Title of the Study: “Prevalence and Correlates of Sleep Disorders in Children Aged 5–12 Years Admitted to a Tertiary Health Centre”

by Jana Publication & Research

Submission date: 02-Jun-2025 01:04PM (UTC+0700)
Submission ID: 2690345585
File name: IJAR-52033.docx (86.63K)
Word count: 5402
Character count: 30201

Title of the Study: "Prevalence and Correlates of Sleep Disorders in Children Aged 5–12 Years Admitted to a Tertiary Health Centre"

Background

Sleep disorders in children adversely affect cognitive, behavioural, and physical health. Despite well-documented impacts on quality of life, limited data exist on the prevalence of paediatric sleep disorders and their correlates within hospitalized settings, especially among school-aged children.

Objectives

To Determine the prevalence of sleep disorders in children aged 5–12 years and to identify common disturbances, examine risk factors and assess the impact on daytime functioning and behaviour.

Methodology

This cross-sectional study recruited children within 48 hours of admission to a tertiary health centre. Caregivers completed structured questionnaires based on guidelines by Indian Academy of Paediatrics capturing demographics, bedtime habits, sugar intake, family history, and daytime behaviours, enabling the identification of sleep disturbances and potential correlates in hospitalized children.

Results

Among 200 participants (mean age 9.3±2.2 years, 53.5% male), 34% exhibited sleep disorders, most commonly sleep talking (41%), nighttime awakenings (34.5%), and snoring (16%). Risk factors included late bedtime (55.5% after 10 PM), screen time before sleep (48%), and sugar use (18.5%). Affected children reported higher irritability (38.5%), concentration difficulties (30%), academic decline (14%), and school absenteeism (20%). Teeth grinding was notably more frequent in males (8.41% vs. 2.2%, p=0.05), while other gender-based differences were not statistically significant.

Conclusion:

Sleep disorders were prevalent among children, with identifiable risk factors influencing daytime functioning. Targeted interventions addressing bedtime practices, screen time, and use of sugary foods may mitigate these disruptions and improve outcomes.

Keywords: Sleep disorders, Children, Hospitalization, Risk factors, Daytime functioning, Paediatric care.

1. Introduction and Background

Normal sleep architecture: NREM – Stage1- this is a transition stage where sleep usually begins, lasting for 1 to 7 minute along with lowered heart rate and respiration. Then comes the 2nd stage with deeper sleep, more difficult to arouse lasting for 10 to 15 minute initial cycle, longer with progressive cycles with further drop in hear rate, respiration and with no eye movements. Stages 3 and 4 has deepest sleep with highest arousal threshold where stage 3 lasts for few minutes while stage 4 lasts for 20 to 40 minutes. There is no significant distinguishing pattern in shift from stages 3 to 4. REM (Rapid Eye Movement) is associated with atonia and muscle paralysis with safe expression of dreams.

Stage 1 to stage 4 and then REM makes 1 cycle, the cycle repeats throughout the night. Total sleep is composed of 75-80% of NREM and 20-25% of REM.

NREM appears to be associated with learning and memory, helps in organizing important synapses whereas REM appears to be involved in memory consolidation and cognitive functioning.

Sleep is a fundamental biological process that plays a pivotal role in cognitive development, emotional regulation, and physical growth in children. Adequate and quality sleep is vital for optimal daytime functioning, which encompasses learning, behaviour, and overall well-being (1). However, sleep disorders remain underdiagnosed and undertreated in paediatric populations, often leading to adverse outcomes such as impaired academic performance, mood disturbances, and increased risk of obesity and cardiovascular issues (2) (3). The prevalence of childhood sleep disturbances is reported to range from 20% to 30% in community settings, with higher rates observed in clinical populations due to comorbid conditions and environmental stressors (4).

Sleep disorders are characterized by abnormalities in quality, time and amount of the sleep. They are classified as per ICSD 3 (International classification of Sleep Disorders 3) into

- Insomnia
- Sleep-disordered breathing
- Central disorders of hypersomnolence
- Circadian rhythm sleep-wake disorders
- Parasomnias
- Sleep-related movement disorders.

Insomnia is defined as a persistent difficulty with sleep initiation, duration or consolidation that occurs despite adequate opportunity and circumstances for sleep.

Sleep disordered breathing includes obstructive sleep apnoea which presents as snoring, laboured, paradoxical or obstructed breathing during sleep with sleepiness, hyper activity, behavioural and learning problems, confirmed with polysomnography. Commonly linked to adeno tonsillar hypertrophy, obesity or positive family history.

Central disorders of hypersomnolence includes narcolepsy and Idiopathic Hypersomnia which are characterised by excessive daytime sleepiness in absence of other sleep disorders.

Circadian rhythm disorders include Delayed sleep phase syndrome wherein sleep schedule lags behind expected sleep schedule. Seen more commonly in teens. When child has difficulty falling asleep and waking up due to daytime event most likely school and not due to physiological dysynchrony of circadian rhythm it is known as Motivational phase delay where underlying issue causing distress must be targeted. Phase advance is when sleep schedule is earlier than environmentally expected sleep schedule, less common than sleep delay.

Parasomnias are largely seen in children but seen to resolve spontaneous with age. NREM parasomnias include sleep walking, night terrors. REM parasomnias include nightmares and nocturnal enuresis.

