

Original Research Article

Restless nights and restless minds: prevalence of sleep disorders in children with attention deficit hyperactivity disorder

Mona P. Gajre, Aditi V. Dandawate*, Rutuja Tere, Niyati Trivedi

Department of Pediatrics, Lokmanya Tilak Municipal Medical College, Mumbai, Maharashtra, India

Received: 02 January 2026

Revised: 06 February 2026

Accepted: 09 March 2026

*Correspondence:

Dr. Aditi V. Dandawate,

E-mail: dr.aditidandawate@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: The prevalence of sleep disorders in India ranges from 40-50% whereas its prevalence in developed countries is 10-40%. Prevalence of sleep disturbances in children with attention deficit hyperactivity disorder (ADHD) is 25-55%. Hence, the present study was undertaken to assess the prevalence of sleep disorders among children, with ADHD and without ADHD (neurotypicals).

Methods: In a cross-sectional observational study, 40 children (mean age 10.9±0.8 years, 85% males) diagnosed as having ADHD by the diagnostic and statistical manual, fifth edition (DSM-5), and 40 neurotypicals (mean age 10.3±0.3 years, 80% males), were screened for sleep disorders by using the BEARS questionnaire.

Results: Children with ADHD had a greater prevalence of sleep disorders as compared to controls, facing most issues with sleep onset.

Conclusions: Sleep disorders have a cause-and-effect relationship with ADHD; hence it is imperative to screen for them while evaluating a child.

Keywords: Sleep, Children, ADHD

INTRODUCTION

Sleep is an integral part of a child's development, playing an indispensable role in maintaining body homeostasis. It is affected by multiple factors such as the body's internal milieu, environmental and sociocultural practices.¹

Recognition of sleep disorders is important among children as they can adversely affect academic performance, cardiovascular health, cognitive functions, and have been associated with increased prevalence of neurodevelopmental disorders such as attention deficit hyperactivity disorder (ADHD).²

American Academy of Pediatrics (AAP) clinical guidelines for obstructive sleep apnea in children recommends that all children should be regularly screened for snoring in order to prevent and minimize the morbidity associated with sleep-disordered breathing.³

The prevalence of sleep disorders in India ranges from 40-50% whereas its prevalence in developed countries is 10-40%.^{1,4} Prevalence of sleep disturbances in children with ADHD is 25-55%.⁵

However, the literature of sleep problems in ADHD remains limited, and this creates significant challenges for the clinician in dealing with sleep problems in children with ADHD.⁴

It is therefore crucial that children with ADHD are assessed and treated for sleep problems, as sleep disturbances may aggravate ADHD symptoms and cause functional impairment of children and their families.⁶

Hence, the present study was undertaken to assess the prevalence of sleep disorders among children, with ADHD and without ADHD (neurotypicals).

METHODS

After approval from the Institutional Ethics Committee (ref no-D020180116), this cross-sectional observational study was initiated in December 2019 and continued till November 2020. This study was carried out in the General Pediatric OPD of Lokmanya Tilak Municipal General Hospital, Mumbai. 40 children with ADHD (diagnosed by DSM-5 criteria of ADHD) of age group 10-12 years, were recruited as cases. Children without ADHD (controls) were matched for age and socioeconomic status. Both consent of parents and assent of children were taken.

The sample size was calculated with standard tools using a confidence interval of 90% and margin of error of 5%. The pooled prevalence of ADHD in the population across age groups of 10-12 years and genders is roughly 5% which yielded a sample size of 40. Similarly, 40 controls were recruited.

Children with visual disabilities, hearing disorders, those with acute or chronic medical conditions, neurological disorders, epilepsy, learning disorders, anxiety, depression were excluded from the study.

Assessment

A detailed clinical history with special emphasis on sleep history, behavioural history was filled in a proforma.

We used the BEAR questionnaire as a screening tool for our study. Parents were asked to maintain a sleep diary for two weeks, with instructions on how to fill it in the language best understood by the parents. Subsequently, both parents and children were interviewed using the BEARS questionnaire (bedtime, excessive daytime sleepiness, awakening during the night, regularity and duration of sleep and snoring). The responses 'yes' or 'no' were recorded using the questionnaire, and then further details regarding the specific sleep problem were noted and recorded

Analysis

All data collected was analyzed with the statistical package for the social sciences (SPSS) software (SPSS Inc, Chicago, Ill). Descriptive analysis was done for demographic variables using the chi-square tests. Comparison between cases and controls was done using the Chi-square test. A p value of less than 0.05 was considered significant.

