

CLINICAL PROFILE OF SLEEP DISORDERS IN CHILDREN

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Abstract

Background: Sleep is essential for physical and mental wellbeing of children. Sleep disorders in children are not well recognized. Sleep related breathing disorders can cause obstructive sleep apnea syndrome and cardiovascular complications. **Materials and Methods:** This is a cross-sectional analytical study done on 400 children attending paediatric OPD for minor illnesses between October and December 2023. Parents were asked to respond to questions in Pediatric Sleep Questionnaire. This has 70 questions to be answered as “yes”, “no” or “don’t know”. Demographic details of children like age, sex, regular bedtime was collected using a proforma. Parents were enquired about hours of screen exposure in children before going to bed. BMI of children were calculated. The prevalence of sleep disorders was calculated and association of each type of sleep disorder with sex, BMI and screen exposure time > 1 hour was analysed. **Result:** The prevalence of sleep disorders in study population was 32.25%. 129 out of 400 children had sleep disorder. Parasomnias were the most common type. 15% children had sleep related breathing disorder. No association was found between sex and any type of sleep disorder. 45 (11.25%) children were overweight and 19 (4.75%) children were obese. There was a strong association between high BMI and sleep related breathing disorder, insomnia and excessive daytime sleepiness. 39% children had screen exposure of > 1 hour before going to bed for at least 5 days a week. Excessive screen time was significantly associated with insomnia, excessive daytime sleepiness, nightmare and bruxism. **Conclusion:** The prevalence of sleep disorders in children were high. Parasomnias were the common type of sleep disorder. High BMI and excessive screen exposure are risk factors for sleep disorders.

INTRODUCTION

Sleep is an essential component of biological cycle, important for maintaining physical and mental wellbeing. Sleep in children varies by age with maximum being at infancy. Sleep disorders in children are not well recognized by paediatricians. Sleep disorders in children are broadly classified as insomnias, parasomnias, sleep related breathing disorder, sleep related movement disorders, narcolepsy and delayed sleep-wake phase disorders.^[1]

Untreated sleep related breathing disorder can lead to obstructive sleep apnea and pulmonary hypertension.^[2] Other sleep disorders can lead to emotional and behavioral problems in children. These disorders can affect the sleep of parents and siblings leading to problems in family.

Sleep related breathing disorder (SRBD) had been reported in 4.8% to 15% of children. Insomnia had been reported in 1% to 17.3% children.^[3-10] Parasomnias had been reported in 20.9% of children.

The screen exposure of children had been exponentially rising for past few years. This may also have an impact on sleep in children.

Hence this study was planned to identify the prevalence of sleep disorders in children and its association with sex, Body mass index (BMI), and screen exposure prior to bedtime.

MATERIALS AND METHODS

This was a cross-sectional analytical study done at Annapoorana Medical College & Hospitals, a tertiary care teaching hospital in Salem, Tamilnadu between October 2023 and December 2023. The institutional Ethics Committee approval was taken. 400 children between 6 and 12 years of age attending paediatric OPD with either one or both parents were included in the study. Children on drugs causing sedation like anticonvulsants, antihistamines, children with developmental delay, children with craniofacial abnormalities and those with chronic illness were excluded.

After taking informed consent, parents were asked to answer questions in Pediatric Sleep Questionnaire (PSQ) designed by Chervin et al. [3] This is a parent completed questionnaire containing 70 questions with response options of “yes”, “no” or “don’t know”.

SRBD scale has 22 questions. Score of 1 is assigned for “yes” and 0 for “no”. Total score was calculated by dividing total positives answers by total of yes and no answers. A score of 0.33 was considered as suggestive of SRBD.

The questions on feeling unrefreshed in the morning, being hard to wake up in the morning, problem with daytime sleepiness, and sleepiness observed by a teacher were used to identify excessive daytime sleepiness. A positive response to any of the above questions was considered suggestive of excessive daytime sleepiness.

Insomnia was screened using the following 4 questions: difficulty in falling asleep at night, waking more than twice on average, trouble falling back to sleep and waking in morning feeling unrefreshed. Positive response of any 2 of above 4 questions was considered suggestive of Insomnia.

Children having positive response to all the following 3 questions were detected with Delayed sleep phase syndrome: Does your child have difficulty in falling asleep at night, does the time at which your child goes to bed change a lot day to day, does the time at which your child gets up from bed change a lot from day to day.

Others parasomnias like sleep walking, sleep talking and nightmares were detected using direct questions. A proforma containing demographic details of children were collected. Anthropometric measurements of children were taken and BMI calculated. The children were classified as normal, overweight and obese using 2015 IAP growth charts. The number of hours children viewing screen (TV, mobile, PC, Tab) before going to bed ≥ 5 days in a week was taken to assess impact of screen exposure on sleep. The children were grouped as children with

more than 1 hour of screen exposure and those with less than 1 hour of screen exposure.

The prevalence of individual sleep disorders was calculated from responses from PSQ. The association of each sleep disorder with sex, BMI and bedtime screen exposure was analyzed using Chi-square test. A $p \leq 0.05$ was considered as statistically significant.

