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Original Research Article

Sleep Disturbances in Children with Allergic Rhinitis

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Abstract:

Objective: To assesses the pattern and proportion of sleep disorders among children having allergic rhinitis.

Materials and Methods: Hospital based observational study in which 149 children aged 4 to 18 years attending S.P.M.C.H.I. (tertiary care hospital) Jaipur having clinician diagnosed allergic rhinitis were considered as study subjects. A validated PSQ questionnaire was supplied to parents/guardians of children to be filled with assistance of investigator for evaluation of presence/pattern of sleep disorder among these children. The data collected were subjected for statistical analysis.

Results: The mean age of study subjects was 9.8±2.4 year. The family history of atopy was found in 63.08% children. Tonsillar hypertrophy was observed in 30.6% children. 52.34% children had adenoid hypertrophy. Snoring during sleep (62.41%) was the most common sleep disordered breathing pattern among children with AR followed by restlessness during sleep (46.3%), mouth breathing during sleep (56.37%), bruxism (26.84%), Sleep walking (18.12%), Sleep talking(24.16%), difficulty falling asleep (28.18%), nocturnal sweating(30.2%), early morning headache (27.5%), sleepiness during day(28.85 and frequent nocturnal awakening was found in 33.55% children.

Conclusion: There are a significant proportion of children of allergic rhinitis have various type of sleep disorders.

Keywords: AR: allergic rhinitis, PSQ: pediatric sleep questionnaire, sleep disorders.

Introduction

Allergic rhinitis is the most common chronic disorder in the pediatric population with up to 40% of children affected. [1] Apart from characteristic features of nasal congestion, rhinorrhea, sneezing, post nasal discharge and nasal pruritus, children with allergic rhinitis often experiences, disrupted sleep, daytime tiredness, somnolence and decreased cognitive functions. [2]

Sleep disorders are not uncommon in children with allergic rhinitis and may range from sleep disturbances, insomnia and Parasomnia to sleep disordered breathing. Several mechanism have been proposed to explain the effect of allergic rhinitis on sleep, including direct effect of nasal obstruction by congestion, mechanical effect of posture and indirect effect of inflammatory cytokines on sleep pattern. Children with allergic rhinitis frequently present with habitual snoring, mouth breathing and enhanced risk of obstructive sleep apnea. [3] Sleep disorders among children have been found to be associated with metabolic complications, obesity, cardiovascular disorders, pulmonary hypertension, and neuropsychiatric disorders like attention deficit hyperactivity disorder and as they also adversely affect academic performance, cognitive performances and quality of life. Therefore early recognition as well as prompt appropriate management of sleep disorders and their underlying etiology has great importance among children. [4]

Studies investigating the association between allergic rhinitis and sleep disturbance in childhood are lacking in Indian scenario. Hence, this study was planned to determine prevalence and pattern of sleep disorder in children presenting with allergic rhinitis.

Material & Methods

It was hospital based observational study, conducted at Department of Pediatrics, Swai Man

Singh Medical College, Jaipur, India from May 2013 to April 2014. Approval from the institutional ethical committee was obtained before performing the study.

We enrolled 149 children aged 4 to 18 years in this study having clinician diagnosed allergic rhinitis. Out of them 91 were male and 58 were female.

We not enrolled the children those were having craniofacial malformation, obesity, global developmental delay, neuromuscular disorders, cardiac diseases, taking treatment for allergic rhinitis in last six month, had history of adenoidectomy or tonsillectomy and those were not willing to participate in study. After explaining the study purpose and the study protocol to the parents, an informed consent was obtained from the parents who were willing to participate in the study.

The Hindi version of validated pediatric sleep questionnaire (PSQ) [5] was supplied to parents of these children and it was filled by them. We used the Hindi Version of PSQ in our study which is constructed by university of Michigan and also tested as well as validated against PSG. The necessary permission for the same was obtained from the competent authority.

Data thus collected were entered into Excel worksheet and classified as well as analyzed according to Objective. Analysis was done using SPSS v 21.0 for Windows (IBM Inc., USA).

Results

The 149 children who had allergic rhinitis for more than 6 month recruited for study with mean age 9.8±2.4years, out them 91 were male and 58 were female. Family history of atopy was obtained in ninety four (63.08%) children with AR and history of passive smoking was found in forty eight (32.21%) children. Seventy eight (52.34%) children with allergic rhinitis had adenoid hypertrophy on lateral skiagram of neck as shown in table 1.

Table 1: Demographic data & characteristics of children with allergic rhinitis

Characteristics		Observations	
		No. of study subjects	% of study subjects
Sex	Male	91	61.07
	Female	58	38.9
Mean age ± SD, year		9.8±2.4	
Passive smoking history		48	32.21
Family history of atopy		94	63.08
Tonsillar hypertrophy		45	30.20
Lateral skiagram of neck	Done	115	77.18
	Adenoid hypertrophy	78	52.34
Other allergic diseases	Allergic conjunctivitis	24	16.10
	Atopic dermatitis	11	7.38

Ninety three (62.41 %) children with AR had snore more than half of time during sleep.

Sixty nine (46.3%) children having allergic rhinitis were found to have restlessness during sleep. Mouth breathing during sleep was found in 56.37 % children, growing leg pains was found in 36.24% children, frequent nocturnal awakening was reported by 33.55 % children. Periodic limb movement was found in 32.21% children having allergic rhinitis.

