

Prevalence of attention deficit hyperactivity disorder in school-going children in rural Konkan region of Maharashtra

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ABSTRACT

Background: Attention deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder of childhood characterised by attention deficit, hyperactivity and impulsiveness. The present study was designed to compute the prevalence of ADHD and assess the association of the predetermined demographic variables and ADHD in school-going children aged 6–12 years in rural areas of Konkan. **Material and Methods:** The present study was a descriptive, cross-sectional study. Using the first edition of Vanderbilt's scale - D4 (Teacher's informant) by National Institute for Children's Health Quality (NICHQ) for identifying symptoms of ADHD in children, a questionnaire was filled out for each child with input from their class teacher. These data were then compiled and analysed. **Results:** Out of the 133 participants in the study aged 6–12 years, the gender distribution was 69 boys and 64 girls. The mean age was 9.2 ± 2.3 years. Of which, one student (0.75%) was found to have a predominantly inattentive subtype of ADHD (ADHD-IA). The prevalence was found to be 1.5% (2/133). In addition, one student (0.75%) was found to have a combined ADHD-IA and hyperactive (ADHD-H/I) subtype of ADHD (ADHD-C). The latter was also positive for the anxiety/depression screening scale administered as part of the same questionnaire. The total symptom score for questions 1–18 was 8.44 ± 7.29 . **Conclusion:** One of the most common neurodivergent conditions among school-age children is ADHD. Using an easy-to-use questionnaire, teachers and parents can report those experiencing symptoms of ADHD. Early diagnosis and treatment are recommended to avoid complications and aid in the improvement of quality of life.

Keywords: ADHD, diet, omega-3, school-age children, Vanderbilt scale

Introduction

Attention deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder of childhood characterised by attention deficit, hyperactivity, and impulsiveness.^[1,2] ADHD is linked to the imbalance of neurotransmitters like

adrenaline and dopamine rather than having a single underlying pathophysiological aetiology. ADHD is a biological disorder, even though its mechanism of development is complicated.^[3] Hyperactivity, inattention, impulsivity, and distraction are all prominent symptoms of ADHD. Complex interactions between developmental, environmental, and genetic variables lead to this syndrome. Male gender, birth order, low socio-economic level, parents' lack of education, mothers' occupation, and solitary parenting are all risk factors for ADHD.^[4-6]

In rural areas of Konkan, there is considerable social stigma and a lack of awareness regarding mental health. Not many

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studies have been conducted in this zone with respect to ADHD. This region also has unique dietary habits that the majority of the population follows, which might directly impact the neurological development in children. Lack of timely diagnosis and treatment can lead to manifestations in later years such as adult ADHD, anxiety and depression. Hence, this study was designed to compute the prevalence of ADHD and assess the association between the predetermined demographic variables and ADHD in school-going children aged 6–12 years in rural areas of Konkan.

Materials and Methods

This was a descriptive, cross-sectional study conducted in the Department of Psychiatry at BKLW Rural Medical College and Hospital, Derwan, Ratnagiri, Maharashtra, India. The duration was 10 months spanning from November 2022 to August 2023. Approval from the institutional ethical committee was obtained. After obtaining formal written permission from the head of the institute and the principal of SVJCT's English Medium School, the study was put into motion. The topic of research, objectives and the purpose of this project were duly explained and informed consent was obtained from the parents, teachers and assent from the students willing to participate in the study.

A random convenient sampling method was adopted, wherein 133 children from age groups 6–12 years were selected from classes 1–5. The selected sample had no pre-existing medical conditions or underlying co-morbidities.

The teachers explained the scale and its contents. Translations in regional languages were also provided along with the printed questionnaires. Each form took an average of 15 minutes to be appropriately filled. The data collection tool used was a questionnaire made of two sections: the first was the demographic data of the child, and the second was the first edition of the Vanderbilt assessment scale – D4 proforma – Teacher informant by NICHQ (2002).^[1] The questionnaire was filled out for each child by the respective class teacher. This data was compiled using Microsoft Excel and analysed using the Statistical Package for Social Sciences (SPSS) 23.0 version. Frequency, percentage, means and standard deviations (SD) were calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Statistical analysis was done using descriptive statistics.

Table 1: Subtype of ADHD

Teacher assessment scale	Frequency	Percentage
Predominantly inattentive subtype	2	1.50
Predominantly hyperactive/impulsive subtype	1	0.75
ADHD combined with both inattention and hyperactivity	1	0.75
Oppositional-defiant/conduct disorder screen	0	0.00
Anxiety/depression screen	1	0.75

The prevalence of traits of ADHD among children in rural area was then calculated.

Further assessment and evaluation were done by a professional. Therapeutic sessions for children with traits of ADHD were undertaken on the school premises. Seminars on guiding students with ADHD behaviours are scheduled to be conducted for the school teachers. The follow-up Vanderbilt scale (D6)^[1] will be used for monitoring, in the near future, if the children are receiving treatment for the same.

Results

Out of the 133 participants in the study aged 6–12 years, the gender distribution was 69 boys and 64 girls. The prevalence was found to be 1.5% (2/133). The mean age was 9.2 ± 2.3 years. Of which, one student (0.75%) was found to have a predominantly ADHD-IA subtype. Moreover, one student (0.75%) was found to have ADHD-C. The same student was also positive for the anxiety/depression screening scale administered as part of the same questionnaire. No student (0%) showed oppositional-defiant/conduct disorder. No family history of ADHD was elicited in both students.