RESULTS

ADHD group (cases)

The mean age of the ADHD cases was 10.9±0.8 years, and 85% were males. As per Kuppusswamy socioeconomic scale, the majority of subjects (n=25;62.5%) were from the upper lower class. On enquiry, 7 (17.5%) parents reported

that their child had sleep disordered breathing. On anthropometric examination, it was found that 23 cases (57.5%) had normal BMI for their age, 3 cases (7.5%) were overweight and 1 case (2.5%) was obese. On oral examination using the Malampatti score, 7 cases (17.5%) had Malampatti grade 2 (soft palate and uvula are visible) airway examination, the rest had grade 1 (soft palate, uvula and pillars are visible).⁷

ADHD was diagnosed on DSM-5 criteria by a clinical interview by a trained physician. Of the 40 ADHD cases, 20 (50%) were of the predominantly inattentive (ADD) subtype, 6 children (15%) were of the predominantly hyperactive (HI) subtype and the remaining 14 (35%) were of the combined ADHD. It was found that 9 (22.5%) of the cases were on stimulant medications while 31 (77.5%) were not on any medications.

Neurotypicals (controls)

The mean age of the neurotypical controls was 10.3±0.3 years; 80% were males and none of the children were on any sleep altering medications. 6 (15%) parents reported that their child had sleep disordered breathing. On examination it was found that 28 subjects (70%) had normal BMI, 2 subjects (5%) were overweight and 1 subject (2.5%) was obese. On oral examination of the cases using the Malampatti score, 3 controls (7.5%) had grade 2 airway examination, the rest had grade 1. There was a significant difference in the academic history between cases and control, 31 cases (77.5%) had a below average school performance, as opposed to a mere 5 children (12.5%) in controls, this was statistically significant (p<0.001).

BEARS questionnaire responses

We administered the BEARS questionnaire as a screening tool for sleep disorders, to cases, controls and their caregivers in our study. We found a concordance in the responses of the parents and children in most of the subdomains in both groups except in the subdomain of nighttime awakenings, wherein 22.5% of the parents of cases reported their child had frequent nighttime awakenings versus only 5% children without ADHD (p<0.05).

The final subdomain in the tool to be compared was the regularity and duration of sleep. 22 (55%) parents and 23 (57.5%) cases felt that the child was getting enough sleep, which was similar to the controls and their parents. However, in comparison in the above-mentioned subdomain, a significant difference in the response of parents (p=0.033) and children (p=0.015) was recorded between cases and controls. On an analysis of sleep problems in the ADHD cases, we found that the predominant subtype was the predominantly inattentive (ADD). We also found that the subdomain of bedtime problems (sleep onset) was the most common issue faced by all three subtypes of ADHD (p=0.163).

What this study adds

Provides updated prevalence data on sleep disorders among children with ADHD using standardized assessment tools. Highlights the clinical importance of

routine screening for sleep problems in children diagnosed with ADHD. Supports the need for integrated management strategies addressing both ADHD symptoms and sleep health.

Table 1: Comparison of sleep quality in ADHD cases and neurotypical controls using the BEARS questionnaire.

Domain	Quality of sleep as assessed by the BEARS questionnaire	Cases (n=40) N (%)	Controls (n=40) N (%)	P value
Bedtime problems (onset)	Does your child have bedtime problems? (P)	15 (37.5)	8 (20)	0.083
	Do you have trouble falling asleep? (C)	14 (35)	7 (17.5)	0.075
	P value parent versus child	0.816	0.774	
Excessive daytime sleepiness	Does the child feel sleepy during the day, or take naps? (P)	8 (20)	5 (12.5)	0.373
	Do you feel tired a lot during the day? (C)	5 (12.5)	2 (5)	0.285
	P value parent versus child	0.363	0.235	
Awakenings at night	Does your child wake up a lot at night? (P)	9 (22.5)	4 (10)	0.129
	Do you wake up a lot at night or have trouble getting back to sleep? (C)	2 (5)	1 (2.5)	0.556
	P value parent versus child	0.023*	0.165	
Regularity and duration of sleep	Do you feel your child is getting enough sleep? (P)	22 (55)	31 (77.5)	0.033*
	Do you feel you are getting enough sleep? (C)	23 (57.5)	33 (82.5)	0.015*
	P value parent versus child	0.821	0.676	

*P value significant

Table 2: Demographic details of the cases and controls with clinical features.