Within tertiary health centres, children are frequently admitted for acute and chronic illnesses, potentially exacerbating sleep problems. Disrupted routines, unfamiliar environments, and heightened parental anxiety can further compromise sleep quality and quantity (5). Additionally, factors such as irregular bedtime schedules, excessive screen time, and higher sugar intake contribute to sleep disturbances in school-aged children (6). Recognizing and managing these modifiable risk factors becomes crucial in preventing long-term complications, particularly as poor sleep has been linked to attention difficulties, learning disorders, and behavioural issues (7) (8).

Despite growing evidence of the negative impact of paediatric sleep disorders, there remains a need for systematic research that quantifies their prevalence and identifies associated risk factors, particularly in hospitalized children. Understanding the magnitude and specific types of sleep disorders—such as bedtime resistance, frequent awakenings, and snoring—can inform clinical protocols aimed at improving sleep hygiene practices, both in hospital environments and upon discharge (9) (10).

In this context, the present study aims to investigate the prevalence of sleep disorders among children aged 5–12 years admitted to a tertiary health centre, filling an important gap in current knowledge. By exploring the correlates of these disturbances, including family history and sugar consumption, this study seeks to elucidate the multifactorial nature of paediatric sleep issues. Furthermore, examining the impact of disordered sleep on daytime functioning—such as academic performance and behaviour—can shed light on the broader implications of inadequate sleep in this vulnerable population. Findings from this research may guide the development of targeted interventions and policy recommendations to enhance screening, early detection, and management of sleep disorders in clinical settings.

2. Aims and Objectives

Primary Objective: To determine the prevalence of sleep disorders among children aged 5–12 years admitted to a tertiary health centre.

Secondary Objectives

1. To identify common types of sleep disturbances (e.g., bedtime resistance, frequent awakenings).
2. To explore associations between sleep-related issues and selected factors such as bedtime routines, family history, and sugar intake.
3. To assess the impact of these sleep disturbances on daytime functioning and behaviour.

3. Methodology

3.1. Study Design

A cross-sectional design was employed. Children who met the age criteria (5–12 years) were approached within the first 48 hours of admission to the paediatric ward. Caregivers were interviewed using a structured questionnaire designed to capture a broad range of sleep-related behaviours and problems.

3.2. Study Setting

This study was conducted in the Paediatric Department of a tertiary health centre, where both acute and chronic paediatric cases were managed.

3.3. Study Population

Inclusion Criteria

1. Children aged 5–12 years who are newly admitted to the paediatric ward.
2. Caregivers who provide written informed consent.

Exclusion Criteria

1. Children with known, previously diagnosed severe sleep disorders.
2. Critical care patients where routine sleep assessments are not feasible.
3. Children whose caregivers do not consent or are unable to complete the questionnaire.

3.4. Sample Size

Based on published literature, sleep disorders affect approximately 25% of school-aged children. This estimate draws from several key studies, including research by Bharti et al. (11) who reported a prevalence of 23.7% in a paediatric population. Among Indian children, the prevalence of individual sleep disorders was 39.4% in another recent study from Chennai(12)

For this prevalence study the required sample size was calculated using the following formula: $n = Z^2_{(1-\alpha/2)} \times p(1-p) / d^2$

Parameters:

- $Z_{(1-\alpha/2)} = 1.96$ (for $\alpha = 5\%$)
- p = expected prevalence (0.4)
- d = precision (0.07)

Calculation: n = $(1.96)^2 \times 0.4(1-0.4) / (0.7)^2$ n = $3.8416 \times 0.4 \times 0.6 / 0.049$ n = 188.2 rounded off to 189

The minimum required sample size is 189 children. Adding a 5% buffer to account for potential non-response or incomplete data: Final recommended sample size = 200

3.5. Sampling Technique

Consecutive sampling was used. All eligible children who met the inclusion criteria and whose caregivers provided consent were enrolled until the desired sample size was reached. This approach minimized selection bias and allowed a diverse range of clinical presentations to be included.

3.6. Data Collection Procedure

Consent and Assent: Written informed consent was obtained from the primary caregiver. Where feasible, assent from the child was sought following institutional guidelines.

Questionnaire Administration

A structured "sleep disorders in Children (5–12 years) Questionnaire" was administered by trained research personnel. The questionnaire was based on the "Guidelines for Normal Sleep and Physical Activity" by the Indian Academy of Paediatrics (IAP).(13)

The questionnaire explored bedtime routines, nighttime awakenings, parasomnia-like behaviours, daytime sleepiness, and related lifestyle factors.

4. Data Analysis

All collected data were cleaned and analysed using SPSS (version 25). Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize demographic variables and major outcomes related to sleep. Bivariate analyses (e.g., Chi-square tests for categorical variables, t-tests for continuous variables) were conducted to explore associations between sleep disturbances and potential risk factors such as family history, bedtime habits, screen time, or sugar intake. A significance level of $p < 0.05$ was adopted for hypothesis testing.

5. Ethical Considerations

Ethical Approval: This protocol was submitted to the Institutional Ethics Committee (IEC) or an equivalent body for review and approval.

Informed Consent: Caregivers were fully informed regarding the study's purpose, procedures, and the voluntary nature of participation.

