

Sleep Disturbances among Children with Bronchial Asthma**Hari Mohan Meena¹, Pawan Dara², Chetan Meena³, B S Sharma⁴, Kavita Meena⁵**¹Assistant Professor, Department of Pediatrics, Dr S N Medical College Jodhpur²Associate Professor, Department of Pediatrics, S P Medical College Bikaner³Assistant Professor, Department of Pediatrics, SMS Medical College Jaipur⁴Senior Professor (Retired), Department of Pediatrics, SMS medical college Jaipur⁵Resident doctor, Department of Pediatrics, SMS medical college Jaipur

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Conflict of interest: Nil

Abstract:**Objective:** To assess the pattern and proportion of sleep disturbances in asthmatic children.**Materials & Methods:** It was a validated questionnaire based observational study, performed from May 2013 to April 2014 at Department of Pediatrics, Swai Man Singh (SMS) Medical College, Jaipur, India. We enrolled 63 asthmatic children age between 6 to 18 years.**Results:** The age of study subjects was 10.2±1.5 year. The restlessness during sleep was found in 50.8% asthmatic children. The other sleep disorders among asthmatic children reported in our study was snoring during sleep (30.1%), Growing pains of legs when in bed (33.3%), difficulty falling asleep(30.2%), frequent nocturnal awakening (38%), grinding of teeth during sleep (28.5%), bed wetting during sleep (25.3%), perspiration during sleep (36.5%), sleepiness during day (44.4%) wake up with headache in morning (30.1%), sleep talking (31.7%) and sleep walking (17.4%).**Conclusions:** The symptoms of sleep disorders in asthmatic children are prevalent. Common disorders are restlessness during sleep, growing pains of leg, difficulty in falling asleep, day time sleepiness, bed wetting during sleep, frequent nocturnal awakening and grinding of teeth.**Keywords:** Asthma, Sleep Disorders, Restlessness Sleep, Snoring, Daytime Sleepiness.

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Introduction

Bronchial asthma is most common chronic pulmonary disorder of children. [1] It is a chronic inflammatory disease of the airways. The chronic inflammation is associated with airway hyperresponsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night or in the early morning. [2]

The asthmatic children are predisposed to be having sleep disturbances. The nocturnal dyspnea and frequent wakefulness induce sleep deprivation, anxiety and poor quality of life in children suffering from bronchial diseases. [3] Difficulties inducing sleep, sleep fragmentation on polysomnography, early morning awakenings and daytime sleepiness are more common in asthmatics compared with subjects without bronchial diseases. More than 40% of asthmatic children report clinically significant daytime sleepiness. [4]

Early identification of sleep disorders is important among children as they adversely affect the academic performances and cognitive function. Apart from this, sleep disorders in children also

lead to cardiovascular disorders, metabolic diseases and neuropsychiatric disorders like attention deficit hyperactivity disorder (ADHD). [5]

Despite significant burden of sleep disorders in asthmatic children as co-morbidities and its long term adverse effect on health, the data is limited in Indian subcontinent. Therefore, we planned and designed a questionnaire based study to evaluate the pattern and burden of sleep disorders in asthmatic children.

Materials & Methods

It was hospital based observational study, conducted at Department of Pediatrics, SMS Medical College, Jaipur, India from May 2013 to April 2014. Approval from the institutional ethical committee was obtained before performing the study.

We enrolled 63 children aged 6 to 18 years in this study having clinician diagnosed persistent bronchial asthma without long term preventive therapy. Out of them 35 were male and 28 were female. We not enrolled the asthmatic children

those were having craniofacial malformation, obesity, global developmental delay, neuromuscular disorders, cardiac diseases, taking treatment for asthma as preventing therapy in last six month 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)[6] 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 most prevalent sleep disturbance was restlessness during sleep (50.3%) in asthmatic children. Twenty four (38%) asthmatic children had reported

frequent nocturnal awakenings. The asthmatic children presented with night time symptoms of sleep disorders were snoring during sleep (30.1%), growing pains of leg when in bed (33.3%), sleep talking (31.7%), sleep walking (17.4%), confusional arousal (19%), nightmares (8%), grinding of teeth during sleep (28.5%), bed wetting during sleep (25.3%), periodic leg movement during sleep (27%), struggle to breath during sleep (22.2%), difficulty falling asleep (30.2%) and mouth breathing during sleep (20.6%). Perspiration during sleep reported by twenty three (36.5%) children. The nighttime symptoms of sleep disorders in asthmatic children were depicted in table no.1.

The most common day time symptoms of sleep disorders in asthmatic children was sleepiness in day time (44.4%) which was identified either by parents or friends/ teacher followed by wake up with headache in morning (30.1%), Unfreshness in morning (28.5%), taking nap during day that noticed either by parents or friends (22.2%), difficulty in waking up in morning (20.6%), sleepiness in classroom (19%) which reported by teachers to parents, mouth breathing during day (15.8%) and hyperactivity suggestive of ADHD (9.5%). Day time symptoms and behaviour of asthmatic children revealed in table no.2.

