ORIGINAL ARTICLE

SLEEP DISTURBANCES IN CHILDREN WITH ENLARGED TONSILS AND ADENOIDS

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ABSTRACT

Background: Sleep plays an essential and critical role in growth and development of children. The consequences of sleep disturbance in children include: impaired immunologic function, reduced alertness, deficits in cognition, memory and learning. **Objective:** This study aims to assess sleep disturbances in children with adenotonsillar enlargement.**Methods:** This is a preliminary report of a study on children with adenotonsillar enlargement at the Otolaryngologic clinics of Aminu Kano Teaching Hospital, Kano Nigeria. **Results:** A total of 38 consecutive patients with adenotonsillar enlargement were studied; 20 (52.60%) were males and 18 (47.40%) were females. Their ages were between 1 and 10years; the mean age was 3.67 $\pm$2.45years. The mean duration of symptom was 1.17 years (SD = 0.84). The overall mean sleep disorder score was 1.94 $\pm$ 0.15. The mean score for males was 1.66 $\pm$ 0.21 and that for females was 2.24 $\pm$ 0.19. The mean sleep disorder score for children $\leq$ 5years was 1.90 $\pm$ 0.15, while that for children > 5years was 2.04 $\pm$ 0.42. The mean score for children with snoring was 3.58 $\pm$ 0.26. There was no significant correlation between the age of the patients, duration of symptoms and the degree of snoring. **Conclusions:** This study found a good sleep health in children with adenotonsillar enlargement except for those children that presented with snoring as their primary complaint.

KEYWORDS : Adenoids, palatine tonsils, airway, sleep disorder.

INTRODUCTION

Sleep is an essential and critical component of health just as diet[1]. In other words, sleep plays an important role in metabolic regulation, emotional function, performance, memory consolidation, brain recuperation processes and learning[2,3]. On the other hand, sleep problems are known to have major health consequences in children such as: impaired immunologic function, reduced alertness, deficits in cognition, memory and learning and a reduced quality of life[1]. Moreover, the effect paediatric sleep disorder may not be limited to the child alone, but can impact on the well-being of the entire family.

Previous researchers have reported that sleep problems may affect about 10 – 45% of the paediatric population and common causes included: narcolepsy, obesity, allergies, asthma, gastric reflux and adenotonsillar hypertrophy[4,5,6]. In particular, the most common cause of obstructive sleep apnea in children is

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adenotonsillar hypertrophy[7]. Although the literature is replete with studies on other aspects of adenotonsillar disease in our environment, there is paucity of research on sleep disturbances in this group of children. Hence, the quest to find the effect of adenotonsillar enlargement on the sleep health of children in our setting. Previous studies on sleep health of children are almost exclusively outside our environment. This study aims to assess sleep disturbances in children with adenotonsillar enlargement.

MATERIALS AND METHODS

This is a preliminary report of a study on children with adenotonsillar enlargement at the Otolaryngologic clinics of Aminu Kano Teaching Hospital, North-Western Nigeria. The study was approved by the Institutional Review Board of the hospital. Also, informed consent was obtained from the parents or guardian of the children.

Consecutive patients attending ENT outpatient clinic with features of adenotonsillar enlargement and a moderate to severe obstruction of the nasopharyngeal airway by adenoids; based on subjective evaluation of their plain nasopharyngeal radiographs. The measurements were done about 1cm below the upper end of the soft palate; but in children less than 3 years this was reduced to about half a centimeter. Accordingly, if the airway is not narrower than the thickness of the soft palate, it is considered normal. When the airway obstruction by adenoid is narrower than the thickness of the soft palate but still wider than half the thickness of the soft palate, the airway is considered moderately obstructed, and when the airway is narrower than half the thickness of the soft palate, the airway is considered severely obstructed. Others were those with enlarged palatine tonsils (Brodsky's grade II or higher)[8,9]. Excluded were children with craniofacial abnormalities, neurological disorders and those with cardiac or renal disorders. The X-rays were taken with the patients in an erect position in the case of the cooperative child, or held and restricted by either an assistant/parent/guardian (they were shielded from radiation exposure by wearing a lead jacket), and the head was fixed in a true lateral position in an uncooperative child. The tube–cassette distance was 180 cm and the exposure time varied between 0.4 and 0.6 s. The radiographs were subjectively evaluated using the same type of viewing box (Kenex–Electro medical HD, Essex, England).

Subsequently, an open access questionnaire developed by Serres et al[10] was adapted and administered to all parents/guardians of the children at the time of diagnosis to obtain data in the sleep disorder and parents/guardian's concern domains. However, those who do not understand English had the questions interpreted in their preferred languages. They rated their children's' sleep problems on a 0 to 5 point scale (0 = no problem, 1 = almost never, 2 = sometimes, 3 = frequent, 4 = a lot, 5= it couldn't be worse) based on how severe they felt the symptoms affected their children. The total domain and the item scores were all recorded.

Data obtained were entered into a specialized form designed for this study. They were analyzed using the Statistical Package for Social Sciences computer software version 16. A low sleep domain

score indicates a better sleep health, while a high score indicates a worse one. The associations between variables were assessed using the non parametric Spearman's correlation coefficient. A significant correlation was considered to be 0.40 or greater. A P-value $\leq$ 0.05 was considered to be statistically significant.

RESULTS

A total of 38 children met the inclusion criteria and were analyzed. Their clinical and demographic characteristics are shown in table 1.

