Original Research

Evaluation of Sleep Disorders in Children with Adenotonsillar Hypertrophy Referring to the Otolaryngology Clinic of Qazvin Children Hospital, Iran

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Abstract

Background and Objective: Obstructive sleep apnea (OSA) has become a highly prevalent condition in pediatric care. OSA in children might considerably impact children's quality of life. We aimed to evaluate sleep disorders in children with adenotonsillar hypertrophy.

Materials and Methods: This was a descriptive-analytical and questionnaire-based study of children with adenotonsillar hypertrophy referring to otolaryngology clinic at Qazvin Children Hospital, Iran, in 2018-2019. 181 children who were randomly selected from the referral hospitals were evaluated using the validated Persian version of the Children's Sleep Habits Questionnaire (CSHQ). Eight main branches were also completed by the parents and how they evaluated the last week sleep patterns of their children.

Results: A total of 120 completed questionnaires were collected from children aged 1 to 15 years. 52.5% were male and 76.7% were urban residents. 88.8% had snoring and 90.0% had no family history of insomnia. 76.3% fell asleep in the morning, 74.3% had moderate to severe bedtime resistance according to the parents' reports, and 60.0% had mild and 22.5% had severe sleep onset delay. Finally, 107 children had confirmed sleep disorder that figures 89.2% of the cases included in the study.

Conclusion: Our study showed a high prevalence of sleep disorders in our cases and its effects on behavioral disorders. Children with adenotonsillar hypertrophy had less sleep duration and more sleep disorder as parents reported in present study. Further studies are highly recommended to understand the etiology of sleep disorders in studied population.

Keywords: Sleep apnea syndromes; Dyssomnias; Sleep hygiene

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Introduction

Sleep in infants, children, and adolescents is a dynamic and important process. The development of sleep parallels physical, behavioral, and neurologic development and there are key reciprocal relationships among these aspects of development (1). The most dramatic evolution in sleep takes place within the first 12 months of life; however, as a physiologic process, sleep continues to evolve over the lifetime. As early as 18 weeks post-conception, neurogenesis has been detected in the primary control center of the circadian timing system, the suprachiasmatic nucleus (SCN) (2). Sleep duration requirements varies widely in infancy, with ranges that gradually decrease and narrow with age (3).

Sleep-related breathing disorders are among the most common reasons for referral to sleep clinics. Typically, these referrals are prompted by snoring or witnessed apneas. Adenotonsillar hypertrophy in the setting of daytime symptoms including sleepiness, inattentiveness, and behavioral or academic problems may also prompt a referral (1, 4).

Since the inception of the theory, obstructive

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sleep apnea (OSA) has emerged as a very common issue in children care, affecting 2% to 3% of children and is associated with emerging of a wide range of complications and not only affects cardiovascular and metabolic systems, but also growth and behavior specially (5, 6). Simple snoring, the mildest expression of obstructive sleep-disordered breathing (OSDB), is not associated with arousal from sleep or episodes of low oxygen saturation in arterial blood. In contrast, OSA syndrome, the most severe expression of OSDB, involves repeated episodes of restricted breathing (hypopnea) and/or complete obstruction (apnea) with reduction in the normal levels of oxygen saturation in arterial blood and arousal during sleep (7).

In children, hypertrophy of the tonsils and adenoid tissue is thought to be the most common cause of OSDB; it causes narrowing of airways, which is a particular problem during sleep when the muscles of the pharynx relax, leading to partial or complete obstruction of the airway (8). Obese children appear to be at higher risk for SDB and also the severity of OSA is correlated to the rate of obesity. In contrast, hypertrophic adenotonsillar tissues may not be the primary cause of OSA in obese children always, and even in non-obese children, tonsil size is associated with OSA severity only in younger children (i.e., < 7 years of age) (9). OSDB may have a considerable impact on children's quality of life, comparable in some aspects to that of juvenile rheumatoid arthritis (JRA) (10, 11) and has been linked to behavioral and neurocognitive morbidities (12).

Since the effect of adenotonsillar size and body mass index (BMI) on pediatric OSA in Iran has not been thoroughly investigated, therefore, we conducted the present study to evaluate sleep disorders in children with grade-3 or grade-4 adenotonsillar hypertrophy referring to the otolaryngology clinic of Qazvin Children Hospital, Qazvin, Iran.

Materials and Methods

This descriptive-analytical questionnaire-based study was approved by Qazvin University of Medical Sciences. The study population consisted of children with adenotonsillar hypertrophy referring to otolaryngology clinic at Qazvin Children Hospital in 2018-2019. The sample size was calculated using the Epi Info software by considering the prevalence of 13.6% for children with sleep disorders (13) and alpha of 0.05. The sample size was 181 people who were randomly selected from the referral hospitals.

