Original Research Article

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Study of prevalence and factors affecting prevalence of attention deficit hyperactivity disorder in primary school children

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ABSTRACT

Background: Attention deficit hyperactivity disorder is a commonly diagnosed neurobehavioral disorder in school age children. ADHD can even persist to adulthood and if left untreated can lead to negative impact not only on health but also on socioeconomic life of patients. Over the past 2 decades there have been 19 community-based studies offering estimates of prevalence ranging from 2% to 17%. Current study was aimed to estimate the prevalence and factors affecting ADHD along with the applicability of a DSM-4 based questionnaire for detecting ADHD.

Methods: Current investigation is a crossectional retrospective study conducted on 1150 children's at two primary schools in the district of Gulbarga. School children between the age range of 7 to 12 years were screened over duration of one year and six months using Conner's parent and teacher rating scale. Students above 65 score as per the scale were considered positive and were interviewed using DSM-4 criteria.

Results: Fifty-eight (5.04%) children satisfied the criteria to be diagnosed as ADHD when interviewed with DSM-4 criteria. Males were observed to be more prone to have ADHD than females. The mean age of ADHD children was between 9 to 10 years. Major effective factors for ADHD were found to be maternal stress during pregnancy, pampering the child and addiction of playing videos games.

Conclusions: Prevalence studies can aid in formulating recommendations for future clinical practice and also assist in clarifying whether the patterns of ADHD diagnosis and treatment in community settings are appropriate.

Keywords: ADHD, DSM criteria, Prevalence, School age children

INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) can broadly be categorized as a heterogeneous neurodevelopmental disorder observed mostly childhood, but often persist until adulthood in majority of cases.^{1,2} Inattention, hyperactivity, and impulsivity, are considered to be the key symptoms of ADHD.³ Published literature, statistics and observations reports, that ADHD usually co-exists with other psychiatric disorders like anxiety, depression, bipolar disorder, impulse control antisocial personality disorders.3-5 disorders or Persistence of ADHD in adulthood is not only an important health issue at individual level but also raises

concerns at society level due to associated negative outcomes like transport accidents, criminality, smoking, unemployment and substance use disorders. 4-6 Diagnostic statistical manual of fifth revision (DSM-5) have classified ADHD into three subtypes based on inattention symptoms.^{7,8} hyperactivity/impulsivity Predominantly inattentive type (ADHD-I) include individuals with maladaptive levels of inattention, but not hyperactivity/impulsivity, the predominantly hyperactive/impulsive type (ADHD-H) is characterized by maladaptive levels of hyperactivity/impulsivity, with no sign of inattention and the combined type (ADHD-C) describes individuals with significant symptoms of both inattention and hyperactivity/impulsivity.9 According to the reports of worldwide scientific studies, ADHD-I is most prevalent subtype, followed by ADHD-C. 9,10 Reported epidemiological studies revealed that ADHD is a common disorder seen in 5% to 10% of school-age children whereas the worldwide prevalence of ADHD in adults ranged between 2% and 5%, it was also observed that ADHD is more prevalent among males in comparison to females. 11,12

Diagnosis and prognosis

It is considered usual and normal when little kids are distractable, restless, impatient, or impulsive. Normally all kids struggle to be attentive, sit still, have sufficient patience to wait for their turn or to listen to others but kids with ADHD may exhibit signs like they are inattentive (easily distracted) and cannot focus or concentrate on a particular task. 13 They may not listen well to directions, miss important details, have problems in organizing tasks and work, seem absent-minded or forgetful, and lose track of their things. 13-15 ADHD kids often exhibit fidgets or tap hands or feet and may have trouble sitting still or staying quiet, they may act impulsive or too quickly before thinking, they often interrupt, might push or grab, and find it hard to wait, and have emotional reactions that seem too intense for the situation. 14,15 Although there is no lab test to diagnose ADHD, doctors use American psychiatric association's guidelines which are based on number and persistence of symptoms exhibited by the patients. 15 Diagnosis involves thorough gathering of information like medical and social history of both the child and the family, physical and neurological assessment that includes screenings of vision, hearing, and verbal and motor skills, evaluation of intelligence, aptitude, personality traits, or processing skills, neuropsychiatric EEG-based assessment aid (NEBA) system, to measures theta and beta brain waves ratio which is usually higher in children and adolescents with ADHD. 16-17 Prognosis of ADHD is variable and depends on the age of the individual.¹⁸ Findings and observations reveal that 50% of ADHD patients grow out of ADHD with treatment, and another 25% do not need treatment into adulthood.¹⁹ However, untreated ADHD can cause persisting dysfunction leading to devastating consequences like long term inability to work, and increased substance abuse. 18-19

Management and treatment strategies

Multimodal approach serves as one of the best strategies in the management and treatment of ADHD.²⁰ Combination of medication, behaviour therapy, parent and school teachers coaching and support can help in effective management and treatment of ADHD.^{20,21} CNS stimulants are the most commonly prescribed medications for treating ADHD as they can help to control hyperactive and impulsive behaviour and improve attention span.²² Behaviour therapy, parent and school teachers coaching and support can help younger kids in managing their attention, behaviour, and emotions.²¹⁻²³