Confidentiality: All participant information was coded, and only de-identified data were used for analysis and reporting. Data access was restricted to authorized research personnel to maintain privacy.

Potential Benefits and Risks: This study involves minimal risk, as it requires only a questionnaire-based assessment. Early identification of sleep issues may lead to improved management strategies within the paediatric ward.

RESULTS AND OBSERVATIONS

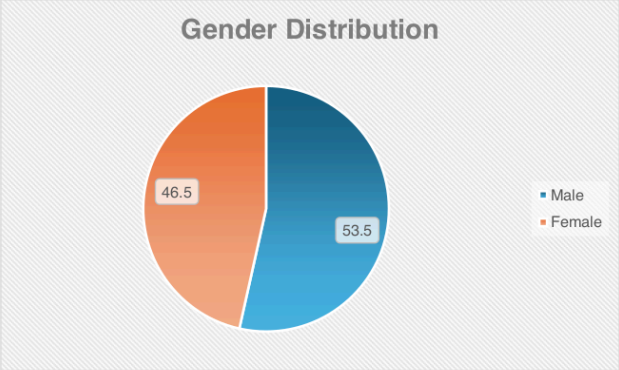
Table No 1: Prevalence of Sleep Disorder

Prevalence	Number	%
Child with Sleep Disorder	68	34
No Sleep Disorder	132	66

The study revealed a 34% prevalence of sleep disorders among hospitalized children aged 5–12 years (68 out of 200), while 66% (132 children) exhibited no sleep disturbances.

Table No.2: Gender Distribution among Study Participants

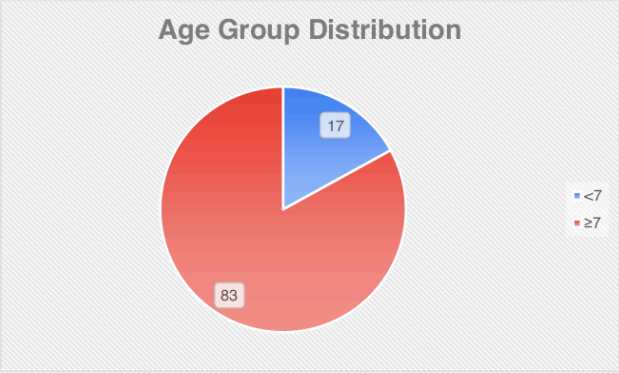
Gender	Number	%
Male	107	53.5
Female	93	46.5
Total	200	100



The gender distribution of the study population showed a slight male predominance, with 53.5% (107) male and 46.5% (93) are female.

Table No.3: Age group Distribution among Study Participants

Age group	Number	%
<7	34	17
≥7	166	83
Mean±SD	9.3±2.2	



The majority of the study population (83%) comprised children aged ≥7 years (166 out of 200), while 17% (34 children) were younger than 7 years. The mean age of the participants was 9.3 ± 2.2 years.

Table No.4: Sociodemographic Characteristics and Family History of Sleep Disorders

Residential area	Number	%
Urban	126	63
Rural	74	37
Education Level		
No formal Education	19	9.5
Primary	53	26.5
Secondary	29	14.5
Graduation and Above	99	49.5
Family History		
Yes	12	6
No	174	87
Not Sure	14	7

The study population had a higher proportion of children from urban areas (63%) compared to rural areas (37%). Regarding parental education, nearly half (49.5%) had completed graduation or higher, while 26.5% had primary education, 14.5% had secondary education, and 9.5% had no formal education. Family history of sleep disorders was reported in only 6% of cases, whereas 87% had no such history, and 7% were uncertain.

Table No.5: Child Sleep Patterns: Duration, Routine, and Disturbances

Child Sleep Routine		Number	%
Usual Bedtime	8:00–9:00 PM	9	4.5
	9:00–10:00 PM	79	39.5
	After 10:00 PM	111	55.5
Total Sleep hours	less than 7	5	2.5
	7–8 hours	36	18
	8–9 hours	93	46.5
	9–11 hours	66	33
Difficulty Falling Asleep		77	38.5
Child Wake up at multiple time		69	34.5
Consistent Bed time Routine		176	88
Child experiences disturbances		50	25
Child Consume sugary food		37	18.5
Child takes nap during day		64	32

The majority of children (55.5%) had a bedtime after **10:00 PM**, while 39.5% slept between **9:00–10:00 PM**, and only 4.5% went to bed before **9:00 PM**. Regarding total sleep duration, **46.5%** slept for **8–9 hours**, while **33%** had **9–11 hours** of sleep. However, **38.5%** reported difficulty falling asleep, and **34.5%** experienced frequent nighttime awakenings. Despite **88%** maintaining a consistent bedtime routine, **25%** experienced sleep disturbances. Consumption of sugary foods was observed in **18.5%** of children, and **32%** took daytime naps, potentially influencing their nighttime sleep.

