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Research Article

Prevalence of attention deficit hyperactivity disorder in an urban school of a developing country

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ABSTRACT

Background: Attention deficit hyperactivity disorder (ADHD) is one of the most common neuro-psychiatric disorder in children. Hence, the prevalence of ADHD and its types in school children as a community based survey in an urban Indian region was assessed in this study.
Methods: A cross-sectional study conducted in an urban English medium school. Children studying in sixth to tenth standard were recruited for the study. DSM-IV based ADHD questionnaire was put forth to parents and teachers. Demographic details, information about their family and school environment were collected from students. Their performance in last year final examination in school was assessed from school records. Statistical analysis was carried out with either Fisher's exact probability test or Chi-square test.
Results: A total of 32/500 (6.4%) children have been diagnosed to have ADHD from the response from parents. Of the 32 ADHD children, 25 (78.1%) were boys and 7 (21.9%) were girls. A majority [22 (68.8%)] were of inattentive type, 2 (6.3%) were hyperactive and 8 (25%) had combined type of ADHD. An unfavourable family environment has been found to be significantly associated with ADHD ($P < 0.001$). A statistically significant difference ($P<0.0001$) in school performance was noted in children with ADHD. ADHD children were found to have unfavourable peer relationship more likely than non-ADHD children both in school [25/32 (78.1%)] and at home [16/32 (50%)].
Conclusions: We found prevalence of ADHD to be 6.4% in an urban English medium school necessitating an early identification through mass screening programmes and directing appropriate interventions.

Keywords: ADHD, Community school, Inattention

INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is the one of the most common neuro-psychiatric condition in children characterized by inattention, hyperactivity and impulsivity.[1] Depending on the predominance of symptoms, ADHD has been classified into three types namely predominant inattentive, predominant hyperactive/impulsive and combined.[2] Estimates from various countries[3-5] including India[6,7] have shown a prevalence of ADHD ranging between 1-13%. The pitfalls in many of these studies are that they have been done on referred cases, small sample size with variations in the diagnostic tool used.[8] The present study was as an attempt to assess the prevalence of ADHD and its types in school children by a community based survey in an urban Indian region.

METHODS

This was a cross-sectional study conducted in an urban English medium school in New Delhi after obtaining

approval from the Institutional Ethics Committee and informed consent from one of the parents and assent from the participating child. Children studying in sixth to tenth standard without past history of any significant medical illness were recruited for the study. DSM-IV based ADHD questionnaire[9] was used to evaluate the children. Along with this questionnaire, socio-demographic details (occupation, education and yearly income of parents) and family environment [favorable/ unfavorable (frequent arguments, fights and parental conflict)] were also collected from the parents. The socio-economic grading of the parents was done using modified Prasad classification and was classified into upper high, high, upper middle, middle and poor categories.[10] Simple randomization was carried out in selecting 100 students (50 boys and 50 girls) in each of the standards accounting for a total of 500 students. The questionnaire was handed over to parents of all the children. Teachers were asked to fill the same questionnaire for every 5th student of each section of that standard (systematic randomization). School performance in the last year final examination was assessed from the school records and was classified into one of the four categories based on marks obtained (> 85%, 70-85%, 50-69.99% and < 50%). The general mood of ADHD children was classified into following types: happy, angry, irritable, nervous and stressed. Categories of responses were analyzed by Chi-square test or Fisher's exact probability test using INSTA 11.0. The proportion of responses was also represented with 95% confidence interval ([]).

RESULTS

Assessment of ADHD in children

A total of 500 students (100 from each standard) were recruited in the present study. Median (range) age (in years) of the children was 13 (11-17). A total of 32/500 (6.4%, 95% CI; 4.5, 9) children were found to meet the criteria of ADHD based on response from the parents. The age-wise proportion of ADHD children is given in Table 1. No statistically significant distribution has been noted with age. Of the 32 ADHD children, 25 (78.1%, 95% CI; 59.6, 90.1) were boys and 7 (21.9, 95% CI; 10, 40.5) were girls and was statistically significant (P =0.001). Of the 100 children who had been scored by teachers, eight of them have been found to have ADHD symptoms, all of whom were found to meet criteria for ADHD from parental questionnaire also.

Types of ADHD in children

Of the 32 ADHD children, a majority [22 (68.8%, 95% CI; 49.9, 83.3)] were of inattentive type, 2 (6.3%, 95% CI; 1.1, 22.2) were hyperactive and 8 (25%; 95% CI; 12.1, 45) had combined type of ADHD. No statistically significant association was observed between genders.