Demographic parameters	Cases (n=40), N (%)	Controls (n=40), N (%)	P value
Demography			
Age (years)			
9-10	13 (32.5)	13 (32.5)	0.85
10-11	15 (37.5)	17 (42.5)	
11-12	12 (30.0)	10 (25.0)	
Gender			
Female	6 (15.0)	8 (20.0)	0.55
Male	34 (85.0)	32 (80.0)	
Socioeconomic			
Upper middle	1 (2.5)	-	<0.001
Lower middle	14 (35.0)	34 (85.0)	
Upper lower	25 (62.5)	6 (15.0)	
History			
Yes	2 (5.0)	-	
History of sleep issues in family			
No	38 (95.0)	40 (100.0)	0.15
History of snoring			
No	22 (55.0)	31 (77.5)	0.033
Yes	7 (17.5)	6 (15.0)	
History of stimulant medications			
Yes	9 (22.5)	-	0.002
No	31 (77.5)	40 (100.0)	
History of academic problems			
Yes	31 (77.5)	5 (12.5)	<0.001
No	9 (22.5)	35 (87.5)	
Examination			
BMI			
Severe thinness (<-3 SD)	2 (5.0)	2 (5.0)	0.34

Continued.

Demographic parameters	Cases (n=40), N (%)	Controls (n=40), N (%)	P value
Thinness (-2 to -3 SD)	11 (27.5)	7 (17.5)	
Normal (-2 to +2 SD)	23 (57.5)	28 (70.0)	
Overweight (+2 to +3 SD)	3 (7.5)	2 (5.0)	
Obese (>+3 SD)	1 (2.5)	1 (2.5)	
Airway examination (Malampatti)			
Grade 1	33 (82.5)	37 (92.5)	0.17
Grade 2	7 (17.5)	3 (7.5)	

DISCUSSION

In our study we found that the prevalence of sleep disorders using the BEARS questionnaire in school aged children in the community was 35%. After extensive literature search, we found no Indian data on prevalence of sleep problems in children with ADHD. In our study, prevalence of sleep problems in children with ADHD was found to be 55%; similar studies in developed nations have also reported a high prevalence.⁸

There was a statistically significant difference ($p < 0.01$) in the academic history of the cases vs controls; 31 cases (77.5%) had a below average school performance as opposed to 5 (12.5%) in controls. This was similar to another study in an Indian context where 33% ($n=72$) children with ADHD were found to have poor academic performance.⁹

On further analysis, the associations between the core symptoms of ADHD and subtypes with sleep disorders has shown inconsistent results. Certain studies found no such correlation while others indicate a higher prevalence in the combined subtype.^{10,11}

We used the BEARS questionnaire as a screening tool and found that sleep disturbances were more common in the subdomains of bedtime problems (sleep onset) - 37.5% in the cases as reported by parents and 35% as reported by the children. Similar findings were noted to be significant in another study of 60 children with ADHD compared with their healthy siblings (controls); $p < 0.01$.¹²

In the subdomain of excessive daytime sleepiness, there were no statistically significant findings in either the cases or the controls.

On analysis of the sub domain of regularity and duration of sleep, we found that both parents ($p=0.033$) and children ($p=0.015$) had significant concordance in both cases and controls. Parents of children with ADHD ($n=22$, 55%) reported that the duration of sleep was less than that of neurotypical controls ($n=31$, 77.5%). Children self-reported that the regularity and duration of sleep was affected as compared to peers (p value=0.015). This was similar to the findings of Vaidyanathan et al where the average sleep duration for the ADHD group was 9 hours and 48 minutes as compared to the healthy siblings in whom the average sleep duration was 10 hours and 28 minutes.¹²

In the subdomain of night-time awakenings, 37.5% of parents of children with ADHD reported the issue of sleep initiation which was close to the percentage of children themselves (35%). We also found that significantly, a greater number of cases (35%) had issues with sleep initiation versus the controls (17.5%). On further inquiry, it was found that 9 (22.5%) parents reported that their child wakes up frequently at night compared to only 2 (5%) children reporting for themselves. This finding was statistically significant (p value=0.023). Our conclusions were similar to Owens et al who also reported a discordance in the ADHD group.¹³

Another significant finding was that social relationships of cases and controls with parents, teachers, and peers - a larger percentage of cases had poor relationships with their parents (45%), teachers (45%) and peers (30%) as compared to the controls [parents (7.5%), teachers (0%) and peers (5%)]. This was corroborated by a recent meta-analysis which found that students with ADHD symptoms tend to experience relationships that are low in closeness and high in conflict.¹⁴

Limitations

The major limitation of the study was the fact that ours was a screening study for sleep disorders. Due to COVID-19 restrictions we were not able to follow this up with a definitive and reliable test, or an objective method like polysomnography or actigraphy. Clinically this illustrates the importance of specifically assessing and monitoring for the issues related to sleep in children with ADHD. Further research into all factors likely to impact the same, including medications are the need of the hour which will help provide a comprehensive approach to the management of ADHD.