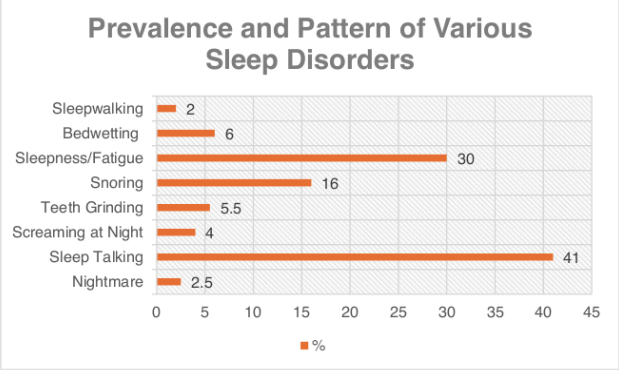
Table No.6: Sleep-Associated Factors and Functional Implications

	Number	%
Parents Presence	65	32.5
TV/Mobile Device	96	48
Specific Toy	40	20
Resist going to Bed	72	36
Repeated Attention	68	34
Irritability/Mood Swings	77	38.5
Difficulty in concentrating	60	30
Poor Academic Performance	28	14
Missing School	40	20

Among the studied children, 48% used TV or mobile devices before sleep, while 32.5% had parental presence as a sleep-associated factor. Resistance to going to bed (36%) and repeated attention-seeking (34%) were commonly observed behaviours. Symptoms associated with sleep disorders included irritability/mood swings (38.5%) and difficulty concentrating (30%). Additionally, 14% had poor academic performance, while 20% had school absenteeism.

Table No.7: Prevalence and Pattern of Various Sleep Disorders.

Sleep Disorder	Number	%
Nightmare	5	2.5
Sleep Talking	82	41
Screaming at Night	8	4
Teeth Grinding	11	5.5
Snoring	32	16
Sleepiness/Fatigue	60	30
Bedwetting	12	6
Sleepwalking	4	2



Among the various sleep disorders observed in children, sleep talking was the most prevalent, affecting 41% of the study population. Sleepiness and fatigue were reported in 30% of cases, followed by snoring (16%) and bedwetting (6%). Other sleep disturbances included teeth grinding (5.5%), screaming at night (4%), nightmares (2.5%), and sleepwalking (2%).

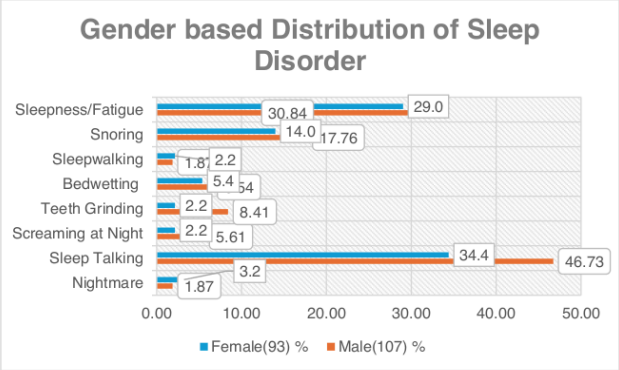
Table No.8: Parental Perspectives on Children's Sleep Patterns, Physical Activity, and Screen Time

Parents Questionnaire		Number	%
Physical Activity	Less than 1 Hour	32	16
	1-2hours	133	66.5
	More than 2 Hours	35	17.5
Screen Time	Less than 1 Hour	34	17
	1-2hours	116	58
	More then 2 Hours	50	25
>1-2hours Stretching		106	53
Parents concern with child's sleep pattern		73	36.5
Parents consulted to specific doctors		7	3.5
Parents Perception that Child's Sleep Quality is poor		50	25

Parental responses indicated that the majority of children (66.5%) engaged in 1–2 hours of physical activity daily, while 16% had less than an hour of activity, and 17.5% exceeded 2 hours. Regarding screen time, 58% had 1–2 hours of exposure, 25% had more than 2 hours, and 17% had less than an hour. Notably, 53% of children experienced stretching sleep durations beyond 1–2 hours. Parental concerns about their child's sleep patterns were reported in 36.5% of cases, while only 3.5% consulted a doctor for sleep-related issues. Additionally, 25% of parents perceived their child's sleep quality as poor.

Table No.9: Gender based Distribution of Sleep Disorders.

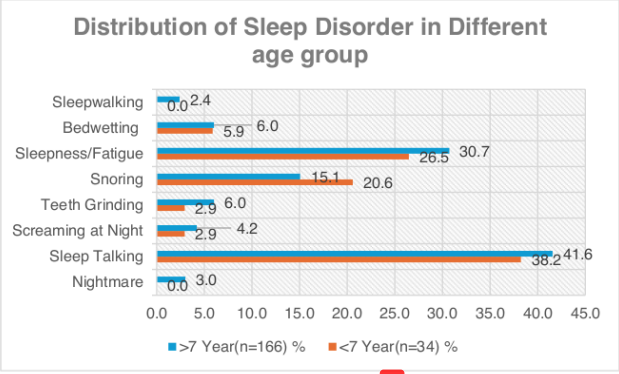
Sleep Disorder	Male(107)		Female(93)		p
	Number	%	Number	%	
Nightmare	2	1.87	3	3.2	0.52
Sleep Talking	50	46.73	32	34.4	0.078
Screaming at Night	6	5.61	2	2.2	0.22
Teeth Grinding	9	8.41	2	2.2	0.05
Bedwetting	7	6.54	5	5.4	0.76
Sleepwalking	2	1.87	2	2.2	0.84
Snoring	19	17.76	13	14.0	0.47
Sleepiness/Fatigue	33	30.84	27	29.0	0.78



