analysis reveals that there was a significant association between ADHD and demographic variables such as age, education level, religion, birth order, primary caregiver, family income, earlier diagnosis of ADHD, and family history of ADHD. [28]

The presentation of exact cause for ADHD may be difficult to identify due to differences in the assessment methods adopted across studies. The limitations of this study are that the sample size was very small; a case - control design should have been adopted to bring out the differences between normal and ADHD children. Future studies should recruit larger samples and include a control group matched for different demographic variables to obtain detailed data on different variables influencing the development of ADHD in children.

5. Conclusion

Prevalence of ADHD was 6% (6/100). A higher prevalence of ADHD in boys was recorded. Demographic characteristics observed in children with ADHD were joint family set - up and lower income group.

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Author's contribution:

Prof. Janaki Shinde: Concepts, Literature search, Clinical studies, Experimental studies, Data acquisition, Data analysis, Statistical analysis.

Dr. Dipti Chavan: Concepts, Design, Definition of intellectual content, Manuscript preparation, Manuscript editing, Manuscript review, Guarantor.

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