Grades 3 and 4 of the tonsils were considered as adenotonsillar hypertrophy. If the ratio of the largest adenoid diameter to the largest root-length distance from the retropharynx was greater than or equal to 50%, it was considered as adenoid magnitude (grades 3 and 4) (14).

The subjects were evaluated using the Persian version of the Children's Sleep Habits Questionnaire (CSHQ). The questionnaire included demographic characteristics and eight main branches to be completed by parents and how they evaluated the sleep patterns of their children during the preceding week to the interview. The eight main branches included: sleep resistance, sleep time delay, sleep duration, sleep anxiety, nocturnal anxiety, parasomnia, respiratory diseases, and daily sleepiness. There were three options for the questions: usually (5-7 nights a week), sometimes (2-4 nights a week), and rarely (0-1 nights a week). Cut-off used to diagnose sleep disorders was 41. At the same time, by this questionnaire, total sleep disorder was also calculated (15). The validity and reliability of the questionnaire were evaluated by Shoghy et al. in Iran (16). Parents' eligibility was defined as being able to speak and write in Farsi, having 1-15-year-old children with no developmental disorders, no history of hypnotic or psychotic medication use, and no history of respiratory tract infection in the past month.

Statistics such as mean, standard deviation (SD), percentage, minimum, and maximum for descriptive results were used for data analysis by SPSS software (version 21, IBM Corporation, Armonk, NY, USA). Informed consent was obtained from parents.

Results

A total of 120 completed questionnaires were collected for children aged 1 to 15 years old. Amongst which, 63 cases (52.5%) were male and 76.7% were urban residents. 88.8% of children had snoring during sleep. In the parents' opinion, 69.2% of children did not have fidgetiness or abnormal movements during sleep. Only nine of the parents stated that their children suffered from sweating during sleep. Three subjects suffered from shortness of breath and 33 had breathing problems when they were sleeping. About half of the parents (51.7%) stated that their child would drink tea or coffee during the day. 86.7% of parents who completed the questionnaire had a high-

Table 1. Distribution of children sex and residence area

		n (%)
	Male	63 (52.5)
	Female	57 (47.5)
Residence	Urban	92 (76.7)
	Rural	27 (22.5)

school diploma or lower education. In the morning, 90 children (76.3%) fell asleep again in their parents' room. All descriptive findings are shown in tables 1 and 2.

Table 2. Distribution of various indices of sleep apnea

		n (%)
Snoring	Yes	97 (80.8)
	No	23 (19.2)
Restlessness	Yes	37 (30.8)
	No	83 (69.2)
Sweating	Yes	9 (7.5)
	No	111 (92.5)
Dyspnea	Yes	10 (8.3)
	No	110 (91.7)
Apnea	Yes	33 (27.5)
	No	87 (72.5)
History of hospitalization	Yes	12 (10.0)
	No	108 (90.0)
Tea/coffee drinking	Yes	62 (51.7)
	No	58 (48.3)
Maternal education	Below diploma	48 (40.0)
	Diploma	50 (41.7)
	Bachelor	15 (12.5)
Maternal job	Housewife	116 (96.7)
	Employee	4 (3.3)

More than 90% of children did not have any family history of insomnia, sleep apnea, restless leg syndrome (RLS), and limb movements. Some comorbidities that children suffered from as their parents reported are shown in table 3.

Table 3. Distribution of comorbidities

		n (%)
Overweight	Yes	10 (8.3)
	No	110 (91.7)
GERD	Yes	5 (4.2)
	No	115 (95.8)
Sinus diseases	Yes	7 (5.8)
	No	113 (94.2)
Chronic cough	Yes	29 (24.2)
	No	91 (75.8)
Allergy	Yes	9 (7.5)
	No	111 (92.5)
Asthma	Yes	3 (2.5)
	No	117 (97.5)
Frequent colds	Yes	108 (90.0)
	No	12 (10.0)
Frequent pharyngitis	Yes	50 (41.7)
	No	70 (58.3)
Frequent otitis	Yes	28 (23.3)
	No	92 (76.7)

GERD: Gastroesophageal reflux disease

26 (21.7%) children had dysphagia, and 52.5% of the parents reported that their children had nasal congestion and problems in breathing.

Bedtime resistance score was defined in the questionnaire as minimum of 5 to maximum of 17. Accordingly, 74.3% of the children scored more than 9 (moderate and severe bedtime resistance according to what the parents reported). 60.0% had mild sleep onset delay (score 1) and 22.5% scored 3. 45.0% of the children had the score of 7 in sleep duration.