CONCLUSION

Sleep patterns of childhood are almost never studied or asked for in spite of them having an extensive effect on a child's well-being and attention span. This is especially important in children with ADHD wherein their medications may alter sleep patterns, and lack of sleep may exacerbate their symptoms. We recommend actively screening children for sleep disorders because it has a significant effect on their quality of life. This is imperative in children with ADHD wherein a significant improvement in their symptoms and attention span may be seen with consistently regular and adequate sleep. To

conclude, sleep disorders have a cause-and-effect relationship with ADHD, and hence it is imperative to screen for sleep disorders especially during ADHD evaluation.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the contributions of Ms. Madhumita Chandrasekaran from the learning disability OPD for her valuable time and effort which was instrumental in the completion of this study.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Bharti B, Malhi P, Kashyap S. Patterns and problems of sleep in school going children. *Indian Pediatr.* 2006;43(1):35-8.
2. Gupta R, Goel D, Kandpal SD, Mittal N, Dhyani M, Mittal M. Prevalence of Sleep Disorders Among Primary School Children. *Indian J Pediatr.* 2016;83(11):1232-6.
3. Section on Pediatric Pulmonology, Subcommittee on Obstructive Sleep Apnea Syndrome. American Academy of Pediatrics. Clinical practice guideline: diagnosis and management of childhood obstructive sleep apnea syndrome. *Pediatrics.* 2002;109(4):704-12.
4. Owens JA, Mindell JA. Pediatric sleep medicine: priorities for research, patient care, policy and education. *J Clin Sleep Med.* 2006;2(1):77-88.
5. Corkum P, Tannock R, Moldofsky H. Sleep disturbances in children with attention-deficit/hyperactivity disorder. *J Am Acad Child Adolesc Psychiatry.* 1998;37(6):637-46.
6. Corkum P, Davidson F, Macpherson M. A framework for the assessment and treatment of sleep problems in children with attention-deficit/hyperactivity disorder. *Pediatr Clin North Am.* 2011;58(3):667-83.
7. Yu JL, Rosen I. Utility of the modified Mallampati grade and Friedman tongue position in the assessment of obstructive sleep apnea. *J Clin Sleep Med.* 2020;16(2):303-8.
8. Bhargava SC, Sethi S. Sleep disorders in children with attention-deficit hyperactivity disorder. *Indian J Psychiatry.* 2005;47(2):113-5.
9. Venkata JA, Panicker AS. Prevalence of Attention Deficit Hyperactivity Disorder in primary school children. *Indian J Psychiatry.* 2013;55(4):338-42.
10. Sung V, Hiscock H, Sciberras E, Efron D. Sleep problems in children with attention-deficit/hyperactivity disorder: prevalence and the effect on the child and family. *Arch Pediatr Adolesc Med.* 2008;162(4):336-42.
11. LeBourgeois MK, Avis K, Mixon M, Olmi J, Harsh J. Snoring, sleep quality, and sleepiness across attention-deficit/hyperactivity disorder subtypes. *Sleep.* 2004;27(3):520-5.
12. Vaidyanathan S, Shah H, Gayal T. Sleep Disturbances in Children with Attention - Deficit/Hyperactivity Disorder (ADHD): Comparative Study with Healthy Siblings. *J Can Acad Child Adolesc Psychiatry.* 2016;25(3):145-51.
13. Owens JA, Dalzell V. Use of the 'BEARS' sleep screening tool in a pediatric residents' continuity clinic: a pilot study. *Sleep Med.* 2005;6(1):63-9.
14. MacLean J, Krause A, Rogers MA. The student-teacher relationship and ADHD symptomatology: A meta-analysis. *J Sch Psychol.* 2023;99:101217.

Cite this article as: Gajre MP, Dandawate AV, Tere R, Trivedi N. Restless nights and restless minds: prevalence of sleep disorders in children with attention deficit hyperactivity disorder. *Int J Contemp Pediatr* 2026;13:600-4.