Discussion

Inattention, impulsivity and hyperactivity are the hallmarks of ADHD that can have a substantial negative influence on many aspects of one's behaviour and performance, both at home and at school.^[7,8] ADHD is a neurodevelopmental disorder that manifests in childhood and includes a number of recurring issues like trouble maintaining concentration, hyperactivity and impulsive behaviour.^[9]

Significant functional limitations are present across contexts in kids with ADHD. Depending on the kind of ADHD and concomitant conditions, the affected youngsters display a constellation of behavioural issues. These children's parents or caregivers deal with varied levels of stress and chaos on a daily basis. In the preschool and early school years, ADHD becomes evident. Three major clinical subtypes of ADHD are recognised: predominantly ADHD-IA, predominantly ADHD-H/I, or ADHD-C [Table 1].^[10]

It may have serious effects on a person's life during adolescence. High comorbidity is linked to childhood ADHD. It is linked to low academic performance, a higher risk of substance use, psychological distress, suicidality, and sexual abuse in young adults as well as poor mental health and social outcomes.^[6]

In the present study, 2 out of 133 students showed ADHD. No history of mental illness in the family was elicited on any subject. All students included in the study sample were also free of any underlying co-morbid conditions. In this study, one student showed predominantly ADHD-IA subtype, and one student showed ADHD-C.

Table 2: According to the questions sequentially asked in the first edition of Vanderbilt scale

Number of questions scored 2 or 3	Frequency of students who filled out the questionnaire – [Vanderbilt D4]			
	Predominantly inattentive [Q 1–9]	Predominantly hyperactive [Q 10–18]	Defiance/conduct disorders [Q 19–28]	Anxiety/depression screen [Q 29–35]
0	109	105	128	119
1	10	12	4	5
2	7	9	0	4
3	3	2	1	4
4	2	1	0	1
5	0	2	0	0
6	1	0	0	0
7	1	0	0	0
8	0	1	0	-
9	0	1	0	-
10	-	-	0	-
Total number of students	133	133	133	133

Table 3: According to the questions sequentially asked in the first edition of the Vanderbilt scale

Number of questions scored 4 or 5	Frequency of students filled in the questionnaire – [Vanderbilt D4]
	Performance questions [Q 36–43]
0	102
1	8
2	3
3	3
4	10
5	2
6	0
7	5
8	0
Total number of students	133

In past decades, various authors have reported highly heterogeneous prevalence rates across the world, ranging from as low as 1% to as high as nearly 20% among school-age children and adolescents.^[11,12] The prevalence found in this study (1.5%) was near, albeit on the lower side of other such studies conducted in India.

In a study by Chawla GK *et al.*,^[13] among 228 students (aged 6–12 years), the prevalence of ADHD was found to be 11.8% based on the teacher tool only and 1.75% based on the parent and teacher tools combined. ADHD was found to be significantly more in males. Inattention was the most prevalent subtype of ADHD, and children screened positive for ADHD had significant learning difficulties at various levels.

In a study by Sharma P *et al.*,^[14] ADHD prevalence was found to be 6.34% (13/205). The majority (69.3%) of the ADHD-positive children were living in a joint family and belonged to the lower/lower middle class. A family history of ADHD was absent in all the ADHD-positive children.

In a study by Venkata JA *et al.*,^[15] the prevalence of ADHD among primary school children was found to be 11.32%. The prevalence was found to be higher among males (66.7%) as

compared to females (33.3%). The prevalence among the lower socio-economic group was found to be 16.33% and that among the middle socio-economic group was 6.84%. The prevalence was highest in the age groups of 9 and 10 years.

The prevalence of ADHD among children and adolescents in different epidemiological studies may be overestimated or underestimated, as the researchers used different scales and instruments to observe the phenomenon. In the present study, restlessness, excessive talking, blurting out answers and hyperactive behaviour driven by energy were observed. No student showed oppositional defiant/conduct disorder – two commonly seen associated conditions in ADHD [Table 2].

The subjects who tested positive also showed impaired learning skills with difficulty in writing, mathematics and poor organisational skills, resulting in low grades and test scores [Table 3]. IM Loe *et al.*,^[16] reported an association of ADHD with poor grades, poor reading and math standard test scores and increased grade retention across years.

ADHD is a disorder that is virtually always linked to subpar academic performance. Numerous research studies have shown that the emergence of an antisocial disposition is coexistent with ADHD. For a diagnosis of ADHD, there must be six or more symptoms of inattention, hyperactivity or impulsivity of this sort that significantly impair functioning in various contexts before the age of twelve.^[12,17] In the current study, prevalence on the lower side may be attributed to the seafood-based diet people in Konkan follow which is rich in omega-3 DHA and polyunsaturated fatty acids (PUFAs) – known to increase learning, memory and cognitive wellbeing. Favourable benefits include improvements in hyperactivity, attention, visual learning, word reading and working/short-term memory. Meaningful reduction in ADHD symptoms is seen on supplementation with the same.^[18]

Conclusion

One of the common neurodivergent conditions among school-age children is ADHD. The exact pathogenesis is unknown, but multiple factors like genetics, social, environmental and dietary habits play a role. Using an easy-to-use questionnaire, teachers and parents can report those experiencing symptoms of ADHD. The likelihood of having ADHD manifest rises with age. When behavioural issues arise in children with ADHD, numerous diagnoses may be necessary. Early diagnosis and treatment are recommended. Lower prevalence could be attributed to seafood-based diet people in Konkan follow known to be rich in omega-3 and PUFAs.

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Conflicts of interest

There are no conflicts of interest.

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