International Journal of Contemporary Pediatrics
Malagi NAN et al. Int J Contemp Pediatr. 2023 Jun;10(6):881-886
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: https://dx.doi.org/10.18203/2349-3291.ijcp20231494

Original Research Article

Prevalence and pattern of sleep disorders in childhood

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Received: 10 April 2023
Revised: 05 May 2023
Accepted: 09 May 2023

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ABSTRACT

Background: Sleep disorders are very common in the population of children, with prevalence rates ranging from 25-40%, and they are often persistent. The aetiology of sleep problems is very complicated and depend on many varied factors. Psychological factors concerning family life and general state of health have a significant impact on children.
Methods: A hospital based descriptive study was carried out among 1024 children visiting the paediatric outpatient departments of Madras medical college, Chennai and Al-Ameen medical college and hospital, Vijayapura over a period of 1 year from March 2022 to March 2023. An appropriate questionnaire was formulated that had to be filled by parents and those children with sleep problems interviewed and assessed using appropriate statistical methods.
Results: Out of 1164 questionnaires, 1024 (88.97%) were filled completely and returned. The 497 (48.54%) boys and 527 (51.46%) girls were included in this study. Of the 1024 children, 621 (60.64%) had no sleep related problems. The 403 (39.36%) had one or more sleep related problem, which included 211 (52.36%) boys and 192 (47.64%) girls. Male children were more commonly affected with sleep disorders and there is statistically significant difference at 5% level among males and females in having sleep disorders ($p<0.05$).
Conclusions: Most of the children studied had only 1 of sleep disorders of which males outnumbered females. Sleep disorders were predominantly found in the age group of 7-10 years among which most common sleep related disorder was nocturnal enuresis. The study also showed that sleep walking is usually associated with another sleep disorder.

Keywords: Somnambulism, Somniloquy, Nocturnal enuresis, Nightmare, Night terror, Bruxism, Sleep disorders, Parasomnia

INTRODUCTION

Sleep can be defined as a state of unconsciousness from which a person can be aroused by sensory or other stimuli.[1] It is the time during which the brain gets refreshed. Although sleep disturbance may be transitory and relatively benign, sleep disorders in general are characterized by great severity, degree and duration that significantly interfere with daily activities. They are often related to emotional and physical stress and experiences associated with specific phases of development. Sleep disorders appear to be very common in the population of children with prevalence rates ranging from 25-40% and are often found to be persistent.[2-4] The aetiology of sleep disorders is very complicated and it depends on various factors. Psychological factors concerning family life and general state of health are found to have significant impact on children. We know by clinical experience that various types of sleep disorders are more frequent in that group of children than in general population.[5] Prevalence of sleep disorders in general population of children has been estimated at approximately 5-16% for sleepwalking, 1-6.5% for sleep terrors, 5-18% for nocturnal enuresis, and 5-10% for sleep talking which can be compared to the results obtained in our study.[6-13]

Sleep disorders are divided into 3 major groups namely, dyssomnias, parasomnias and sleep disorders of organic origin.

Dyssomnias are disturbances in duration, type and pattern of sleep. Parasomnias can be defined as undesirable physical/experiential events that accompany sleep. These sleep disorders cannot be considered as abnormalities of the processes responsible for sleep and awake states per se, but are found to be certain undesirable phenomena which occur predominantly during sleep.[14]

Children generally grow out of the sleep problems when they become adolescents, which implicate the delayed CNS maturation in the etiopathology of sleep disorder. The present generation of children are exposed to increased academic pressures, high parental expectation, peer group competitions, changing food habits with increased consumption of stimulants like caffeine, altered sleep patterns like going to bed late and getting up late and exposure to violent and frightening events in the television serials which they watch before retiring to the bed. All these factors play a role in the etiopathology of sleep disorders in children. Actigraphy occupies a significant place as it can be useful as a more objective measure of sleep patterns. An actigraphy is a watch-like device worn on the wrist or ankle and measures sleep activity. Previous studies have shown that it can distinguish between sleep and awake states in children and the adolescents as well as was found to be the reliable.[15,16]

From the time the child is born his/her sleeping pattern is a matter of concern for the parents second only to the feeding patterns. As parents are becoming more health conscious, more and more parents are seeking professional help for sleep disturbances and disorders, which are either transitory manifestation during normal childhood development or may be due to specific sleep disorders or symptoms and signs of other mental and emotional childhood.

This study was undertaken with an objective to know the prevalence sleep disorders in Indian urban school children, their pattern and etiology as more number of children are brought by parents to the medical practitioners for various sleep related problems.