RESULTS

400 children between age 6 and 12 years were studied. 212 (53%) were boys and 188 (47%) were girls.

129 children had sleep disorders screened using PSQ. The prevalence of sleep disorder in study population was 32.25%.

Almost all children had more than one type of sleep disorder screened by PSQ.

The frequency of each sleep disorder is shown in the Table 1. Parasomnias were more prevalent. 15% of children had SRBD.

The association between sex and sleep disorders is shown in Table 2. No association was found between sex and any type of sleep disorder.

336 (84%) children had normal body mass index. 45 (11.25%) children were overweight and 19 (4.75%) children were obese as per IAP 2015 BMI chart.

The association between BMI and each sleep disorder is shown in Table 3.

Overweight and obese children showed strong association with sleep related breathing disorder, excessive daytime sleepiness and insomnia. No association was found in other types of sleep disorders.

156 (39%) children were using screen devices more than 1 hour before going to bed at least 5 days a week. The association between screen exposure > 1 hour on at least 5 days a week and sleep disorders is shown in Table 4. A significant association was found between excessive screen time and insomnia, excessive daytime sleepiness, nightmare and bruxism.

Table 1: Frequency of sleep disorders

Sleep disorder	n	%
Sleep related breathing disorder	60	15
Insomnia	17	4.25
Excessive daytime sleepiness	66	16.5
Sleep talking	53	13.25
Nightmare	58	14.5
Bruxism	80	20
Restless leg syndrome	74	18.5
Night terror	34	8.5
Sleep walking	4	1

Table 2: Association between sex and each type of sleep disorder

Sleep disorder	Present (yes/no)	Boys n (%)	Girls n (%)	p value
Sleep related breathing disorder	Yes	35 (16.5)	25 (13.3)	0.36
	No	177 (83.5)	163 (86.7)	
Insomnia	Yes	6 (2.8)	11 (5.9)	0.13
	No	206 (97.2)	177 (94.1)	
Excessive daytime sleepiness	Yes	38 (17.9)	28 (14.9)	0.49
	No	174 (82.1)	160 (85.1)	
Sleep talking	Yes	31 (14.6)	22 (11.7)	0.43

	No	181 (85.4)	166 (88.3)	
Nightmare	Yes	36 (17)	22 (11.7)	0.17
	No	176 (83)	166 (88.3)	
Bruxism	Yes	45 (21.2)	35 (18.6)	0.59
	No	167 (78.8)	153 (81.4)	
Night terror	Yes	20 (9.4)	14 (7.4)	0.59
	No	192 (90.6)	174 (92.6)	
Restless leg syndrome	Yes	38 (18)	36 (19.1)	0.85
	No	174 (82)	152 (80.9)	

Table 3: Association between BMI and each type of sleep disorder

Sleep disorder	Present (yes/no)	Normal n (%)	Overweight n (%)	Obese n (%)	p value
Sleep related breathing disorder	Yes	44 (13%)	9 (20%)	7 (36.8%)	0.01
	No	292 (87%)	36 (80%)	12 (63.2%)	
Insomnia	Yes	11 (3.3%)	3 (6.7%)	3 (15.8%)	0.02
	No	325 (96.7%)	42 (93.3%)	16 (84.2%)	
Excessive daytime sleepiness	Yes	50 (14.9%)	9 (20%)	7 (36.8%)	0.03
	No	286 (85.1%)	36 (80%)	12 (63.2%)	
Sleep talking	Yes	50 (14.9%)	3 (6.7%)	1 (5.3%)	0.17
	No	286 (85.1%)	42 (93.3%)	18 (94.7%)	
Nightmare	Yes	51 (15.1%)	6 (13.3%)	1 (5.3%)	0.47
	No	285 (84.9%)	39 (86.7%)	18 (94.7%)	
Bruxism	Yes	62 (18.5%)	15 (33.3%)	3 (15.8%)	0.05
	No	274 (81.5%)	30 (66.7%)	16 (84.2%)	
Night terror	Yes	28 (8.3%)	5 (11.1%)	1 (5.3%)	0.71
	No	308 (91.7%)	40 (88.9%)	18 (94.7%)	
Restless leg syndrome	Yes	62 (18.5%)	11 (24.4%)	1 (5.3%)	0.19
	No	274 (81.5%)	34 (75.6%)	18 (94.7%)	

Table 4: Association between screen exposure > 1 hour and each type of sleep disorder

Sleep disorder	Present (yes/no)	Screen time < 1 hr n (%)	Screen time > 1 hr n (%)	p value
Sleep related breathing disorder	Yes	37 (15.2%)	23 (14.7%)	0.97
	No	207 (84.8%)	133 (85.3%)	
Insomnia	Yes	6 (2.5%)	11 (7.1%)	0.04
	No	238 (97.5%)	145 (92.9%)	
Excessive daytime sleepiness	Yes	32 (13.1%)	34 (21.8%)	0.03
	No	212 (86.9%)	122 (78.2%)	
Sleep talking	Yes	33 (13.5%)	20 (12.8%)	0.95
	No	211 (86.5%)	136 (87.2%)	
Nightmare	Yes	28 (11.5%)	30 (19.2%)	0.04
	No	216 (88.5%)	126 (80.8%)	
Bruxism	Yes	39 (16%)	41 (26.3%)	0.01
	No	205 (84%)	115 (73.7%)	
Night terror	Yes	34 (13.9%)	21 (13.4%)	0.98
	No	210 (86.1%)	135 (86.6%)	
Restless leg syndrome	Yes	46 (18.9%)	28 (17.9%)	0.92
	No	198 (81.1%)	128 (82.1%)	

DISCUSSION

The prevalence of sleep disorder in children in this study was 32.25%. Parasomnias were the most common type of sleep disorder.