60.8% of the subjects had moderate sleep anxiety (score 6), 56.7% had score 3 in waking up during night, and 87.5% had score 7 to 10 of parasomnia. 50.8% of the children scored 7 to 9 in questions measuring breathing disorders during sleep.

All of the cases had score > 7 for daytime sleepiness according to the parents' report.

Finally, the cut-off used to diagnose sleep disorders was 41; therefore, 107 children had confirmed sleep disorder (score > 41) that constituted 89.2% of the study participants (Figure 1).

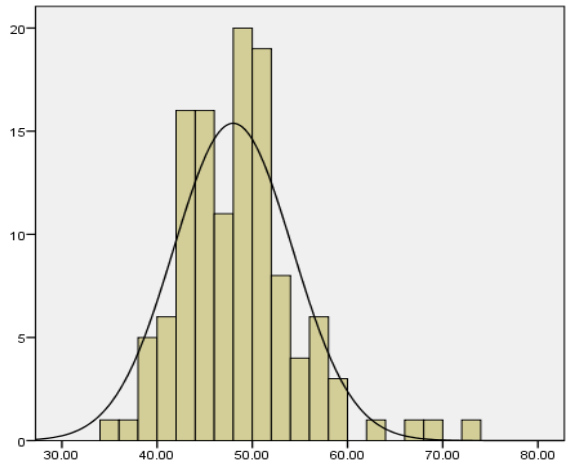

Figure 1. Total point of sleep disorder according to Children's Sleep Habits Questionnaire (CSHQ)

Discussion

One of the most common disorders among children is children sleep disorder (CSD) which is getting more and more nowadays globally (17). Simple bedtime resistance, frequent sleep-waking, parasomnia, and OSA are the prevalent forms of CSD around the world that children suffer from as studies have shown (18). One of the serious concerns is chronic sleep disorder since it is associated with decrease in physical growth and school performance (19) and also elevation in risk of depression and anxiety (20). Adenotonsillar hyper-

trophy is the leading cause for OSA syndrome (OSAS) in children. The peak age for adenoid and tonsillar hypertrophy and related OSAS is 3-6 years (21). In this study, we measured sleep habits and chronic disorders affecting children according to CSHQ tool on 181 children referred to otolaryngology clinic with a chief complaint of adenotonsillar hypertrophy-related problems. Out of 120 completed questionnaires, we reported all aspects of the tool. Our aim was to only describe eight aspects of the questionnaire; however, we will try to report correlations and significant differences in data recorded in children's sleep habits and sleep disorders or adenotonsillar hypertrophy and obesity as well as other aspects in a future publication.

As stated, children with adenotonsillar hypertrophy had less sleep duration and more disorder score as parents said in questionnaire as Brouillette reported (10). Moreover, Kojima et al. reported that mean sleep time of children with adenotonsillar hypertrophy was less than other children (22).

Only 5 children had sleep anxiety according to their parents that shows that adenotonsillar hypertrophy may not have an important role in anxiety of children during sleep. Wada et al. (23) stated that sleep anxiety was statistically and significantly more frequent in girls; however, there was no significant relationship between adenotonsillar hypertrophy and sleep anxiety. But Turkoglu et al. reported that sleep anxiety significantly decreased after adenotonsillectomy (24).

In the present study, children with adenotonsillar hypertrophy had score of 6 and more in CSHQ of breathing disorder during sleep which indicates that adenotonsillar hypertrophy could have impressive effects on breathing during sleep (5, 10, 24).

As stated, 89.2% of the cases included in this study suffered from CSD. Noticeably, we estimated the prevalence of 89.6% of CSD in our previous study on 511 students in 2018 (25). We found out in our former study that the school grade had an inverse relation with bedtime resistance, sleep anxiety, and sleep-disordered breathing. ($P < 0.05$) and this finding was consistent with our current study.

We declare that our study could have methodological infirmities that can be discussed before data analysis. We conducted a questionnaire-based study which included eligible children whose adenotonsillar hypertrophy had been confirmed by ear, nose, and throat (ENT) specialists in educational-governmental clinics. Having full consent of parents and document concealment was somehow difficult that we did in our study.

Conclusion

Our study found a high prevalence of sleep disorders among studied children and its impact on children's behavioral disorders. Children with adenotonsillar hypertrophy had less sleep duration and more sleep disorder as parents reported in the present study. Further studies are highly recommended to understand the etiology of sleep disorders in the studied population.

Conflict of Interests

Authors have no conflict of interests.

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