METHODS

A descriptive study was carried out at the Madras medical college, Chennai and Al-Ameen medical college and hospital in Vijayapura over a period of 1 year from March 2022 to March 2023. Based on the criteria for selection, patients who visited the department of paediatrics' outpatient clinic were chosen for the study. After obtaining the parents' informed consent and ethical clearance from the institutional ethical committee, children between the ages of 4 and 12 who were healthy and normal were included in the study.

The children excluded from the study were sensory handicaps like blindness and deafness, mental retardation, Cerebral palsy, any other chronic physical illness like epilepsy and those on long-term medication like tranquilizers and anticonvulsants.

A printed questionnaire in Tamil, Kannada, and English was given. The doubts were clarified before seeking the parent's written responses. The questionnaire was given to parents of 1164 children catering to middle and upper middle socioeconomic strata. Parents of 1024 (88.97%) children responded.

The data was evaluated and those children with sleep related problems were offered adequate intervention.

Statistical analysis

With 95% confidence level and margin of error of ±5%, a sample size of 1024 subjects were allowed to study. Categorical data was represented in the form of frequency and percentage. Association between variables were assessed with chi square test. P<0.05 was considered statistically significant. Data was analysed with IBM SPSS version 25 for windows.

RESULTS

Out of 1164 questionnaires, 1024 (88.97%) were filled completely and returned. 497 (48.54%) boys and 527 (51.46%) girls were included in this study. Of the 1024 children, 621 (60.64%) had no sleep related problems. 403 (39.36%) had one or more sleep related problem, which included 211 (52.36%) boys and 192 (47.64%) girls. Male children were more commonly affected with sleep disorders and there is statistically significant difference at 5% level among males and females in having sleep disorders (p<0.05) (Figure 1).

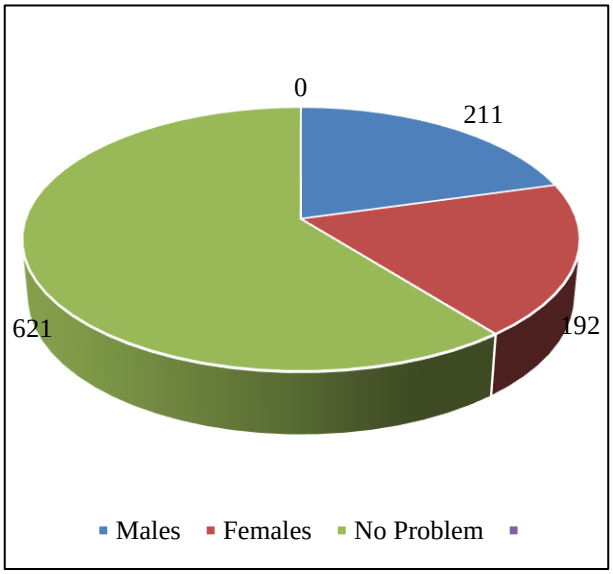

Figure 1: Distribution of sleep disorders in male and female.

Of these 1024 children 60.64% (621) had no sleep related problems. Boys (52.36%) were more commonly affected than girls (47.64%). Most (67.74%) of children had only one of the following sleep disorders-viz. somnambulism (Sleep walking), somniloquy (Sleep talking), nocturnal enuresis (Bed wetting), nightmare, night terror, bruxism (Teeth grinding), Sleep disorders, Parasomnia and others. The most common sleep related problem was nocturnal enuresis and was found equally in boys and girls, 51-49% respectively. The next most common single problem was sleep talking (21.25%). Sleep walking was never a singular problem. It was more commonly present with sleep talking (50%). The commonest component of a dual problem was again nocturnal enuresis and it was present with bruxism in 35.47% of the children with sleep disorders. When a child had got multiple sleep problems, night terror finds a predominant place in majority of the cases. Out of 29 children who had multiple sleep related problems, night terror and nightmare were found in 48% and 44.83% respectively. In males with multiple sleep problems night terror was frequently and equally present with bruxism and nocturnal enuresis (71.43%) whereas in females night terror was frequently present with sleep talking (100%).

Nocturnal enuresis tops the list followed by sleep talking and bruxism (Figure 2).

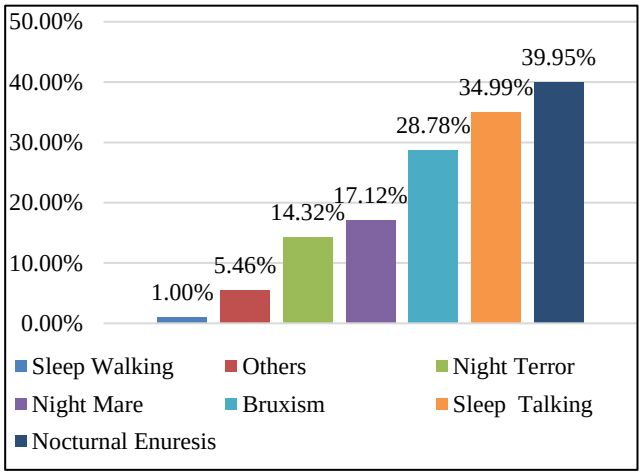

Figure 2: Prevalence of various sleep disorders observed.