Untreated ADHD may lead to low self-esteem, depression, oppositional behaviour, school failure, risk-taking behaviour, family conflict or other negative socioeconomic impacts. 22-24

Objectives

Current lifestyle and cultural trends leads to a forecast that frequency of ADHD would be increased in future. Prevalence studies would not only aid in formulating recommendations for future clinical practice and research but would also assist planners and policymakers in clarifying whether the patterns of ADHD diagnosis and treatment in community settings is appropriate. Thus, the objectives of the current investigation were to determine prevalence of ADHD in primary school children involved in the study and to study the factors affecting prevalence of ADHD in children.

METHODS

Study design, location and duration

Current investigation was a cross sectional descriptive study, conducted on 1150 students at two private schools from urban region of Gulbarga for a period of one year and six months.

Procedure

Current investigation was carried out on 1150 primary school children (710 males and 440 females) aged between 7 to 12 years. Informed written consent was taken from parents of all the selected children before undertaking the study. Teachers and parents of the children included in the study were asked to complete a Conner teacher and parent rating scale questionnaire. Score of 65 was assumed as the cut-off point and teachers and parents of children with scores more than 65 were invited to participate in the next step during which teachers and parents of children were interviewed directly by applying DSM-4 criteria, for the diagnosis of ADHD. During the interview and evaluation process, a detailed history, physical examination and systemic examination of all the selected children were carried out.

RESULTS

Current investigation findings revealed that the prevalence of ADHD among school children aged between 7-12 years was 5.04%, the results supported the previous published literature which reported the prevalence rate of ADHD in school children between 1-20%. Male to female ratio of prevalence of ADHD was observed to be 2.6: 1 in current study, which was consistent with prior reported studies.

Out of one thousand one hundred and fifty children screened, 5.04% were observed to be positive with more than 65 score in accordance to Conner teacher and parent

rating scale questionnaire. Total 4.95% of interviewed children satisfied the DSM-4 criteria, results were observed to be consistent with reported studies that exhibited a wide range of prevalence rates (between 2% and 17%). The mean age of ADHD school children was observed to be between 9 to 10 years. It was also observed from current study findings that prevalence rate of hyperactive/impulsive type of ADHD was higher in comparison to inattentive and combined type of ADHD.

Table 1: Prevalence rate of ADHD observed in current investigation.

Parameters	N	%
Total number of school children included in current study	1150	100
Total number of school children with ADHD	58	5.04

Table 2: Prevalence rate with respect to gender and type of ADHD.

Parameters	N	%
Total number of school children included in current study	1150	100
Total number of school children with ADHD	58	5.04
Predominantly hyperactive/impulsive type of ADHD	28	48.28
Predominantly inattentive type of ADHD	17	29.31
Combined type of ADHD	13	22.41
Male to female ratio in ADHD children	2.6:1	

Affecting factors in majority of ADHD children were found to be maternal stress during pregnancy, pampering the child and addiction for playing video games. The observed factors would in turn aid in making behavioural modifications essential to prevent the neuro- behavioural disorder like ADHD.

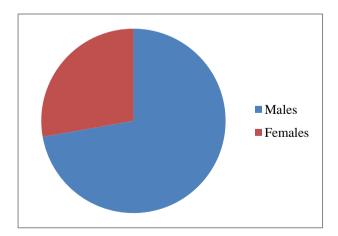


Figure 1: Distribution of prevalence rate of ADHD depending on gender.

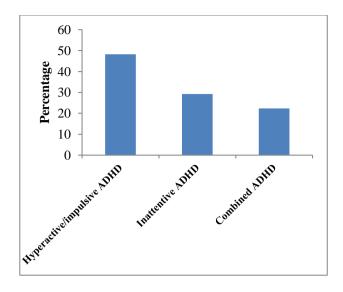


Figure 2: Distribution of prevalence rate depending on type of ADHD.

DISCUSSION

It was observed through current study that the prevalence of ADHD among school children aged between 7-12 years in private schools of Gulbarga was 5.04%, the prevalence rate was consistent with findings published in Western and Indian reports.^{25,26} In a cross sectional study conducted by Tashakori et al on prevalence of ADHD symptoms among 192 school age children in Ahvaz city of North East Iran it was reported that total 32 children were found to meet the DSM-4 criteria and the prevalence rate of ADHD was 16.66%.²⁷ Serkhel et al conducted a study on ADHD in 240 students of central institute of psychiatry, Kanke, Ranchi and reported that 4 (1.58%) children had ADHD.²⁸ Hebrani et al conducted study on prevalence of ADHD in 1083 school age children in Mashhad, North East Iran and reported 133 children with ADHD, which translates to a prevalence rate of 12.3%.29 The prevalence of ADHD varies in different reports depending on the diagnostic criteria and tools used for evaluation of ADHD.22 Bhatia et al conducted a study to determine the prevalence of ADHD among school children aged between 3 to 12 years in a tertiary care teaching hospital. The cases were recorded as per DSM-4 diagnostic criteria and it was reported that the incidence of ADHD was higher in preschool children.30

