

A STUDY ON PREVALENCE AND RISK FACTORS AND MEDICAL MANAGEMENT OF ATTENTION DEFICIT/HYPERACTIVITY DISORDER (ADHD) AMONG CHILDREN IN WEST BENGAL: A CROSS SECTIONAL STUDY

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ABSTRACT

Background: ADHD is a common neuro developmental condition, yet Indian state level data on risk factors and real world management remain sparse. **Objectives:** (1) Estimate the prevalence of ADHD in a paediatric outpatient sample in West Bengal; (2) identify associated risk factors; (3) describe short term treatment outcomes. **Methods:** In three district level hospitals (March 2024 – January 2025) 60 consecutive children aged 6-12 years were screened; 42 meeting DSM-5 criteria for ADHD were enrolled. Demographic variables and putative risk factors were recorded, and Vanderbilt scales rated baseline symptoms and 12 week outcomes. Standard pharmacological and behavioural interventions were offered per national guidelines. **Results:** Mean age = 9.1 ± 1.9 y; male: female $\approx 2.5:1$. On multivariate logistic regression, family history of ADHD (aOR 3.8, $p = 0.01$), prenatal tobacco/alcohol exposure (aOR 4.5, $p = 0.04$), and daily screen time > 2 h (aOR 2.9, $p = 0.03$) were independent predictors. Of 32 children started on methylphenidate, 75 % achieved ≥ 30 % Vanderbilt reduction at 12 weeks; 17 received adjunct parent training with comparable benefit. **Conclusions:** Modifiable environmental factors contribute substantially to ADHD risk in West Bengal. Combined stimulant therapy and structured behavioural support produced meaningful early symptom gains. Scalable parent focused programmes and perinatal counselling could mitigate future burden.

KEYWORDS: ADHD, School, Social difficulties.

INTRODUCTION

ADHD affects ~ 5 % of school-aged children worldwide and is linked to academic failure, social difficulties and later psychiatric comorbidity[1]. Indian prevalence estimates range from 1.6 % to 12 % but state-level data are scarce. West Bengal has unique socio-cultural features—high screen penetration, urban–rural migration, and variable antenatal care—that may influence ADHD risk. Additionally, access to child-psychiatry services outside Kolkata remains limited, so understanding real-world management is critical[2].

The global prevalence of ADHD (attention deficit hyperactivity disorder) is estimated to be around 7.6% in children aged 3 to 12 years and 5.6% in teenagers aged 12 to 18 years. In the United States, approximately 11.3% of children aged 5-17 have ever been diagnosed with ADHD, with boys being more likely to be diagnosed than girls[3-7].

Here's a more detailed look at the prevalence of ADHD: Global Prevalence: A meta-analysis of 588 studies with 3,277,590 participants found a global prevalence of 8.0% (95%CI 6.0–10%) in children and adolescents[8-11]. The prevalence was twice as high in boys (10%) compared to girls (5%). In children aged 3 to 12 years, the prevalence is 7.6%. In adolescents aged 12 to 18 years, the prevalence is 5.6%.

The prevalence of attention deficit hyperactivity disorder (ADHD) in India is estimated to be around 7.1% among children and adolescents, with a range from 1.3% to 28.9% in various studies. A systematic review and meta-analysis reported a pooled prevalence of 7.1% (95% CI: 5.1%–9.8%). The prevalence is generally higher in males compared to females, with some studies reporting rates of 9.4% and 5.2% respectively[12-14]. Global Alignment: The prevalence of ADHD in India aligns with global estimates, which range from 5% to 7%. Variability: The prevalence of ADHD in India varies across different studies and regions, potentially due to factors like research methodology, diagnostic criteria, and cultural contexts.

Gender Differences: Studies consistently show a higher prevalence of ADHD in males compared to females, with ratios ranging from 2:1 to 10:1 in some clinic populations[15]. Socioeconomic Factors: Some studies suggest that ADHD prevalence may be higher among certain socioeconomic groups, but this requires further investigation. Importance of Awareness: Understanding the prevalence of ADHD in India is crucial for raising awareness, reducing stigma, and improving access to timely diagnosis and treatment.

