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R Parkavi
Intern, Sarada Krishna Homoeopathic Medical College, (Affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai), Kulasekharam, Kanyakumari, Tamil Nadu, India

D Praveena
Intern, Sarada Krishna Homoeopathic Medical College, (Affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai), Kulasekharam, Kanyakumari, Tamil Nadu, India

R Prithish Bhavan
Intern, Sarada Krishna Homoeopathic Medical College, (Affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai), Kulasekharam, Kanyakumari, Tamil Nadu, India

K Ramya
Intern, Sarada Krishna Homoeopathic Medical College, (Affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai), Kulasekharam, Kanyakumari, Tamil Nadu, India

Dr. Sibin
Assistant Professor, Department of Organon of Medicine and Homoeopathic Philosophy, Sarada Krishna Homoeopathic Medical College, (Affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai), Kulasekharam, Kanyakumari, Tamil Nadu, India

Corresponding Author:
R Parkavi
Intern, Sarada Krishna Homoeopathic medical college, (Affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai), Kulasekharam, Kanyakumari District, Tamil Nadu, India

A systematic review and meta analysis of the prevalence of ADHD among children in India in recent years

R Parkavi, D Praveena, R Prithish Bhavan, K Ramya and Sibin

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Abstract
Background: A prevalent neurodevelopmental disease in children is ADHD. India is becoming more aware, yet there are still gaps in infrastructure and diagnosis [1].
Objective: Reviewing new data on the prevalence of ADHD in Indian children, examining risk factors that may contribute, and highlighting difficulties in diagnosis and treatment are the goals [1].
Result: According to a meta-analysis of 19 Indian studies, the combined prevalence of ADHD is around 6.3%, with school-based studies accounting for 7.5% of the total and community-based studies for 1.9%. Coimbatore has a greater male incidence (9.4%) than female prevalence (5.2%), with regional variations reaching up to 11.3%. Environmental pollutants (such lead), more screening through school programs, better diagnostic tools (DSM-5, Vanderbilt, Conners), demands from society and education, internet exposure, and shifting parenting styles are some of the contributing factors [2].
Conclusion: the observed increase is a result of increased awareness, changes in society, and possible behavioral and environmental risk factors. Effective management and preventative measures require more targeted study.

Keywords: neurodevelopmental problems, children, India, ADHD, and prevalence

Introduction
Inattention, hyperactivity, and impulsivity are hallmarks of ADHD, which frequently affects social and academic functioning [1]. ADHD is still underrecognized" in India despite a growing emphasis on child mental health because of stigma, low awareness, and inadequate infrastructure. The increasing prevalence of ADHD noted in recent Indian studies is the focus of this review, which also discusses diagnostic challenges and therapeutic viewpoints.

Review of literature
1. Prevalence in Urban Primary Schools (Belagavi, Karnataka, 2017)
Joshi & Angolkar (2021) conducted a cross-sectional study using the SNAP-IV scale among 156 children aged 6-11 in Belagavi. They found an ADHD prevalence of 5.76%, with higher rates in girls (3.8%) compared to boys (1.9%)—a reversal of typical gender patterns [15]

2. Rural Konkan Region (Maharashtra, 2024)
A study using the Vanderbilt scale among 133 rural schoolchildren (6-12 years) reported a significantly lower ADHD prevalence of just 1.5%, indicating potential under-detection in teacher-only screenings [14]

3. Urban Bengaluru Schools (DSM-IV & Conners, ~2016)
Mannapur *et al*. surveyed nearly 1,000 students aged 6-12 in Bengaluru government-run English-medium schools using the Conners' index alongside DSM-IV diagnostic interviews. ADHD was confirmed in 2.3%, with a male:female ratio of ~3.6:1 [11]

4. Coimbatore District, Tamil Nadu
A cross-sectional survey in Coimbatore, using Conner's Abbreviated Rating Scale across 770 children (6-11 years), identified an ADHD prevalence of 11.32%, with significantly higher rates in lower SES families (16.3%) versus middle-class groups (6.8%) [12]

5. Preschoolers in Kottayam, Kerala (2020-21)
Sukanya & Vikraman studied 380 preschoolers (ages 4-5) using Vanderbilt Preschool Scale-IV, finding an ADHD prevalence of 6%, slightly higher in boys (3.4%) than girls (2.6%), with hyperactivity-impulsive type more common in boys and inattentive type in girls [14].

