Original Article

A CROSS SECTIONAL STUDY OF PREVALENCE OF ATTENTION DEFICIT HYPERACTIVITY DISORDER IN CHILDREN OF CENTRAL KARNATAKA

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Received: 26/8/2019 Revised: 15/09/2019 Accepted: 21/09/2019

ABSTRACT:

Introduction: Attention capacities form the basis for many cognitive and neuropsychological functions. Perhaps no other childhood psychiatric disorder manifests attentional problems leading to such significant functional impairment than Attention Deficit Hyperactivity Disorder (ADHD). Symptoms of ADHD are attributed to developmentally inappropriate levels of attention, hyperactivity and impulsivity that lead to functional impairments in a variety of domains across situations. The prevalence estimates exhibit rising trends in the recent years to about 11% highlighting the increasing burden of ADHD on health care systems. Various studies assessing prevalence of ADHD have mainly used a combination of clinical evaluation and parent and teacher-rated scales, while we aimed at assessing the prevalence by objective child-based instruments.
Objective: To evaluate the presence of ADHD in children in Davangere, India.
Methodology: After obtaining IERB approval, students from 3 schools who were willing to participate in the study and whose parents consented for the same were administered the TEA-ch2 tool and were clinically evaluated.
Results: The prevalence of ADHD in our study population was found to be 6.8% and selective attention index was statistically significant in correspondence with the prevalence of ADHD.
Conclusion: ADHD is an important behavioural problem among school-going children and adolescents which affects their academic and social functioning and this study emphasises on the possible use of objective child-based instrument which serves the purpose of both clinical and research utility.
Keywords: Attention Deficit Hyperactivity Disorder, School children

INTRODUCTION

Attentional capacities forms the basis for many cognitive and neuropsychological functions[(1,2)].

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Various psychiatric and neurological disorders can cause impairments in attention[(1)]. About 10-15% of the general population experience clinically significant attentional problems[(3)]. Perhaps no other childhood psychiatric disorder manifests attentional problems leading to such significant functional impairment than Attention Deficit Hyperactivity Disorder(ADHD)[(1)].

Attention Deficit Hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by

pervasive and persistent symptoms of inattention, hyperactivity and impulsivity, affecting individuals across the life cycle[4,5]. The symptoms are attributed to developmentally inappropriate levels of inattention, hyperactivity and impulsivity that lead to functional impairments in a variety of domains across situations[5,6].The worldwide-pooled prevalence of ADHD was estimated to be 5.29% in 2007[7,8]. A study in New Delhi, India[1] reported a 7.2% prevalence of ADHD on assessment of 500 adolescents using standard parent- and teachers-rating scale.However, the prevalence estimates exhibit rising trends in the recent years to about 11% highlighting the increasing burden of ADHD on health care systems[9].

The assessment of ADHD has traditionally relied on information collected from clinical interviews and behavioural observations supplemented by data from parent- and teacher-report behaviour rating scales[10]. Though informant questionnaires can provide clinicians with useful information regarding children's attentional impairments in everyday settings and situations, objective test measures of attention can provide clinicians with a more controlled, standardised first-hand assessment that may be less susceptible for reporting bias. Recently there has been a call for alternative strategies in assessing ADHD, including an emphasis on more objective laboratory and clinic-based instruments that provide both research and clinical utility[6,11,12].

In contrast with the tests and paradigms formally used, Test of Everyday Attention for Children (TEA-Ch) is a new ecological measure of attention that is more suitable for child population[13].TEA-Ch is a game-like test in which children are likely to feel more comfortable taking itand be more willing to co-operate with researchers[14,15].

In comparison to TEA-Ch, TEA-Ch2 is a shorter and more user-friendly assessment using a unique combination of both paper-based and computerised tests updated to make the testing process more fun and engaging.

With this background, we aimed at assessing the prevalence of ADHD in the town of Davangere by applying both, TEA-Ch2 and clinical evaluation of school students.

OBJECTIVE:

To evaluate the presence of ADHD in children in the town of Davangere, India.

MATERIAL AND METHODS

Inclusion criteria:

1. Children who are 6 to 12 years of age
2. Children whose parents are willing and consenting for participation in the study.

Exclusion criteria:

1. Children who are less than 6 years of age and more than 12 years of age.
2. Children with past history of any psychiatric illness.
3. Children whose parents are not willing for participation in the study

Duration of study: 2 years

Sample size:

Sample size = n= (z_(1*)^2 p*q)/d^2
Where, z¬1 – 95% confidence level = 1.96
p = Prevalence = 8%
d = Absolute precision = 3.4%
Sample size n= 1.962*8*(100-8)/3.42
n= (〖1.96〗 ^2 x 8 x (100-8))/(3.4 x 3.4)
Sample size n= 244 rounded to 250

Assessment tools:
Clinical interview and observation:
Socio-demographic data was collected using a semi-structured self-designed proforma. The child's activity level was objectively assessed by trained experts during the school visit.
Test of Everyday Attention for Children - 2:TEA-Ch2 is a test of attention for children, between the age range of 5 to 15 years. which uniquely measures 3 separable aspects of attention, namely:

1. Selective attention
2. Sustained attention
3. Everyday attention

The scale has 2 subgroups:

1. JUNIOR (TEA-Ch2 J) for children of age range 5-7 years
2. ADOLESCENT (TEA-Ch2 A) for children between 8-15 years.

The scale TEA-ch2 J was administered for a duration of 35 to 40 mins in the junior group and TEA-ch2 A was administered for a duration of 40 to 55 mins in the adolescent age group.