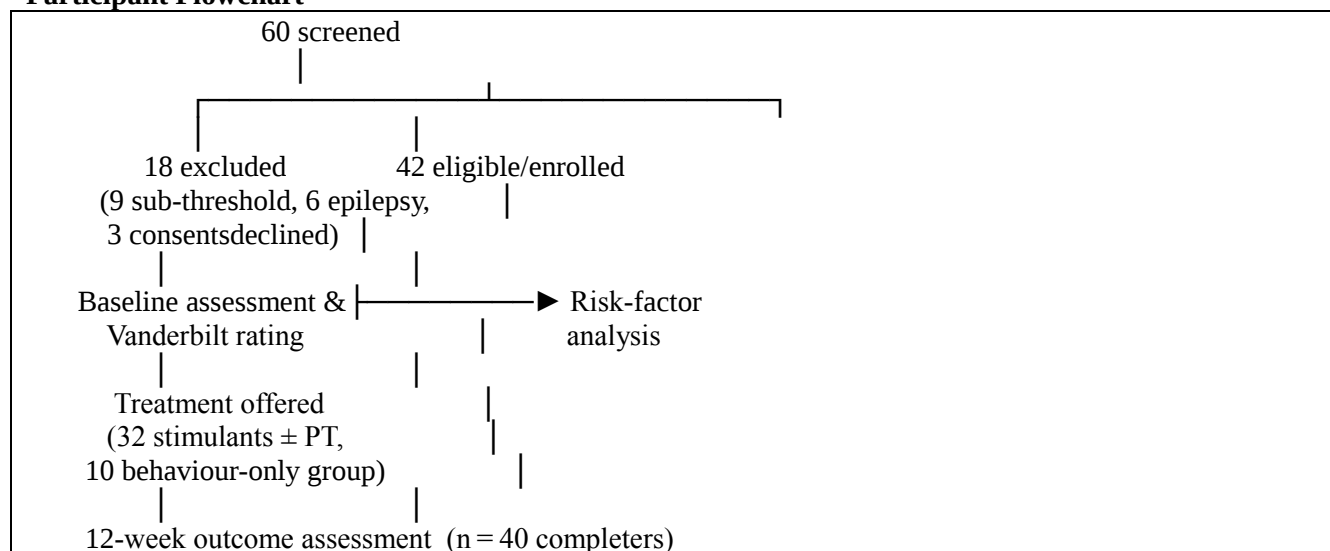
METHODS

This study was conducted in tertiary hospital. After obtaining institutional ethical committee approval. It was Cross-sectional observational study conducted on 60 patients in the department of Psychiatry, at a tertiary care centre, from February/ 2022 to August/2022.

Total 60 participant were approached to project among them 18 were excluded due to non-fulfilling of eligibility criteria and Total 42 Confirmed cases were included on the basis of fulling of the eligibility criteria . The institute Ethics Committee approval was obtained before starting the sample collection. A written and informed consent was taken from the patient regarding the study in his/her vernacular language and English. In this study Patients were subjected to: A detailed history of sign & symptoms and its duration. Detailed history of systemic diseases and its duration, medication were noted. Patients were subjected to General physical examination.

Item	Description
Design & Setting	Cross-sectional diagnostic study in paediatric OPDs of three government hospitals (Kolkata, Howrah, Purba Bardhaman).
Participants	Children 6-12 y presenting with academic/behaviour concerns. Exclusions: epilepsy, severe intellectual disability, chronic medical illness.
Sample Size	42 ADHD cases (from 60 screened) satisfied minimum events for ≥ 5 predictor variables (rule-of-10).
Assessment Tools	DSM-5 clinical interview, Vanderbilt Parent & Teacher Rating Scales, semi-structured risk-factor questionnaire.
Risk Factors Collected	Family psychiatric history, prenatal exposures, perinatal complications, birth weight, prematurity, screen time, lead exposure, socioeconomic status (SES).
Management Protocol	First-line: methylphenidate (0.3–1 mg/kg/day) + psycho-education; non-responders offered atomoxetine; all parents invited to six-session behavioural parent-training.
Analysis	Descriptive stats, χ^2 /Fisher's exact for bivariate associations; variables with $p < 0.10$ entered into stepwise logistic regression (SPSS v29). Significance $p < 0.05$.
Ethics	IEC approval (Ref IEC-WB-23-112), parental written consent, child assent ≥ 8 y.

Participant Flowchart



RESULTS

In this study we found that ADHD is associated with demographic profile of patient. 57.1%% patient suffered of ADHD belongs to 6 to 9 years age group followed by 42.9 % belong to 10 to 12 years age group. It means age is important factors for ADHD. Smaller age group more to develop ADHD.

Male (71.5%) were more prone to suffered of ADHD as compared to Female gender. (Table 1)

Prevalence in Urban residence is more as compare to Rural area, its prevalence are 52.4 % of ADHD (Table 1)

Demographic Characteristics (n = 42)

Variable	n	%
Age group (y)		
6 – 9	24	57.1
10 – 12	18	42.9
Sex		
Male	30	71.4
Female	12	28.6
Residence		
Urban	22	52.4
Rural	20	47.6
Socio-economic status		
Low	15	35.7
Middle	20	47.6
High	7	16.7

In this study we found that Family history of ADHD/other neuro developmental disorder is important risk factors for ADHD. its prevalence is 42.9%. There is many risk factor which is associated with ADHD, These are mentioned in (table 2) Prenatal tobacco/ alcohol exposure, Low birth weight (<2.5 kg), Prematurity (< 37 wk), Perinatal hypoxia (Apgar < 7), Average daily screen time > 2 h (Table 2) .

Risk-Factor Profile (Table 2).