The diagnosis of ADHD is a challenging problem because differentiation of cardinal symptoms of ADHD from temperamental characteristics and routine behaviours of school age children is very difficult. So, both over diagnosis and under diagnosis may occur. 13-15 Lower rates in current study may be attributed to under recognition and delay of parents in seeking treatment for their children or to the hesitance of some clinicians in diagnosing ADHD in children. A review study suggested that cultural differences as one of the factors that affect the prevalence of ADHD. 31 There is controversy in the

literature regarding defining ADHD as a biological or cultural disorder. We perceive that since reports of informants are basic tools for the diagnosis of ADHD and acceptable behaviours are different by attitude, therefore ADHD may be cultural dependent.³¹

Table 3: Comparison of ADHD prevalence with published reports.

Reference number	Total participants		Total no. of children with ADHD		
	N	%	N	%	
27	192	100	32	16.66	
28	240	100	4	1.58	
Current study	1150	100	58	5.04	

Table 4: Comparison of ADHD prevalence with published reports on the basis of gender.

Reference no.	Participants, N (%)			ADHD children, N (%)		
	Males	Females	Total	Males	Females	Total
29	553 (51.06)	530 (48.93)	1083 (100)	97 (8.95)	36 (3.32)	133 (12.28)
Current study	710 (61.73)	440 (38.26)	1150 (100)	42 (3.65)	16 (1.39)	58 (5.04)

Table 5: Comparison of ADHD prevalence with published reports on the basis of type of ADHD and gender.

Danamatana	Reference, N (%)			
Parameters	Malhi et al ³³	Bhatia et al ³⁰	Current study	
Total number of school children included	245 (100)	362 (100)	1150 (100)	
Total number of school children with ADHD	20 (8.1)	64 (17.7)	58 (5.04)	
Predominantly hyperactive/ impulsive type of ADHD	10 (50)		28 (48.28)	
Predominantly inattentive type of ADHD	07 (35)	·	17 (29.31)	
Combined type of ADHD	03 (15)		13 (22.41)	
Male to female ratio in ADHD children	5:1	1.4:1	2.6:1	

In current study 65 children with Conner's index questionnaire score more than or equal to 65 were reported by teachers, out of which only 07 were reported by parents or by both parents and teachers and remaining all were reported by teachers, this suggests that ADHD symptoms may be reported more by teachers than parents. Literature reports that there is variation in prevalence of ADHD depending on different informants and that ADHD is more common in one setting rather than two setting screening studies.³¹ Informant disagreement on ADHD existence would be due to several factors like different contexts of observation, informant psychopathology, situation, kind of activity, informant attitude, and their characteristics.³¹ Children's with ADHD may differently act in each setting. They are more hyperactive in unstructured situation, conversely, problems in inattention are more often seen in classroom setting and carrying out task related rule enforced activity which can be considered as a differentiating factor.³¹

In India, it was observed and reported that the prevalence of ADHD increases with age.³² In current study also, the study prevalence of ADHD at 6 years of age was found to be 0.3%, at 7 years, the prevalence of ADHD was 0.5%, at 8 years the prevalence of ADHD was 0.6%, at 11 and 12 years the prevalence of ADHD was 1.6%. This shows that the prevalence of ADHD increases with age, the stated observation was found to be consistent with previous published reports. Singhi et al conducted a study

on spectrum of ADHD in children of the department of paediatrics, post graduate institute of medical education and research, Chandigarh, India and reported that out of 245 children 20 (8.1%) were found to meet the DSM-4 criteria for ADHD.³³ The higher prevalence of ADHD was attributed to the study population being referred cases to the psychiatry OPD.³³

In current study the male to female ratio of prevalence of ADHD was found to be 2.6:1 which was consistent with the previous published reports. Epidemiological studies in Western countries have reported greater incidence in boys than in girls, the ratio ranging from 2:1 to 10:1.³⁴ Whereas Indian studies have reported ADHD to be 3.3 to 7.7 times more common among boys than girls. Gender differences in ADHD strengthen the evidence for a biologically based, often genetically transmitted, etiology for ADHD. 35

Limitations

Most of the parents due to their low educational status may not have perceived symptoms of ADHD in their children which would have impacted the results as well as statistics of current investigation. The participants were selected from only two private schools; inclusion of students from more number of schools would have contributed towards more statistically significant results.

CONCLUSION

It was concluded from current study findings that ADHD is one of the prevalent psychiatric disorders in school age children and could be associated with clinically significant impairment in day-to-day functioning. It was also concluded from the study findings that prevalence of ADHD increase with age and ADHD is observed more in boys in comparison to girls. Thus, in order to successfully design an intervention program, it is important that all the areas of impairment in children with ADHD should be identified.

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Institutional Ethics Committee

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