Section: Otolaryngology

Original Research Article

EVALUATION OF PATIENTS PRESENTING WITH SNORING IN RURAL TERTIARY CARE HOSPITAL

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ABSTRACT

Background: This study aimed to find out common otolaryngological causes of snoring in both adults and in children and, to study about the risk factors of snoring in general population.

Materials and Methods: Prospective observational study done in 45 children and 67 adults have participated in the study. The general information such as age, sex, BMI, neck circumference, co morbidities are collected. The history was taken, and detailed clinical examination was done in the study participants. Based on age, two different questionnaires were used to enquire about snoring habits.

Results: Increasing age is considered as a risk factor for snoring in general population. In this study, it was found that male participants had higher prevalence of snoring. Risk factors associated with snoring are male gender, high BMI, increased neck circumference, co morbidities, addictions. The most common cause in the children was adeno-tonsillar hypertrophy in both boys and in the girls (regardless of gender). Most child snorers can improve by undergoing adenoidectomy and/or tonsillectomy. The clinical findings found in adults are bulky tongue with FTP III/IV, DNS, allergic rhinitis, chronic rhinitis with or without nasal polyps. The most common causes in adults were bulky tongue with FTP class III/IV. In adult males, the second common cause was DNS. In females, second common cause was allergic rhinitis. Based on pediatric child questionnaire, 7 boys and 5 girls are habitual snores. 5 boys and one girl child (2.22%) were at high risk of developing OSA due to associated apnea during sleep. Based on berlin questionnaire used for adults, 25 males and 16 females were habitual snorers. Whereas 14 men and 9 women had high risk of developing OSA. These people had associated apnea during sleep, daytime sleepiness.

Conclusion: In adults, both in males and females, obesity is found to be a risk factor in adults. Which in children it was not noticed as a risk factor. Therefore, weight management will alleviate the snoring symptoms in the adults.

Keywords: Sleep Disordered Breathing (SDB), Adeno-Tonsillar Hypertrophy (ATH), Pediatric Child Questionnaire (PCQ).

INTRODUCTION

Sleep is something that everyone needs, no matter how young or old they are. Hence sleep plays an important role in good health and well-being throughout your life. During sleep, the body performs several repairing and maintaining processes that affect nearly every part of the body. Hence, a good night's sleep, or a lack of sleep, can impact the body both mentally and physically. One such condition that disrupts the sleep is snoring. Snoring is one of the most common sleep disorders in the general population. Though it is seen only as a social problem it can represent very serious health concerns. It is the most common manifestation of obstructive sleep apnoea and primary or habitual snoring represents one end of the spectrum of sleep-related breathing disorders. It is thought to occur because of a turbulent airflow through the upper airway, with the obstructive anatomical segment being anywhere

from the nose to the larynx. The obstruction can be multi-segmental. Depending on how light your partner sleeps, sleep disturbances are likely to affect both you and your partner. Sleep fragmentation and deprivation can lead to severe daytime sleepiness, impairing your ability to function normally during the day.[1,2]

If the problem goes untreated for a long time, it may increase the risk that the patient will develop other medical disorders in addition to social problems. The person who snores can have frequent awakenings at night, daytime sleepiness, lack of sleep, morning headaches, difficulty in concentration or remembering things, irritability, fatigue, low libido. There is also increased risk of accidents, coronary diseases, hypertension, arrhythmias, stroke and increased mortality in the adult population. In the paediatric population, snoring is increasing and has been identified as a primary health concern by the American Academy of Paediatrics. It has been associated with rise in co morbid diseases such as asthma, allergies, decreased cognitive function, behavioral problems and increasing obesity in pediatric population. Risk factors for snoring include male gender, increasing age, obesity, smoking, alcohol, physical inactivity. If left untreated the partial obstruction of upper airway can progress to complete obstruction leading to obstructive sleep apnea which can cause metabolic and cardiovascular complications.[3,4]

Despite there is increased awareness of OSA in the public and advancements in diagnosing the condition, a majority of those affected are still undiagnosed. Therefore, it is important for primary care physicians and specialists to recognize and identify those affected subjects for early and appropriate treatments. Hence this study aims to evaluate the causes in the patients with complaints of snoring and risk factors so that appropriate treatment can be given.