The Table showed variations in prevalence between males and females. Sleep talking was more common in males (46.73%) compared to females (34.4%), with a p-value of 0.078. Screaming at night was observed in 5.61% of males and 2.2% of females (p = 0.22). Teeth grinding was significantly more frequent in males (8.41%) than in females (2.2%), with a p-value of 0.05, indicating a notable gender difference. Bedwetting was reported in 6.54% of males and 5.4% of females (p = 0.76), while sleepwalking was almost equally prevalent in both genders (1.87% in males and 2.2% in females, p = 0.84). Snoring was observed in 17.76% of males and 14% of females (p = 0.47). Sleepiness or fatigue affected 30.84% of males and 29% of females (p = 0.78). While some sleep disorders, such as teeth grinding, were notably more prevalent in males, most conditions did not show statistically significant gender-based differences.

Table No. 10: Distribution of Sleep Disorder in Different age group

Sleep Disorder	<7 Year(n=34)		≥7 Year(n=166)		p
	Number	%	Number	%	
Nightmare	0	0.0	5	3.0	0.31
Sleep Talking	13	38.2	69	41.6	0.71
Screaming at Night	1	2.9	7	4.2	0.72
Teeth Grinding	1	2.9	10	6.0	0.47
Snoring	7	20.6	25	15.1	0.43
Sleepiness/Fatigue	9	26.5	51	30.7	0.72
Bedwetting	2	5.9	10	6.0	0.98
Sleepwalking	0	0.0	4	2.4	0.37



The prevalence of sleep disorders was analyzed in children younger than 7 years (n=34) and those aged 7 years or older (n=166). Nightmare occurrences were absent in children under 7 years but were reported in 3.0% of older children (p = 0.31). Sleep talking was observed in 38.2% of younger children and 41.6% of older children (p = 0.71). Screaming at night occurred in 2.9% of younger children and 4.2% of those aged 7 or older (p = 0.72). Teeth grinding was reported in 2.9% of children under 7 and 6.0% of older children (p = 0.47). Snoring was more frequent in younger children (20.6%) compared to 15.1% in older children (p = 0.43). Sleepiness or fatigue was reported in 26.5% of younger children and 30.7% of older children (p = 0.72). Bedwetting was noted in 5.9% of children under 7 and 6.0% of those aged 7 or older (p = 0.98). Sleepwalking was absent in younger children but was observed in 2.4% of older children (p = 0.37). Overall, none of the differences between the age groups were statistically significant.

DISCUSSION

Prevalence of Sleep Disorder

In this study, 34% of hospitalized children aged 5–12 years had sleep disorders, closely matching Raju et al. (14), (32.25%) and moderately lower than Malagi et al. (12), (39.35%). These rates exceed general population estimates (20–28%), as hospitalized children often experience comorbidities or stressors that worsen sleep disturbances. Similar global data from Owens et al. and Galland et al. underscore the heightened vulnerability in clinical settings and the importance of routine sleep screening in at-risk paediatric populations.

Gender Distribution

Males comprised 53.5% of participants, closely mirroring other paediatric sleep studies (e.g., Alfakeh et al., (15) Gupta et al. (16)). The minimal disparity (about 53% males vs. 47% females) aligns with a meta-analysis by Galland et al., (17) suggesting sex differences in childhood sleep disorders are negligible. Minor variations in male predominance likely reflect methodological or cultural factors. Collectively, the near-balanced distribution reinforces that sleep disorders are not strongly sex-specific in prepubertal children

Age Distribution

Participants ranged from 5 to 12 years (mean: 9.3 ± 2.2 years), with 83% aged ≥7 years. This focus on school-aged children aligns with Malagi et al. (12) but contrasts with studies (e.g., Alfakeh et al., (15) Kim et al. (18)) that included broader age spans. The older skew here may reflect the tertiary care context, where conditions such as asthma, epilepsy, and behavioural disorders frequently lead to hospitalization in middle childhood. These findings highlight varying age distributions across sleep research and underscore the importance of developmental factors in paediatric sleep issues.

Prevalence of Specific Sleep Disturbances

Sleep Talking (41%) emerged as the most common disturbance, higher than Gupta et al. (16), (20.9%) and Liu et al. (19) (16.5%) but comparable to Malagi et al. (12) (34.99%). **Daytime Sleepiness/Fatigue** (30%) aligned with Gupta et al. (16), (25.5%) yet exceeded Liu et al. (19), (4.25%), highlighting potential methodological differences in how symptoms are reported.

Snoring (16%) fell between Gupta et al. (16) (11.4%) and Kim et al. (18) (31.6%). **Bruxism** (5.5%) was notably lower than in other studies (e.g., Malagi et al. (12) 17.12%), possibly due to underdiagnosis in acute care. **Nightmares** (2.5%) and **Night Terrors** (4%) were less frequent compared to Malagi et al. (12) or Liu et al., (19) perhaps reflecting higher age or stricter criteria. **Nocturnal Enuresis** (6%) was also lower than Malagi et al. (12) (30.95%), likely due to an older cohort, as enuresis commonly declines with age. **Sleepwalking** (2%) matched Gupta et al. (15) (3.2%) but diverged from Liu et al. (19) (8.5%), underscoring differences in population or parental awareness.