Sweating during sleep (30.2%), sleep walking (18.12%), sleep talking (24.16%), and bruxism during sleep (26.84%), confusional arousal (14.7%), and nightmare (13.42%) were also found in children suffering from allergic rhinitis as shown in table 2.

Table 2: Night-time symptoms of and sleep behaviour during sleep in children having allergic rhinitis

Nighttime symptoms and sleep behavior	Children with AR having sleep disorders	
	Numbers	Percentage
Snore during sleep	93	62.41
Restlessness during sleep	69	46.3
Mouth breathing during sleep	84	56.37
Growing pains when in bed	54	36.24
Frequent nocturnal awakening	50	33.55
Periodic leg movement during sleep	48	32.21
Perspiration during sleep	45	30.20
Difficulty falling asleep at night	42	28.18
Grinding of teeth during sleep	40	26.84
Sleep talking	36	24.16

Sleep walking	27	18.12
Confusional arousal	22	14.7
Nightmares	20	13.42
Struggle to breathe during sleep	12	8.05

Mouth breathing during day was found in 47.65% of children with AR followed by dry mouth on waking (42.95%), unfreshness in morning (35.57%), difficulty in waking up in morning (32.21%), sleepiness during day (30.6%), wake up with headache in morning (28.5%), taking nap during day (28.18%) noticed by parents or reported to parents by their friends and school teachers and sleepiness in classroom reported to parents by class teacher (12.08%) were also found in these children as shown in table 3.

Table 3: Daytime symptoms and behaviors of children having allergic rhinitis

Daytime symptoms and behavior	Children with AR having sleep disorders	
	Number of study subjects	% of study subjects
Mouth breathing during day	71	47.65
Dry mouth on waking	64	42.95
Sleepiness during day	43	28.85
Wake up with headache in morning	41	27.5
Unfreshness in morning	53	35.57
Difficulty waking up in the morning	48	32.21
Taking nap during day	42	28.18
Sleepiness in classroom	18	12.08
ADHD	12	8.05

Discussion

The aim of this was to assess the prevalence and pattern of sleep disorders in children suffering from allergic rhinitis. The relationship between atopic diseases, such as asthma, allergic rhinitis and atopic dermatitis has gained increasing interest concerning both pathophysiological mechanisms underlying sleep disorders and burden of sleep impairment on daily activities and quality of life [6]. The impact of sleep disorders on patients with allergic rhinitis has been emphasized by the ARIA for allergic rhinitis, which introduced the presence of sleep disturbance as a component of the new classification of the disease. The quality of sleep in patient with allergic rhinitis can significantly impaired by the disease. [7]

Adenoid hypertrophy was investigated only in thirty eight out of forty nine children who had clinical indication based on clinical finding. Since lateral skiagram of neck were not obtained in all study subjects therefore we cannot conclude that adenoid hypertrophy itself is contributed to how much extent to sleep problems in children with AR. Tonsillar hypertrophy was found in 30.2% of children with AR while sleep problems in these children were much more prevalent. Same observations were made by poachanukoon et al in their case control study. [8]

We found that 62.41 % study subject had snore during sleep. Wasilewska J et al. [9] conducted a PSQ based study as Sleep disorders in childhood and adolescence, with special reference to allergic diseases. . Allergic diseases have a significant impact on the quality of life. He was found that habitual snoring history was revealed in 43.4% of patients and in 6.4% of controls ($p < 0.0001$), being significantly more common in children with allergic rhinitis.

Leger et al. [10] conducted a cross-sectional epidemiological study in adult. He found that snoring was significantly more often reported in patients with AR (46.6%) than in the control group (18.6%, $P<.001$). Smedje H et al. [11] conducted a survey as Parents' reports of disturbed sleep in 5-15-year-old Swedish children. Snoring was found in 7.7% children.

In the current study, periodic leg movement (32.21%) was significantly associated with allergic rhinitis. It should be mentioned that the possible explanation for PLMS may be sleep disordered breathing, which also was supported in this present study. In our study Restlessness during sleep was found 46.3% children having AR. Frequent nocturnal awakening was reported by 36.24 % AR patients in our study. Similar finding was obtained by Leger et al in their study. [10]

Sleep walking and sleep talking episodes are disturbing to parents. Depending on the degree of confusion, bedroom location, furniture and strength of the subjects, sleep walking may lead to accidents and self-injury. [12,13] In our study, sleep walking and sleep talking was found in 18.12% and 24.16% study subjects respectively. Sleep bruxism has multifactorial etiology and there is no consensus in literature about the relevance of each factor for its development. [14] In this study, 26.84 % subjects had sleep bruxism. Sleep bruxism was associated with sleep disordered breathing in AR patients. In

our study, symptoms of OSA like struggle to breathe during sleep (14.3%), perspiration during sleep (30.6%) were also observed. Sleep apnea in children often related to the adeno-tonsillar hypertrophy. Day time sleepiness (28.85%), napping during daytime (28.18%) and sleepiness in classroom (12.08%) has indicated that the lesser quantity or poor quality of night-time sleep. Daytime sleepiness is an important concern in these children because it has been found correlated with frequent nocturnal awakening and poor academic performances. [15]

Conclusion

Allergic rhinitis in children is usually resulted in sleep disordered breathing as co morbidity that may be under recognized and untreated by health care providers. Snoring was the most common morbidity in children suffering from allergic rhinitis as sleep impairment is concerned.

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