Most of the children (67.75%) had a single sleep disorder. The most common single sleep related problem was nocturnal enuresis, followed by sleep talking. Percentage of sleep walking as a singular problem was almost negligible. The commonest component of a dual problem was nocturnal enuresis, which was more commonly associated with sleep talking (50%) and with bruxism (35.47%). When a child had multiple sleep related problems night terror found a predominant place in majority of cases.

Sleep talking was found to be common in the age group of 8 to 10 years and both males and females were equally affected. Of 403 cases with problems, 67.70% had single problem, 25.06% had dual problems and 7.2% had multiple (more than 2) problems. The difference was statistically significant ($p<0.05$). Males outnumber females in having sleep disorders (Table 1).

Table 1: Comparison of children presenting with single and multiple sleep disorder in both sexes.

No. of problems	Male	Female	Total	Percentage (%)
One	150	123	273	67.74
Two	52	49	101	25.06
More than two	9	20	29	7.20
Total	211	192	403	

There is statistically significant difference among males and females in having number of sleep problems ($p=0.048$).

Statistically significant difference ($p=0.048$) was found. Of 403 children with problems, those with single problem formed the bulk. There was a decline in incidence with increasing number of problems, viz., Single problem - 67.74%, Dual problem, -25.06% and multiple problems-7.2%.

There is a statistically significant difference between the age groups in having sleep disorder ($p=0.0047$). The sleep disorders are highly concentrated between the age groups 7 and 10 years (Figure 3).

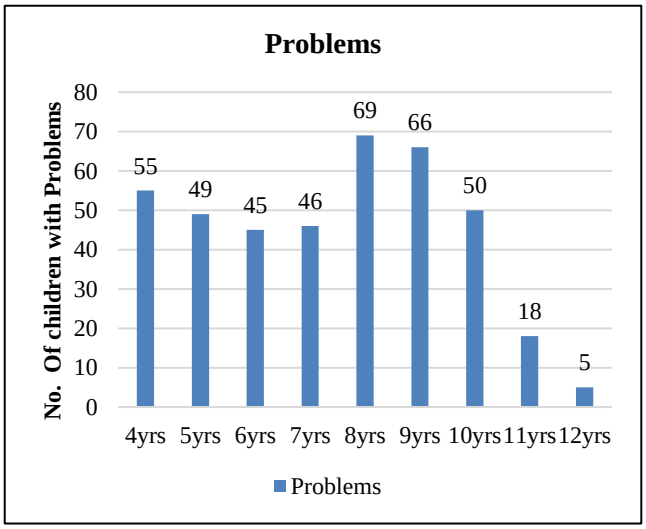

Figure 3: Distribution of various sleep disorders in different age groups.

Prevalence of nocturnal enuresis was most common among 4-6 years old and had decreasing trend with advancing age. Sleep disorders are highly concentrated in the age group of 7-10 years ($p<0.01$). Sleep talking was more common in the age group 8-10 years, males and females being equally affected.

DISCUSSION

Sleep disturbances are usually transitory and benign and are secondary to immaturity of central nervous system. Sleep disorders can be classified into: dyssomnias (Insomnia/ hypersomnia), parasomnias, restless leg syndrome, sleep disorders related to other mental disorders (like autism, ADHD) and sleep disorders due to general medical condition or substance abuse.

As this study was conducted in normal school going children the last two groups have been excluded. We did not come across any case of dyssomnias like hypersomnia, insomnia, and narcolepsy. According to the literature available in the age group of 8 to 10 years, in the study conducted by Owens et al 12% had trouble in falling asleep and 4% were troubled by waking at night.[3] The majority of studies on these issues have been conducted in the United States and other predominantly Caucasian countries. In these studies, the prevalence of these sleep problems range between 20% to 30%.[11-13] Insomnia in children seems to be more of a psychosocial problem related to a lack of limit setting and bedtime struggles, where the child wishes to be up and active till late hours of night. Fears of nightmares and insecurity too have been found to contribute the etiology of insomnia.

Though we have not come across any case in this category the tendency for the children to be awake till midnight is increasing, thanks to the various programs telecast through the cable TV, some of which are nightmarish in nature. This factor has to be taken into consideration when parents are counselled regarding sleep hygiene. The two other conditions viz. primary hypersomnia, narcolepsy are comparatively rare conditions and hence probably we have not come across these cases in our study.