6. Rural Jammu & Kashmir (Jammu District)
In a rural government school sample, utilizing Vanderbilt teacher and parent scales, researchers uncovered an ADHD prevalence of 6.34% among children aged 6-12, with most cases (69%) from joint families of lower/middle socioeconomic strata [16].

Methods
Techniques have out a thorough literature assessment of research indicating the prevalence of ADHD in Indian youngsters from 2017 to 2024. Included meta-analyses and cross-sectional surveys conducted in communities and schools. The Vanderbilt Rating Scale: Vanderbilt Rating scale, Conners' Rating Scale, and DSM-5 diagnoses were among the instruments and criteria examined. [2]

Results
A meta-analysis of 19 studies found that the pooled prevalence of ADHD was around 6.3% (7.5% in schools and 1.9% in the community).

Variability by region: A research conducted in Coimbatore revealed an 11.3% prevalence among children aged 6 to 11, particularly in lower socioeconomic groups.

Differences by sex: According to a South Asian meta-analysis, the prevalence was higher for men (9.4%) than for women (5.2%) [3].

Risk factors: Children's ADHD behaviors in Chennai are associated with elevated blood lead levels.

Diagnostic advancements: Case recognition has improved with the use of standardized screening and diagnostic procedures (DSM-5, Conners, Vanderbilt) [4]

Discussion
Rather than a real spike in new cases, the rise in ADHD is probably the result of improved diagnostic techniques and more screening.

Diagnostic Bias vs. Real Increase: Increased awareness and school-based screening, as well as the use of standardized diagnostic instruments like the DSM-5, Vanderbilt, and Conners, are probably the causes of the apparent increase in ADHD incidence in India. Interpretation is nevertheless made more difficult by methodological variations Throughout studies. Different diagnostic criteria (e.g., teacher vs. parent reporting scales) can produce widely divergent prevalence estimates (ranging from 1.3% to over 20%), according to research from rural North India. This suggests that, in the absence of a standard approach, observed trends may reflect measurement differences rather than actual changes in incidence [5].

Environmental health and nutrition: In addition to lead, other modifiable risk factors, like deficiencies in certain micronutrients, may also play a substantial role in the symptoms of ADHD. Chronic shortages in iron, magnesium, iodine, and zinc have been shown to worsen hyperactivity, inattention, and cognition in ADHD study, especially in environments with restricted nutritional access. Therefore, dietary evaluations should be a part of child mental health screening programs as part of public health initiatives [6].

Environmental risks: Nutrient deficiencies and lead exposure stand out as modifiable concerns, particularly in lower socioeconomic sectors.

Socio-educational effects: ADHD symptoms are more noticeable in structured environments and with increased academic demands.

Educational and Socio-Familial Stressors: In India, ADHD is still significantly correlated with lower socioeconomic class (SES). Research indicates that a higher risk of ADHD is associated with poverty, prenatal/perinatal stress, malnutrition, substandard housing, and exposure to environmental pollutants. The NCBI Times of India. Inconsistent parenting, parental mental health issues, and nuclear families all contribute to behavioral issues in Indian pediatrics. It is evident that societal expectations and familial stress frequently exacerbate ADHD symptoms when you combine these factors with the demands of extremely organized academic environments, early school enrolment, and a competitive exam culture. [7]

Technology and family dynamics: Exposure to screens and shifting family settings can make attention-related behaviors worse.

Limitations: Prevalence estimates may be impacted by variations in study designs, diagnostic techniques, and regional representation.

Future directions: Suggest interventional and longitudinal research to analyze etiologies and evaluate preventative measures [8].

Conclusion
Although there have been more ADHD instances reported in India, this development is a result of better detection and shifting environmental conditions [9]. Public awareness campaigns, universal screening in community and school settings, environmental health upgrades, and the development of mental health infrastructure must be the main priorities in order to solve this [10].

Conflict of Interest
Not available

Financial Support
Not available

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