Gender-Specific Prevalence of Sleep Disorders

Few disturbances showed significant sex variation. Sleep talking and snoring were slightly higher in males, consistent with some data (Kim et al. (18)) but often not reaching statistical significance. **Bruxism** demonstrated a significant male predilection in this study (8.4% vs. 2.2%), contrasting with others (Gupta et al. (16)). In contrast, **nocturnal enuresis**, **nightmares**, and **night terrors** showed no marked sex difference, mirroring findings from Kim et al. (18) and Gupta et al., (16) Overall, minor fluctuations in gender-specific prevalence reflect varying methodologies, cultural norms, and underlying comorbidities.

Age-Specific Prevalence of Sleep Disorders

Snoring appeared slightly higher in younger children (20.6% in <7 years vs. 15.1% in ≥7 years), aligning with the notion that adeno tonsillar hypertrophy is more common in early childhood. Parasomnias (e.g., nightmares, night terrors) were generally low in the present cohort and did not vary sharply by age—possibly due to fewer preschoolers. **Bruxism** (2.9% in <7 years vs. 6.0% in ≥7 years) rose somewhat in older children, echoing other studies that note increased stress-related behaviours in school-aged populations. (20)

Daytime Sleepiness/Fatigue was common across both age groups, suggesting that hospitalization and illness can impair sleep quality at any developmental stage. **Nocturnal Enuresis** remained similar across ages (about 6%), though broader research often shows a gradual decline with maturation. These observations highlight distinct developmental trajectories for certain disorders—such as snoring or parasomnias—and support the need for age-tailored sleep assessments in paediatric care.

Limitations and Future Prospects

Although this study provides valuable insights, it has several limitations. Reliance on parent-reported data may introduce recall bias, and the use of subjective screening tools could miss subclinical sleep disturbances. Furthermore, the hospital-based sample restricts generalizability to community populations, and the cross-sectional design precludes establishing causality.

Moving forward, longitudinal research is recommended to clarify how paediatric sleep disorders evolve over time and how they impact long-term physical and mental health. Studies evaluating targeted interventions—such as behavioural therapies for stress-related sleep issues or surgical approaches for snoring—may offer more effective strategies to manage and prevent sleep disturbances in children.

CONCLUSION

This study highlights a significant prevalence of sleep disorders among children aged 5–12 years admitted to a tertiary health centre, with sleep talking, daytime sleepiness, and snoring being the most common disturbances. The findings reveal strong associations between sleep issues and factors such as irregular bedtime routines, family history, and sugar intake, emphasizing the multifactorial nature of these disorders. Sleep disturbances were also found to negatively impact daytime functioning, including academic performance and behaviour. These results underscore the importance of routine screening and early intervention in clinical settings to address modifiable risk factors and improve sleep health. Future research should focus on longitudinal studies to better understand the long-term effects of sleep disorders and the effectiveness of targeted interventions in paediatric populations.

BIBLIOGRAPHY

1. Mindell JA, Owens JA. A clinical guide to paediatric sleep: diagnosis and management of sleep problems. 3rd ed. Philadelphia: Lippincott Williams & Wilkins; 2015.
2. Sadeh A, Gruber R, Raviv A. The effects of sleep restriction on adolescents' emotional regulation and cognitive function. J Child Psychol Psychiatry. 2007;48(7): 683–92.
3. Cappuccio FP, Cooper D, D'Elia L, Strazzullo P, Miller MA. Sleep duration predicts cardiovascular outcomes: a systematic review and meta-analysis of prospective studies. Eur Heart J. 2011;32(12):1484–92.
4. Galland BC, Spruyt K, Dawes P, McDowall PS. Sleep disordered breathing and academic performance: a meta-analysis. Pediatrics. 2022;149(2):e2021053844.
5. Owens JA, Mindell JA. Hospitalization-related stress and sleep disruption in children. J Paediatr Child Health. 2020;56(3):325–30.
6. Hale L, Guan S. Screen time and sleep among school-aged children and adolescents: a systematic literature review. Sleep Med Rev. 2015;21:50–8.
7. Touchette E, Petit D, Séguin JR, Boivin M, Tremblay RE, Montplaisir JY. Associations between sleep duration patterns and behavioral/cognitive functioning at school entry. Sleep. 2007;30(9):1213–9.
8. Gruber R. School-based sleep education programs: a potential avenue for public health promotion? J Clin Sleep Med. 2017;13(4):499–501.
9. Meltzer LJ. Brief screening for paediatric sleep problems in clinical practice. J Clin Sleep Med. 2013;9(11):1143–50.
10. Kotagal S. The parasomnias of childhood. Semin Pediatr Neurol. 2015;22(2):86–92.
11. Bharti B, Malhi P, Kashyap S. Patterns and problems of sleep in school going children. Indian Pediatr. 2006 Jan;43(1):35-8
12. Malagi N, Raja Muthu Raja K. Prevalence and pattern of sleep disorders in childhood. International Journal of Contemporary Pediatrics [Internet] 2023;10:881–6. Available from: https://www.ijpediatrics.com/index.php/ijcp/article/download/5445/336
13. Jayakar A, Panicker JC, Gaur A, Naregal A, Kiritkar S. Guidelines for Normal Sleep and Physical Activity. Indian Academy of Pediatrics 2021
14. Arunkumar Raju, Bharanidharan S. Clinical profile of sleep disorders in children. Int J Acad Med Pharm. 2024;6(1):1234-8.
15. Alfakeh S, Mandili RL, Aljabri RN, et al. Prevalence and correlates of sleep disorders among paediatric inpatients in a tertiary paediatric hospital. *Cureus*. 2023 Feb 11;15(2):e34871
16. Gupta R, Sharma P, Mehta M. Paediatric sleep disturbances in India: a hospital-based analysis. Indian J Pediatr. 2020;87(6):452–458.