Narasimhan et al studied Indian children with different questionnaire and prevalence was 34%.^[4] Sleep hyperhidrosis was the most prevalent one which correlates with nightmares and night terrors. In study by Ravi Gupta et al on 831 children between 8 – 13 years, identified parasomnias like sleep talking in 20.9%, sleep walking in 3.2% and night terrors in 8.4% of children.^[5] 38% of 1038 children studied by Archbold et al had parasomnias.^[6] Parasomnias are found to improve with age and do not cause any significant morbidity.

Sleep related breathing disorder was seen in 15% of children in this study. Insomnia was seen in 4.25% of children. Kim et al study on 901 children between 0 – 18 years age in South Korea using Pediatric Sleep

Questionnaire identified that 15.1% had sleep related breathing disorder and 13.2% had insomnia.^[7] In a Pediatric Sleep Questionnaire based study by Gabriele Di Carlo et al found that 7.87% of children from Italy and 13.5% of children from Spain between 2 – 16 years had sleep disordered breathing.^[8] Archbold et al study in United States found that 11% of children had sleep disordered breathing, 18% had insomnia. In a study on 2475 children by M K Sen et al identified 12.7% of children with snoring and 17.3% with insomnias.^[9] Sleep disordered breathing was seen in 4.8% of preschool and 5% of school children in a study by Ravikiran et al.^[10]

The prevalence of sleep related breathing disorder is similar to findings in various studies. However, the prevalence of insomnia is less in this study population.

There was no correlation between sex and any type of sleep disorders noted in this study. Similar absence of correlation between sex and any sleep

disorder was seen in study by Kim et al. However, in study by Archbold et al, boys had higher incidence of sleep walking and bruxism but no difference was noted for sleep terror and insomnia.

45 (11.25%) of children were overweight and 19 (4.75%) were obese. Insomnia, sleep related breathing disorder and excessive daytime sleepiness were positively associated with high BMI. There was no correlation with BMI and other types of sleep disorders.

Torres-Lopez et al found that increased BMI is a strong risk factor for SRBD.^[11] In a study by Bhatia et al found that total body fat mass and trunk fat mass as well as BMI correlated with total arousal index and desaturation index which are markers for SRBD.^[12]

Duraccio K M et al studied children between 2 -18 years and found that higher body mass index Z-score modestly predicted baseline insomnia severity and worse sleep hygiene in adolescents than children.^[13]

Higher BMI Z-score in children was associated with greater total sleep problems and daytime sleepiness.

The probable reasons postulated were excessive fat around neck causing obstruction of upper airway, increased chest and abdominal wall fat reducing lung compliance and reduced lung volume by high intra-abdominal pressures.^[14]

39% of children in this study population had a screen exposure time > 1 hour and this was significantly associated with presence of a sleep disorder. Increased screen time delays bedtime in children and can lead to sleep deprivation. Media content can cause psychological and emotional disturbances in children. It is also postulated that blue light emitted from digital screens can alter circadian rhythm.^[15]

There was an association between increased screen exposure and insomnia, excessive daytime sleepiness, nightmare and bruxism. These may be probably due to the delayed bedtime and emotional impact of media content consumed by children.

Sin-Chin Tan et al reviewed 99 studies and found that 87% of the studies showed at least one adverse sleep outcome with screen use.^[16] 43 out of 56 (77%) studies reported significant negative impacts on sleep outcomes with television watching.

Hisler et al studied various time duration of screen viewing among 9 – 10-year-old children and found that screen time > 2 hours is associated with decreased sleep duration, increased sleep onset latency, insomnia and excessive sleepiness.^[17]

In a study on Columbian children by Claudia Restrepo et al found that average screen time was 2.43 hours/day and it was significantly associated with sleep bruxism.^[18]

In a study by Kaur et al in preschool children in Chandigarh found an association with screen exposure of > 1 hour with sleep problems.^[19]

Data from various studies shows some form of sleep disorders and decreased sleep duration in children due to excessive screen exposure.

CONCLUSION

The study findings suggest that sleep disorders are more prevalent in children. Parasomnias are common type of sleep disorder. There is no association between sex and sleep disorders. High BMI and excessive screen exposure before going to bed are risk factors for sleep disorders.

This study has few limitations. PSQ is not a diagnostic tool for sleep disorders. Only the SRBD scale has been validated against polysomnography. The questions related to parasomnias are mostly by one question which may not be specific. But PSQ helps to screen for sleep disorders which can be useful for early intervention.

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