Association of ADHD with other factors

Majority of the ADHD children belonged to upper middle or high class 22/32 (68.8%, 95% CI; 49.9, 83.3). Of the remaining, 9/32 (28.1%, 95% CI; 14.4, 47) were of upper high and 1 (3.1%, 95% CI; 0.2, 18.0) was of middle socio-economic class. No statistically significant difference (P=0.9) was observed between the different socio-economic classes. An unfavorable family environment has been found to be significantly associated with ADHD (P < 0.001). Of the non-ADHD children, only 3.21% (15/468) had an unfavorable environment in the family as against 34.4% (11/32) amongst the ADHD children. A statistically significant difference (P <0.0001) in school performance was noted in children with ADHD (Table 2). No statistically significant association was observed between various types of ADHD and school performance. The general mood of ADHD children was found to be significantly altered {angry [2/6 (33.3%, 95% CI;6, 75.9)], irritable [6/18 (33.3%, 95% CI;14.4, 58.8)], nervous [1/8 (12.5%), 95% CI;0.7, 53.3] and stressed [5/32 (15.6%), 95% CI;5.9, 33.6] in comparison with non-ADHD children. ADHD children were found to have unfavorable peer relationship more likely than non-ADHD children both in the school [25/32 (78.1%), 95% CI; 59.6, 90.1] and at home [16/32 (50%), 95% CI; 32.2, 67.8]. No significant difference in any of the above factors was observed with the types of ADHD.

Table 1: Age-wise distribution of ADHD children (n=32).

Age of the children (years)	Number of boys [n (%) [95% CI]]	Number of girls [n (%) [95% CI]]
11	4(12.5) [5, 28.1]	1 (3.1) [0.6, 15.8]
12	5(15.6) [6.9, 31.8]	2 (6.3) [1.7, 20.2]
13	5(15.6) [6.9, 31.8]	1 (3.1) [0.6, 15.8]
14	6(18.8) [8.9, 35.3]	1 (3.1) [0.6, 15.8]
15	4(12.5) [5, 28.1]	2 (6.3) [1.7, 20.2]
16	1(3.1) [0.6, 15.8]	0
17	0	0

Table 2: Association of categories of school performance in ADHD children (n=32).

Categories of school performance*	Number of children with ADHD [n (%) [95% CI]]	Number of non-ADHD children [n (%) [95% CI]]
> 85%	5 (3.8, 1.4-9)	128 (96.2, 91-98.6)
70-85%	6 (1.9, 0.8-4.3)	312 (98.1, 95.7-99.2)
50-69.99%	14 (35, 21.1, 51.7)	26 (65, 48.3-78.9)
< 50%	7 (77.8, 40.2-96.1)	2 (11.1, 0.6-49.3)

* - P < 0.0001 by Chi-square test for association.

DISCUSSION

The present study was a cross-sectional school based study assessing the prevalence of ADHD using DSM IV questionnaire in an urban English medium school in the national capital of India. In the present study, we found a prevalence of 6.4% of ADHD in children and 68.8% amongst them were of inattentive type. Median age of the children in the present study was 13 years. ADHD was predominantly seen in boys (78.1%), parents with unfavourable environment (34.4%) and was associated with a significant decline in school performance.

The prevalence of ADHD in the present study corroborates with the global data. A systematic analysis of 102 studies conducted in different regions of the world had shown the prevalence rate of ADHD to be about 5.29% in children.[3] The prevalence also corroborates with Venkata et al (Indian data) obtained from the school community.[8] Of the clinic based studies from the same population, a higher prevalence was noted.[11,12] Although difference in several investigators was noted regarding the prevalence of ADHD in children over the years. A recent meta regression analysis of the studies that were done in the past three decades concluded that the recent rise in the estimate of ADHD prevalence from studies were attributed to methodological differences and no conclusive evidence to say that there is an increase in the number of children who meet the ADHD criteria.[13] Nearly around 3/4th of the ADHD children in the present study were boys similar to the earlier estimates both from Western world[14] and India.[8]

68.75 % (22/32) of the ADHD children in the present study were of inattentive type comparable to other studies.[15,16] Hyperactivity is present in 6.25 % (2/32) of ADHD children in present study. Other studies reports hyperactivity has been predominantly noted in younger age children including pre-school.[7,11,17] In fact, many a times predominance of the hyperactive symptoms leads to early consultation of ADHD child with a doctor.[7] A decreasing trend towards hyperactivity is seen as a process of aging in ADHD.[18] Inattention leads to learning impairment. More than 3/4th of the ADHD students had a poor school performance in the present study. Considering such a high rate of inattention and poor scholastic performance, counseling and training has to be considered to the ADHD child, parents and teachers.

Some of the Indian studies found a greater association of lower and middle socio-economic class with the occurrence of ADHD[11,19] while others did not.[7] As the present study was conducted in an urban English medium school, majority of the parents were belonging to either upper middle or high class rendering a bias in assessment with the outcome. However, we could not found any significant association between the socio-economic class and ADHD in present study. ADHD has been found more commonly reported in families with adverse life events and lack of social support as in the present study.[20] A positive family environment is crucial for a child's behavioral and emotional well-being.[21] Hence, a holistic approach is necessary from care-givers, both at home and school to improve the living ambience of the child.

CONCLUSION

The strength of the present study is its community setting therefore referral bias has been eliminated. However, this study is performed amongst the children from a single school. In conclusion, in present study we found a prevalence of ADHD to be 6.4% in an urban English medium school. Inattention type is the most common ADHD. Boys have higher prevalence. We recommend an earlier identification through mass screening programs and directing appropriate interventions.

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