17. Galland BC, Taylor BJ, Elder DE. Methodological challenges in paediatric sleep research: a systematic review. *Sleep Med Rev*. 2022;61:101–115.
18. Kim DS, Lee JH, Choi SJ. Prevalence of sleep disorders in Korean children. J Korean Med Sci. 2019;34(45):e298 .
19. Liu X, Liu L, Owens JA. Sleep patterns and sleep disturbances in school-aged children. Sleep Med. 2021;85:45–53.
20. American Academy of Sleep Medicine. Clinical guidelines for paediatric sleep disorder screening. J Clin Sleep Med. 2021;17(3):567–574.
21. World Health Organization. Guidelines on promoting healthy sleep in children and adolescents. Geneva: WHO; 2023 [cited 2024 May 15]. Available from: https://www.who.int/publications/i/item/9789240074327

Annexure : Parent's Questionnaire

Section 1: Demographic and Background Information

1. **Age of the child:**

   5–6 years 7–8 years 9–10 years 11–12 years

2. **Gender:**

   - Male Female Other/prefer not to say *(optional, based on your context)*

3. **Place of residence:**

   - Urban Rural

4. **Parent/guardian's education level:**

   - No formal education Primary Secondary Graduate and above

5. **Family history of sleep disorders (e.g., insomnia, sleep apnea) in first-degree relatives (parents or siblings)?**

   - Yes No Not sure

Section 2: Sleep Patterns and Hygiene

Bedtime and Duration

6. **What is the usual bedtime for your child?**

   - Before 8 PM 8:00–9:00 PM 9:00–10:00 PM After 10:00 PM

7. **On most nights, how many total hours does your child sleep?**
    - Less than 7 hours 7–8 hours 8–9 hours 9–11 hours

Sleep Initiation and Maintenance- 8.In the past month, how often has your child had difficulty falling asleep?

- Never Rarely (1–2 times in 4 weeks) Sometimes (1–2 times a week)
- Often (3–5 times a week) Always (nearly every night)

9. **In the past month, how often has your child woken up multiple times at night?**
    - Never Rarely Sometimes Often Always

Pre-Bedtime Routine

10. **Which activities does your child typically engage in during the hour before bedtime?**

- Watching TV/using devices Reading or storytelling
- Playing (active play) Other (please specify): _____

11. **How consistent has your child's bedtime routine been in the past month?**

- Never consistent Rarely consistent Sometimes consistent
- Often consistent Always consistent

12. **How often does your child experience disturbances like noise or light in the sleeping environment?**

- Never Rarely Sometimes Often Always

13. **How often does your child consume caffeinated or sugary drinks within 2 hours before bedtime?**

- Never Rarely Sometimes Often Always

Napping and Morning Feel

14. **Does your child take naps during the day?**

- No → *Skip to Q15* Yes → *If yes, how many hours per day on average?*

15. **In the past month, how often does your child wake up feeling refreshed?**

- Never Rarely Sometimes Often

Section 3: Behavioral and Physical Sleep Problems

16. **In the past month, how often has your child shown the following during sleep or at bedtime?**
    (Mark one frequency per item)
Symptom	Never	Rarely	Sometimes	Often	Always
a. Nightmares						b. Sleepwalking						c. Sleep talking						d. Screaming at night						e. Teeth grinding						f. Bedwetting					

17. **In the past month, how often does your child rely on the following to fall asleep?**
    (Select a frequency for each that applies)
Sleep Association	Never	Rarely	Sometimes	Often	Always
a. Parent's presence						b. TV/mobile device						c. Specific objects (toy etc.)					

18. **In the past month, how often does your child resist going to bed (e.g., protesting, stalling)?**

- Never Rarely Sometimes Often Always

19. **In the past month, how often does your child ask for repeated attention (e.g., extra stories, drinks) before falling asleep?**

- Never Rarely Sometimes Often Always

20. **In the past month, how often have you noticed your child snoring?**

- Never Rarely Sometimes Often Always

21. **In the past month, how often has your child complained of leg discomfort or restlessness at bedtime?**

- Never Rarely Sometimes Often Always

Section 4: Impact of Sleep Problems

22. **In the past month, how often has your child shown the following daytime symptoms?**
Daytime Symptom	Never	Rarely	Sometimes	Often	Always
a. Sleepiness or fatigue						b. Irritability or mood swings						c. Difficulty concentrating						d. Poor academic performance					

23. **Has your child's sleep issues impacted their daily functioning or behavior in a noticeable way (e.g., missing school, conflicts with peers)?**