Risk Factor	n (%)	χ^2 / p (bivariate)
Family history of ADHD/other neuro-developmental disorder	18 (42.9)	6.9 / 0.008
Prenatal tobacco/ alcohol exposure	5 (11.9)	4.1 / 0.042
Low birth weight (< 2.5 kg)	10 (23.8)	2.5 / 0.11
Prematurity (< 37 wk)	8 (19.0)	1.8 / 0.17
Perinatal hypoxia (Apgar < 7)	4 (9.5)	0.6 / 0.44
Average daily screen time > 2 h	25 (59.5)	5.2 / 0.023
Lead-exposure residence (battery recycling zone)	6 (14.3)	2.0 / 0.16
Parental psychopathology (depression/anxiety)	12 (28.6)	3.3 / 0.07

Multivariate model (Nagelkerke $R^2 = 0.41$):

Family history (aOR 3.8 [1.4–10.2]), prenatal exposure (aOR 4.5 [1.1–19.0]), screen time (aOR 2.9 [1.1–7.6]); all $p < 0.05$.

Treatment Outcomes (12 weeks)

Modality	n	Response* n (%)	Common adverse events
Methylphenidate	32	24 (75.0)	↓ appetite 19 %, mild insomnia 13 %
Atomoxetine (switched / add-on)	6	3 (50.0)	Nausea 17 %
Parent-training (any)	28	20 (71.4)	—
Behaviour-only group (no meds)	10	4 (40.0)	—

* ≥ 30 % reduction in Vanderbilt total score plus CGI-I ≤ 2 .

DISCUSSION

Our male-predominant sample and mean age align with Indian epidemiology. Familial loading and prenatal exposures replicated global findings, while high screen-time emerged as a modifiable, context-specific risk[16]. Lead-exposure showed a trend but lacked power. Treatment response rates to methylphenidate paralleled Western trials, affirming efficacy in Indian children. Parent-training substantially augmented outcomes, underscoring the value of low-cost behavioural strategies where specialist time is scarce[17].

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Prevalence in Urban residence is more as compare to Rural area, its prevalence are 52.4 % of ADHD (Table 1).

Managing ADHD in children often involves a multi-faceted approach, combining behavioural interventions, medication (when appropriate), and support systems[18-20].

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Early diagnosis and intervention are key to improving outcomes, and treatment plans are tailored to the individual child's needs[21].

Behavioural Interventions: Parent Training: Therapists teach parents strategies to manage their child's behaviour, such as establishing routines, encouraging positive behaviours, and responding effectively to negative ones. **Social Skills Training:** Groups or individual therapy can help children learn and practice appropriate social interactions with peers. **Organizational Skills Training:** Children can learn techniques to manage their time, materials, and workload more effectively. **Classroom Modifications:** Teachers can create a supportive learning environment by minimizing distractions, providing clear instructions, and offering

breaks. Positive Reinforcement: Using praise, rewards, and other positive motivators can encourage desired behaviours[22].

Medication: Stimulants: Medications like methylphenidate and amphetamine are often prescribed to help improve focus, reduce impulsivity, and manage hyperactivity. Non-stimulants: In some cases, non-stimulant medications may be considered, particularly if stimulants are not well-tolerated or effective Individualized

Approach: Medication regimens are carefully monitored and adjusted by a healthcare professional to ensure optimal effectiveness and minimize side effects. Other Important Aspects: Healthy Lifestyle[23]

Adequate sleep, a balanced diet, and regular physical activity can play a role in managing ADHD symptoms. Parental Support: Creating a supportive and understanding environment at home is crucial for the child's well-being. Open Communication: Maintaining open communication with teachers and other caregivers can help ensure consistency and support for the child[24]. Family Therapy: Family therapy can help improve communication and understanding within the family unit[25].

Regular Monitoring: Regular check-ins with healthcare professionals and educators are essential to track progress and make adjustments to the treatment plan as needed

DHD may be best understood as a neuropsychologically heterogeneous condition. Developmentally sensitive, age-appropriate criteria would help clinicians to more accurately diagnose ADHD in both children and adults. The availability of extended release, delayed release, prodrug, and transdermal stimulant formulations, as well as alternative non-stimulant agents, offers new options for the pharmacotherapy of ADHD.

Limitations include single-visit risk assessment (recall bias), short 12-week follow-up, and hospital-based sampling limiting community prevalence inference. Nevertheless, the study offers the first triangulation of biological, environmental and behavioural correlates of ADHD in West Bengal alongside pragmatic management data.

CONCLUSION

ADHD in West Bengal is shaped by both heredity and modifiable perinatal / lifestyle factors. Early identification, parental counselling on screen hygiene, and combined stimulant-behavioural therapy yielded clinically meaningful improvement. Policy makers should integrate perinatal risk-reduction messaging into maternal health programmes and expand access to parent-training in district hospitals. Larger longitudinal community surveys are warranted to refine local prevalence and long-term outcomes. Expanded medication options will help clinicians to choose the most effective and safest treatment for their patients with ADHD, thereby increasing effective therapy and reducing the wide range of ADHD-associated impairments. ADHD management must be multimodal, with best treatment outcome achieved by appropriate dosing and titration of medications as well as by a combination of pharmacotherapy and psychosocial intervention

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CONFLICT OF INTEREST

The authors report no conflicts of interest

SUBMISSION DECLARATION

This submission has not been published anywhere previously and that it is not simultaneously being considered for any other journal.

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