Table 1: Night-time symptoms of sleep disturbances and sleep behaviour during sleep in asthmatic children

Night time symptoms and sleep behavior	Proportion of asthmatic children having sleep disturbances
	%
Snore during sleep	30.1
Restlessness during sleep	50.8
Mouth breathing during sleep	20.6
Growing pains when in bed	33.3
Frequent nocturnal awakening	38
Periodic leg movement during sleep	27
Perspiration during sleep	36.5
Difficulty falling asleep at night	30.2
Grinding of teeth during sleep	28.5
Bed wetting during sleep	25.3
Sleep talking	31.7
Sleepwalking	17.4
Confusional arousal	19

Table 2: Daytime symptoms of sleep disturbances and behaviour of asthmatic children

Daytime symptoms and behavior	Proportion of asthmatic children having sleep disturbances
	%
Mouth breathing during day	15.8
Sleepiness during day	44.4
Wake up with headache in morning	30.1
Unfreshness in morning	28.5
Difficulty waking up in the morning	20.6
Taking nap during day	22.2
Sleepiness in classroom	17.4

Discussion

The sleep disorders have significant impact on children in terms of quality of life, cardiopulmonary and neurocognitive function. The sleep disorders in asthmatic children are under recognized. This could be because of low awareness of sleep problems in these children. In our study, we found that half of asthmatic children had restlessness during sleep. C. Janson et al [7] did report that forty four percent of young adult asthmatics had restlessness during sleep. It was one of the most common sleep disturbance patterns among young adult asthmatics in their study. They also reported that 24.7% asthmatic patients had difficulty in falling asleep. Which was statistically significant ($p < 0.001$)

Frequent nocturnal awakening is commonly reported among asthmatic patients. In current study we have observed that twenty four (38%) asthmatic children had frequent nocturnal awakening. Chugh et al. [8] (2006) conducted a case control, questionnaire based study in seventy school-going children at Vallabhbai Patel Chest Institute, University of Delhi. He found that frequent nocturnal awakening was present in 38% asthmatic children and 30% had difficulty falling asleep. This was statistically significant ($p < 0.001$). They had also reported that daytime sleepiness (60%), early morning awakening (35%), involuntarily falling asleep (43%) and nightmare (10%) was present in asthmatic children. Frequent nocturnal awakening were also reported in 12% to 19% in general population of school going children by some studies. They have included subjects in age group of 5 to 12 years. [9-12] Difficulty falling asleep is a common problem in asthmatic children. [8] In our study, we have noticed that one third of asthmatic children had experienced of difficulty in falling asleep.

In present study, nocturnal enuresis was observed in sixteen (25.3%) asthmatic children. Gupt et al. [13] did report that nocturnal enuresis was present in 9% of school going children aged 8 to 13 years. They also reported that snoring was present in 11.4% children and 6.3 children reportedly struggled to breathe during sleep. We must be noticed that nocturnal enuresis in children can be a sign of obstructive sleep apnea (OSA). [14] In current study symptoms of OSA like struggle to breathe during sleep (22.2%), perspiration during sleep (36.5%) and stop breathing during sleep (9.5%) were also observed. Snoring during sleep was present in fifteen (30.1%) asthmatic children in our study. Desager et al. [3] also noticed that almost fifty percent of their eighty three asthmatic children had snoring during sleep. They stated that upper airway obstruction was implicated as cause of snoring and OSA in asthmatic children. It has been postulated that nasopharyngeal inflammation

with lower airways narrowing due to inflammation leads to adenoid and tonsillar hypertrophy which may lead to snoring and OSA.

Daytime sleepiness indicates the poor quality or lesser quantity of night-time sleep. In present study, we have found that twenty eight (44.4%) of asthmatic children had daytime sleepiness. Chugh et al [8]. Reported that daytime sleepiness was present in sixty percent of their asthmatic children. Desager et al [3] too, observed that asthmatic children were five times more at risk of having daytime sleepiness as compared to non-wheezing children. It has been found that daytime sleepiness has impact on poor academic performance and frequent nocturnal awakening. [12,15]

Parasomnias like sleep walking (17.4%), sleep talking (31.7%) teeth grinding (28.5%) was also present in our study. Gupt et al. [13] have reported that the prevalence of parasomnias like sleep talking 20.9%, sleep walking 3.2% and teeth grinding 15.4% in school going children.

Prevalent of symptoms of parasomnias and OSA in asthmatic children could be due to frequent nocturnal awakenings, poor sleep quality as well as quantity and daytime sleepiness in our study. Stores et al. [16]. Did compare subjective rating of sleep quality, daytime sleepiness, and cognitive function test in twenty one asthmatic children with healthy children. They found that asthmatic children had greater sleep disruption, more daytime sleepiness and lower cognitive function as compared to healthy children

Conclusions

The significant proportion of asthmatic children had sleep disturbances. The common symptoms of sleep disturbances in asthmatic children are restlessness during sleep followed by daytime sleepiness, frequent nocturnal awakening, and growing pains of leg during sleep, difficulty falling asleep, snoring and sleep bruxism.

Contributions

PD and CM conceived the idea. BSS designed the study. HMM was involved in data collection. PD and HMM were involved in data analysis. Manuscript was prepared by HMM. KM was provided the intellectual inputs.

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