MATERIALS AND METHODS

Prospective observational study done in Department of ENT at Mediciti institute of medical sciences and hospital, ghanpur in patients attending ENT OPD with complaints of snoring in 18 months. Informed consent was obtained from all subjects after explaining to them in detail about the study in their own language.

The subjects were interviewed using a predesigned questionnaire to elicit information from themselves and from their parents or partner. Pediatric sleep questionnaire below 18 years of age and Berlin questionnaire for age group of 18 years and above are documented. Then the subject underwent thorough clinical examination along with diagnostic nasal endoscopy and video laryngoscopy. Patients below 12 years of age will be evaluated by radiological investigation (x ray nasopharynx) instead of endoscopy for adenoid hypertrophy.

Data Analysis

Data will be entered into MS-Excel (2010), then data will be exported to SPSS and analyzed.

Continuous variables will be summarized as mean and standard deviation. Categorical variables will be summarized as proportions. Tests of significance for difference in proportions will be performed by using chisquare test. P value less than or equal to 0.05 were considered statistically significant.

RESULTS

When divided according to the age groups, the male subjects (12.5%) are noticed to higher in old age (51-60 yrs). While the female subjects are higher among 0-10 years of age group.

In this study, most of the snoring children are found to be in underweight category (53.33%). About 33.33% of male child snorers are in underweight category. In females there was no one in overweight or obese category with complaints of snoring. In the adult subjects, around 29.85% of the males are obese and 19.4% of females are obese. No adult was found as underweight in this study. 15 males (22.38%) out of 67 adults had addictions of both alcohol and smoking. 2 males (2.98%) had only alcohol addiction. 4 females (5.97%) had alcohol addiction. [Table 1]

A total of 22.38% of males and 0.08% of females were with high neck circumference. About 43.28% of males and 25.37% of females were with low neck circumference. [Table 2]

In the children only 4 (3.57%) had co morbidities (1 male, 2 females). In adults, 25 males (22.32%) and 12 females (10.71%) have co morbidities. The number of male snorers with co morbidities are about 23.32 %. The number of female snorers with co morbidities are about 13.39%. [Table 3]

Pediatric sleep questionnaire (PSQ) is used to determine the snoring habits of the children. About 18 males and 15 females snore more than half the time. 7 males and 5 females are habitual snorers. 2 of the male children had history of stopping breathing (apnea) during the sleep. Around 3 male children and 3 female children have mouth breathing during daytime. [Table 4]

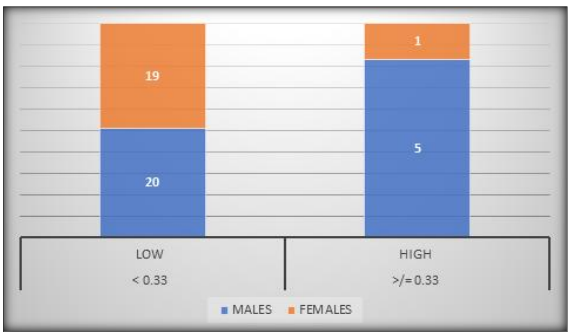


Figure 1: Pediatric sleep questionnaire score

Based on PSQ, 5 male children had high risk of developing obstructive sleep apnea (OSA). Only one female child had high risk of developing OSA which is not significant.

On examination, 18 males (40%) and 17 females (37.77%) had tonsillar hypertrophy. Adenoid hypertrophy was seen in 18 males (40%) and in 19 females (42.22%). Inferior turbinate hypertrophy was found in 4 males (8.88%) and 3 females (6.66%).

Allergic rhinitis was diagnosed in 2 males (4.44%) and 3 females (6.66%). Chronic rhinosinusitis (CRS) was diagnosed in 2 of male children (4.44%) and one male child (2.22%) had Antro choanal polyp causing CRS. Deviated nasal septum (DNS) was found only in one male (2.22%) and one female children (2.22%). 2 male children had bulky tongue with FTP class III (4.44%).