TEA-ch2 J has 7 subtests in which Selective Attention was assessed using Balloon Hunt, Balloons 5, Hide and Seek Visual and Sustained Attention was assessed using Barking, Sustained Attention to Response Test(SART), Simple Reaction Time (SRT) and Hide and Seek Auditory tests.

In TEA-ch2 A subtests namely Hector Cancellation, Hector-B cancellation, Troy Dual Task, Hecuba Visual Search were used to assess selective Attention. Vigil, Sustained Attention to Response Test (SART), Simple Reaction Time (SRT) and Cerberus Auditory Task were used for assessment of sustained Attention. Red & Blues, Bags & Shoes (RBBS) was administered for Switching Attention assessment [16]

METHODOLOGY:

This is a cross sectional study aimed to be conducted on school children between the age range of 6-12 years in the town of Davangere, India. The study protocol was scrutinised and approved by the Institutional Ethical Research Board. After obtaining IERB approval, 10 private schools in Davangere were approached for permission to conduct the study of which 3 schools were willing to participate in the study. Subsequently the children from class 1 – 7 and their parents were explained about the study protocol and need for the study, in each of the schools. Children of parents, who were willing and consenting to participate, were included in the study. On obtaining written consent from the parents, the children who met the inclusion criteria were recruited in the study and socio-demographic details were collected. Based on the child's age, TEA-Ch2 J and TEA-Ch2 A were administered accordingly and hyperactivity was clinically assessed. The data so obtained was tabulated and subsequently analysed using SPSS version[19].

RESULTS:

In the present study, there were about 53.2% and 46.8% of children belonging to 6-7 years and 8-12 years age group respectively, with equal number of male and female subjects and majority (92%) of them were from urban background. About 70% of the parents of the children studied, were graduates. No family history of ADHD was reported. Although, 1.2% reported to have history of some psychiatric illness in the family. In the ROC curve, reference line was obtained using the clinical evaluation of the child and the cut-off scores for each of the attention sub-types based on that. Selective attention index was found to be statistically significant. Table 2 shows that with the above obtained data the prevalence of ADHD in our study population to be 6.8% of which approximately 65% were boys.

DISCUSSION:

Evaluation of attention in children with ADHD has always been important considering its implications on learning, academic achievement and social functioning. Various studies assessing prevalence of ADHD have mainly used a combination of clinical evaluation and parent and teacher-rated scales [1,17], while very few studies have used objective child-based instruments (14,18). The current study gave a prevalence of 6.8% ADHD in the study population with objective assessment using TEA-Ch2. This finding is similar to previously estimated prevalence of 7.2% as assessed by Conners' Teacher Rating

Scale-Revised: short form (CTRS-R:S)[1]. However other studies have shown a wide range of prevalence of 2-17%(17,19,20)

Attention, which is the most important component of ADHD, is a complex cognitive function involving different processes like selectively attending to specific stimuli, focusing for prolonged periods, or regulating and monitoring of actions[21]. It is generally subclassified into 3 different types namely: selective attention, sustained attention and divided attention. Sustained attention is the vigilant focus on stimuli [22], while selective attention is the process of allocating resources on specific input and divided attention is the process of resource allocation between different stimuli by rapidly shifting or splitting focus. Though other studies have assessed different subtypes of attention, our study has shown a statistical significance of selective attention with the prevalence of ADHD estimated in the study which intrigues more interest for further exploration in this direction.

Though age-specific differences in attentional performance was observed in previous studies(14,18), our study did not show such differences considering use of separate age-specific scale categorised as TEA-Ch2 J for age group of 5-7 years and TEA-Ch2 A for age group of 8-12 years.

STRENGTH OF THE STUDY:

Child based instrument which uses play as part of the tool administered helps to assess the child's attention keeping in mind the child's innate interest for more accurate responses.

LIMITATIONS OF THE STUDY:

1) Majority of the study population was from urban background which could have led to a possible bias in the study finding.

2) A larger sample size with a wider distribution can be considered for future studies.

CONCLUSION:

ADHD is an important behavioural problem among school-going children and adolescents which affects their academic and social functioning. Though criteria-based clinical assessment supplemented by data from parent- and teacher-report behaviour rating scales have been useful for diagnosis of ADHD, this study emphasises on the possible use of objective child-based instrument which serves the purpose of both clinical and research utility.

Table 1:
Socio-demographic data of the children

AGE (in years)		
	Numbers(n)	Percentage(%)
6-7	133	53.2%
8-12	117	46.8%
GENDER		
Male	124	49.6%
Female	126	50.4%
RESIDENCE		
Urban	230	92%
Rural	20	8%
PARENT EDUCATION		
Primary	5	2%
Secondary	25	10%
Higher secondary	45	18%
Graduate	175	70%
FAMILY HISTORY OF OTHER PSYCHIATRIC ILLNESS		
Present	3	1.2%
Absent	247	98.8%
FAMILY HISTORY OF ADHD - NIL		

Table 2:
Prevalence of ADHD

	ADHD		
Gender	Absent	Present	Total
Female	118	6	124
Male	115	11	126
Total	233	17	250

Acknowledgement:

Authors would like to thank RGUHS for funding and SSIMS & RC for the facilities.

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How to Cite this article :

Mruthyunjaya.N, Prasad.B.S, Rajeev S Swamy, Asha. H.N, Ashwathi.J, Pavithra.A, Reshmi.R, Vadiraj Gorebal. A cross sectional study of prevalence of attention deficit hyperactivity disorder in children of central Karnataka. J Pub Health Med Res 2019;7(2):1-6

Funding: RGUHS, Bangalore, **Conflict of interest**: Declared none