In a study conducted by Mendell et al parasomnias like sleep walking and sleep terrors are more common in children than in adults. About 15% of children are estimated to have at-least one sleep walking episode and sleep terrors are reported in 1-3% of all children and are considered to be disorders of impaired arousal according to Bruni et al.[4,5] In our study sleepwalking was found in 0.1% and sleep terror in 14.39%. This stresses the need to educate the parents regarding the protective measures to be taken in addition to the counselling and reassurance.

Stein et al observed in their study that when the REM sleep disorder of nightmares is considered, in a sample of 900 school children aged 6-12 years, 22% reported it.[6] In our study 14.89% had nightmares. Nightmares are often related to specific sleep phases. Here parental counselling involves minimizing the child's exposure to potentially traumatic experiences like terrifying movies and T.V. programs or frightening bed time stories.

Enuresis, which was the commonest sleep related problem encountered in this study is the most distressing of the childhood sleep disorders for both children and parents.

The prevalence quoted in various western studies is around 10-15% in the age group of 3-12 years and about 3% at the age of 12 years. Determining whether the child has primary or secondary enuresis is critical to the effective management and majority of the children studied had primary enuresis, necessitating the use of physiological, psychological, behavioural and pharmacological measures.

Sleep disorders cause considerable parental anxiety to seek medical advice. The standard approach to the treatment of bedtime problems and night wakings includes appropriate sleep hygiene, as discussed above, including a set sleep schedule and institution of a consistent bedtime routine, and helping children learn to fall asleep independently.[14]

Restless leg syndrome in children has limited studies that suggest a prevalence of 2%. Since sensorimotor spinal cord circuits and motor areas of the brain appear to be involved in the pathophysiology of restless leg syndrome, animal models showed altered dopamine receptor patho-physiologies and hyper-glutamatergic states as mentioned in a study by Clemens et al.[30] The condition is characterized by an unpleasant sensation in the legs, with the urge to move the legs starting in the evening. Rest worsens symptoms, and movement provides some relief. Other symptoms include difficulty falling asleep, bedtime resistance, "growing pains" and symptoms similar to those of attention-deficit/hyperactivity disorder according to Esposito et al.[28]

Measures of intervention included EEG, including sleep EEG and neuroimaging when deemed necessary. In addition to support for behavioural treatments following the development of a problem, it is worth noting that preventive education aimed at parents and written materials or classes have also been found to be highly successful.[14] Mindell et al in their study opined that discussing sleep patterns with parents provides an opportunity to learn more about the child and family and gives a possibility to evaluate the behavioural and family interventions. It allows educating the parents about sleep hygiene and preventing more serious sleepproblems.[25]

Melatonin is a hormone (N-acetyl-5-methoxytryptamine) synthesized by the pineal gland, whose secretion is controlled by the suprachiasmatic nucleus of the hypothalamus, with a peak between 2 and 4 am. It reduces latency to sleep onset and number of awakenings, as well as improving mood and daytime behaviour. Melatonin appears to have little effect on sleep efficiency in children with neurodevelopmental disabilities but the greatest effect on sleep onset as reported by Kennaway in his study.[29] The recommended dose is 0.5-3 mg in children and 3-5 mg in adolescents. Stein et al opined in their study that at usual doses, the side effects are

irrelevant.[26] Melatonin can be safe and effective in treating both primary sleep disorders and the sleep disorders associated with various neurological conditions as reported by Nunes et al in their study.[27]

The current study is limited to outpatients attending our hospitals. Inclusion of inpatients and more specifically inpatients without CNS pathology would contribute to the study on prevalence and pattern of sleep disorders in children.

CONCLUSION

Most of the children studied had only one of the sleep disorders. Males outnumbered the females. Sleep disorders are predominantly seen in the age group of 7 to 10 years. Commonest sleep related disorder was nocturnal enuresis. Sleep walking usually is associated with another sleep disorder.

Recommendations

Inclusion of inpatients in future studies will enhance our understanding on the prevalence and pattern of sleep disorders in children. Early identification of different patterns of sleep disorders and associated symptoms and initiation of therapy in the form of counselling and/or medications with psychosocial support will contribute in reducing the incidence of sleep disorders in children.

ACKNOWLEDGEMENTS

Authors would like to thank all the teaching and non-teaching staff and post graduate residents of Madras medical college, Chennai and dept of paediatrics, Al-Ameen medical college and hospital, Vijayapura for their cooperation and support throughout the period of study and for timely help in preparing charts and tables.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Malagi NAN, Ahmed Z, Bavalatti RA, Bala A, Muthuraja K, Visvanathan J et al. Prevalence and pattern of sleep disorders in childhood. Int J Contemp Pediatr 2023;10:881-6.