- Never Rarely Sometimes Often Always

- **Section 5: Physical Activity and Sedentary Behavior**

24. **How many hours per day does your child engage in physical activity (moderate to vigorous)?**

- Less than 1 hour 1–2 hours More than 2 hours

25. **How much time does your child spend on screen-based entertainment daily (TV, phone, gaming, etc.)?**

- Less than 1 hour 1–2 hours More than 2 hours

26. **Does your child participate in structured physical activities (e.g., sports, dance, martial arts)?**

- No Yes *(please specify type/frequency if you wish): _____)*

27. **How often does your child spend long periods (>1–2 hours at a stretch) being sedentary (sitting or lying down, excluding sleep)?**

- Never Rarely Sometimes Often Always

Section 6: Parental Concerns and Observations

28. **Do you have concerns about your child's sleep patterns?**

- Never Rarely Sometimes Often Always

29. **Has your child ever consulted a doctor specifically for sleep-related problems?**

- Yes No

30. **Overall, how would you rate your child's current sleep quality?**

    - Excellent Good Fair Poor

Scoring Suggestions (Optional)

1. **Frequency-Based Items**:
    - *Never* = 0 points *Rarely* = 1 point *Sometimes* = 2 points *Often* = 3 points
    - *Always* = 4 points
2. **Positive vs. Negative Items**: -For questions indicating a *potential problem* (e.g., difficulty falling asleep), higher points = more severe/ more frequent problem.
    - For *healthy habits* (e.g., waking up refreshed, consistent bedtime routine), you can either reverse-score them (so that *Always* = 0 points, *Never* = 4 points) or track them separately as protective factors.

3. **Total Score**:-You could sum all relevant problem-related items (difficulty initiating sleep, frequent awakenings, nightmares, snoring, etc.). Higher scores = greater risk or severity.
    - Conversely, you can sum the “positive” items (consistent routine, feeling refreshed) to gauge overall sleep hygiene.
4. **Cutoffs**:
    - If you plan to use cutoffs (e.g., mild vs. moderate vs. severe sleep problems), conduct a small pilot or refer to existing paediatricsleep questionnaires to determine meaningful thresholds.

Title of the Study: “Prevalence and Correlates of Sleep Disorders in Children Aged 5–12 Years Admitted to a Tertiary Health Centre”

ORIGINALITY REPORT

9%	7%	5%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	onlinelibrary.wiley.com Internet Source	1%
2	Submitted to Roy C. Ketcham High School Student Paper	1%
3	Submitted to University of Bucharest Student Paper	1%
4	www.coursehero.com Internet Source	<1%
5	www.researchgate.net Internet Source	<1%
6	www.mdpi.com Internet Source	<1%
7	Submitted to Kean University Student Paper	<1%
8	Maha K ABOU-KHADRA. "Sleep patterns and sleep problems among Egyptian school children living in urban, suburban, and rural areas", Sleep and Biological Rhythms, 04/2009 Publication	<1%
9	www.ncbi.nlm.nih.gov Internet Source	<1%
10	Manisha Gurumurthy, Joseph Schwab, Sri Ram Pentakota, Rahul Ukey, Maria Gennaro, Pauline Thomas, Stephen Friedman.	<1%

	"Validation of the Diabetomics CovAB SARS-CoV-2 antibody test in children: comparison with serology", Microbiology Spectrum, 2024 Publication	
11	zomasleep.com Internet Source	<1 %
12	"Sleep Disorders in Children", Springer Science and Business Media LLC, 2017 Publication	<1 %
13	Asmaa M. Abumuamar, Sharon A. Chung, Gili Kadmon, Colin M. Shapiro. "A comparison of two screening tools for paediatric obstructive sleep apnea", Journal of Sleep Research, 2017 Publication	<1 %
14	www.researchsquare.com Internet Source	<1 %
15	era.library.ualberta.ca Internet Source	<1 %
16	ijer.ut.ac.ir Internet Source	<1 %
17	www.scribd.com Internet Source	<1 %
18	dergipark.org.tr Internet Source	<1 %
19	Anil Kumar Gupta, Hari P. Dhungana, Bishnu Prasad Lamsal. "Political parties' accountability to the public in Nepal: What factors affect it?", Heliyon, 2025 Publication	<1 %
20	Submitted to University of Oxford Student Paper	<1 %
21	ir.jkuat.ac.ke Internet Source	<1 %

22	"Energy Transition, Climate Action and Sustainable Agriculture", Springer Science and Business Media LLC, 2025 Publication	<1 %
23	"Pediatric Obesity", Springer Science and Business Media LLC, 2018 Publication	<1 %
24	atpsnet.org Internet Source	<1 %
25	journals.sbmu.ac.ir Internet Source	<1 %
26	umpir.ump.edu.my Internet Source	<1 %
27	www.science.gov Internet Source	<1 %
28	www.scirp.org Internet Source	<1 %
29	Álvaro J. Ruiz, Martín Alonso Rondón Sepúlveda, Olga Patricia Panqueva Centanaro, Alan Waich et al. "Sleep problems in low income, urban pediatric populations living at different altitudes in Colombia", Sleep Medicine, 2022 Publication	<1 %
30	link.springer.com Internet Source	<1 %

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		