Most common finding in both males and in females was adeno-tonsillar hypertrophy. About 16 males (35.55%) and 16 females (35.55%) had adeno-tonsillar hypertrophy (ATH). About 2 males (4.44%) and one female (2.22%) had only tonsillar hypertrophy. 3 male children (6.66%) and 2 female children (4.44%) had only adenoid hypertrophy.

About 12 males (26.66%) and 14 females (31.11%) had grade 3 tonsillar hypertrophy. About 7 males (15.55%) and 3 females (6.66%) had grade 4 tonsillar hypertrophy.

About 7 males (15.55%) and 9 females (20%) had grade 3 adenoid hypertrophy. 8 males (17.77%) and 6 females (13.33%) had grade 4 adenoid hypertrophy.

About 25 males (37.31%) and 16 females (23.88%) snore every day (habitual snorers).

11 males (16.41%) and 4 females (5.97%) snore very loudly. And they had episodes of quitting breathing during sleep. 4 males (5.97%) and 2 females (2.98%) had daytime sleepiness. 3 males (4.47%) had history of nodding off during driving vehicle. [Table 6]

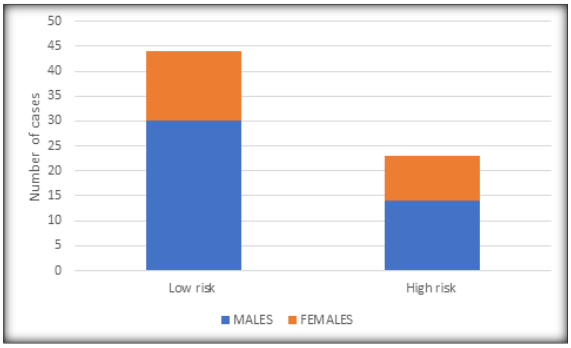


Figure 2: Berlin questionnaire score

Based on berlin questionnaire, about 14 men (20.89%) and 9 women (13.43%) had high risk of developing obstructive sleep apnea (OSA).

The most common finding was bulky tongue with FTP class III/IV. About 15 males (22.38%) and 6 females (8.95%) had bulky tongue with FTP class III/IV. Deviated nasal septum (DNS) was found in 11 males (16.41%) and 2 females (2.98%). 10 males (14.92%) and 4 females (5.97%) had CRS with nasal polyps. Without nasal polyps, CRS was diagnosed in 2 males (2.98%) and I female (1.49%).

Inferior turbinate hypertrophy was found in 10 males (14.92%) and 4 females. Allergic rhinitis was diagnosed in 5 males (7.46%) and 6 females (8.95%). Only two males and 3 females (4.47%) had tonsillar hypertrophy. 1 male (1.49%) and 2 females (2.98%) had adenoid hypertrophy.

About 15 males (22.38%) and 6 females (8.95%) had bulky tongue with FTP class III/IV.

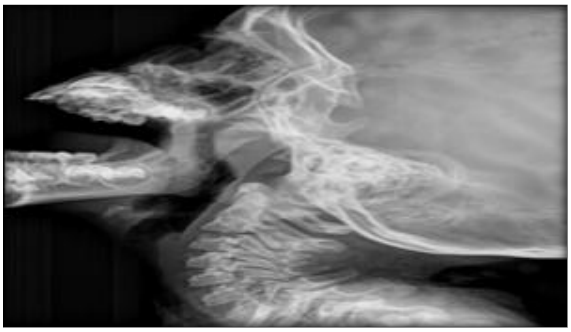
The most common is bilateral ethmoidal polyps in both men (13.43%) and women (5.97%). Only one male had antro-choanal polyp. [Table 7]

The most common clinical finding in males was bulky tongue with FTP III/IV followed by DNS, CRS with polyps and inferior turbinate hypertrophy.