Table1: Clinical and demographic characteristics

Characteristics	Number (n)	Percentage (%)
Sex		
Male	20[a]	52.60
Female	18[b]	47.40
Age (years)		
Range	1 – 10	
Mean	3.67 (SD = 2.45; 95%CI, 2.87 – 4.47)	
Duration of disease (years)		
Range	0.2 – 4	
Mean	1.17 (SD = 0.84; 95%CI, 0.89 – 1.44	

[a,b] No significant difference $X^2 = 0.11$; P= 0.75
SD= standard deviation, CI= confidence interval

The overall mean sleep disorder score was 1.94 $\pm$ 0.15 (95% CI, 1.63 – 2.24). The overall mean disorder score for males was 1.66 $\pm$ 0.21 (95% CI, 1.22 – 2.10) and that for females was 2.24 $\pm$ 0.19 (95% CI, 1.84 – 2.65). The mean sleep disorder score for children $\leq$ 5years was 1.90 $\pm$ 0.15 (95% CI, 1.59 – 2.22), while that for children > 5years was 2.04 $\pm$ 0.42 (95% CI, 1.08 – 3.00).

Mean scores for each of the sleep disorder domains assessed in the study population is shown in table 2.

Table 2: Mean scores for individual sleep disorder

Domain	mean score	95% confidence interval
Snoring	3.58 $\pm$ 0.26	3.06 - 4.10
Choking	1.89 $\pm$ 0.26	1.37 – 2.42
Restless sleep	1.89 $\pm$ 0.27	1.34 – 2.45
Difficult waking	1.03 $\pm$ 0.18	0.66 – 1.40
Deep thorax	1.29 $\pm$ 0.23	0.82 – 1.76

Table 3 shows the mean score for snoring and parental concern

Table 3: Mean score for snoring and parental concern

Characteristics	Snoring	Parental concern
Sex		
Male	3.40 ± 0.35[a]	4.10 ± 0.32[c]
Females	3.79 ± 0.37[b]	4.61 ± 0.20[d]
Age group		
≤ 5years	3.55 ± 0.30[e]	4.28 ± 0.24[g]
> 5years	3.67 ± 0.53[f]	4.56 ± 0.29[h]

[a b] No significant difference Z=-0.99; P=0.32
[c d] No significant difference Z=-0.89; P=0.38
[e f] No significant difference Z=-0.30; P=0.76
[g h] No significant difference Z=-0.43; P=0.67

There was no significant correlation between the age of the patients and the degree of snoring (Spearman rho; r=-0.02, P=0.90). Also, there was no significant correlation between the duration of symptoms and the degree of snoring (Spearman rho; r=-0.20, P=0.24).

DISCUSSION

Even though the importance of a healthy sleep to normal paediatric growth and development is widely acknowledged, sleep research is rather new in our environment and especially here in Nigeria. Moreover, to the author's best knowledge, the nation (with the exception of Lagos) is yet to establish a standard sleep laboratory in other parts of the country. Regrettably, parents and at times health care providers do not notice these sleep problems nor consider them as health hazards.

In line with previous works[11], the present study found the mean age of the study population to be 3.67 years. Similarly, it has been reported that at about this age; the adverse effects of adenotonsillar enlargement were most severe [11]. That is to say, a good number of those who participated in this study might have exhibited the features of this disease sufficient enough to justify their referral to the otolaryngologist. Thus, increasing the sensitivity of the inclusion criteria used in the present study.

In this study, the overall sleep health of children with enlarged tonsils and adenoids was found to be satisfactory. Also, when the individual sleep parameters were investigated, their sleep health remained good irrespective of the children's age, sex and duration of symptoms except for those children that presented with snoring as their primary complaint. On the contrary, Vaher et al[12], in their study reported that children with adenotonsillar enlargement with sleep

disordered breathing had parasomnias. In addition, enlarged tonsils and adenoids are well known causes of obstructive sleep apnea[7]. The sleep disturbances exhibited by children that presented with snoring might partly due to the blockage or narrowing of the upper airway caused by enlarged tonsils and adenoids. Also, during sleep, this airway obstruction might further be aggravated by the enlarged tonsils and other relaxed tissues in the throat pressing down on the airway, narrowing it and causing snoring and sleep apnea. Hence, it stands to reason that children in the age bracket 4 – 5years and those whose symptoms are chronic should possibly have worse sleep disturbances since airway obstruction tend to be most severe in them than other sub-sets of sufferers. However, these observations are at variance with the findings in this study where neither age nor duration of symptom influenced the severity of snoring in these children.

Considering parental concern, this study found that parents and guardians were wary of their children's snoring problem irrespective of their age or gender. This finding corroborates that of Francesco et al[13], who reported similar observation in a quality of life study in children with adenotonsillar enlargement. Perhaps, the associated cessation of breath that occurs in some of these patients with sleep apnea could have frightened some parents and guardians. Moreover, the excessively loud snoring in some of these children might have caused a lot of anxiety and insomnia amongst parents and other family members alike.

In conclusion, this study found a good sleep health in children with adenotonsillar enlargement except for those children that presented with snoring as their primary complaint. However, these findings are not without some limitations. For instance, the scope of the sleep characteristics investigated in this study were rather limited compared to other studies cited in the literature. Furthermore, the relatively small sample size in this study was a draw back. As a consequence, these could have biased the findings in this study. Therefore, further prospective multi-center studies with large sample sizes under standardized settings using a polysomnography machine or a sleep laboratory will help provide more valid evidence. ■

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