The most common finding in women was bulky tongue with FTP III/IV and allergic rhinitis. Followed by CRS with polyps and inferior turbinate hypertrophy. [Table 8]

Tonsillar Hypertrophy

Adenoid hypertrophy



X ray nasopharynx

Bulky tongue with ftp iv in adult

CRS with nasal polyps in adult

Table 1: Demographic details in present study

Variable	Male	Female
Children	25	20
Adult	44	23
Age in years		
0-10 years	13	12
11-17 years	9	11
18-30 years	8	5
31-40 years	9	3
41-50 years	9	4
51-60 years	14	9
> 60 years	4	2
BMI category		
Children		
Underweight	15	9
Normal Weight	7	11
Overweight	2	0
Obese	1	0
Adults		
Underweight	0	0
Normal weight	12	8
Overweight	13	2
Obese class I	10	6
Obese class II	7	4
Obese class III	3	3
Addictions		
Smoking	15	0
Alcohol	17	4

Table 2: Neck circumference in patients of present study

Gender	Neck circumference	Number of participants	Percentage
Male	< 43 cms	29	43.28%
	>/= 43 cms	15	22.38%
Female	< 40 cms	17	25.37%
	>/= 40 cms	6	0.08%

Table 3: Co morbidities of the participants

	Children		Adults	
	Males	Females	Males	Females
Hypertension	0	0	13	4
Diabetes mellitus	0	0	14	7
Asthma	0	2	1	3
Hypothyroidism	1	3	5	8

Table 4: Snoring habits of children -paediatric sleep questionnaire

	Males	Females
1. Does your child snore:	18	15
a. more than half the time	7	5
b. Always snore	4	2
c. Snore loudly	3	1

d. Have troubled breathing		
2. Stop breathing during the night	2	0
3. Mouth breathing during daytime	3	3
4. Sleepiness during the day	2	1

Table 5: Local and clinical examination of ear, nose, throat in children

Local examination	Males	Females
Tonsillar hypertrophy	18	17
Adenoid hypertrophy	19	18
Inferior turbinate hypertrophy	4	3
Allergic rhinitis	2	3
Chronic rhinosinusitis without polyps	2	0
Chronic rhinosinusitis with polyps	1	0
Deviated nasal septum	1	1
Bulky tongue	2	0
Friedman tongue position (3/4)	2	0
Most common clinical finding in child snorers		
Adeno-tonsillar hypertrophy	16	16
Tonsillar hypertrophy	2	1
Adenoid hypertrophy	3	2
Tonsillar Hypertrophy		
Grade 1	1	0
Grade 2	4	3
Grade 3	12	14
Grade 4	7	3
Adenoid Hypertrophy		
Grade 0	3	0
Grade 1	3	2
Grade 2	4	3
Grade 3	7	9
Grade 4	8	6

Table 6: Berlin questionnaire

	Males	Females
Category 1 1. Do you snore? (yes)	44	23
2. Snoring frequency Nearly every day 3-4 times a week	25 20	16 6
3. Snoring is As loud as talking Louder than talking Very loud	16 14 11	12 6 4
4. Quit breathing during sleep	11	4
Category 2 5. Tired after sleep	17	9
6. Daytime sleepiness	4	2
7. Nodded off or fallen asleep during driving a vehicle	3	0

Table 7: Clinical examination in adults

Clinical examination	Males	Females
Bulky tongue	15	6
Friedman tongue position (FTP 3/4)	15	6
Chronic rhinosinusitis with polyps	10	4
Chronic rhinosinusitis without polyps	2	1
Allergic rhinitis	5	6
Deviated nasal septum	11	2
Inferior turbinate hypertrophy	10	4
Tonsillar hypertrophy	2	3
Adenoid hypertrophy	1	2
Friedman Tongue Position (FTP)		
Class 3 or 4	15	6
Class 1 or 2	29	17
Laterality		

Unilateral	1	0
Bilateral	9	4

Table 8: Most common clinical finding in adult snorers

Males	Number of cases	Percentage
Bulky tongue with FTP (3/4)	15	22.38%
DNS	11	16.41%
CRS with polyps	10	14.92%
Inferior turbinate hypertrophy	10	14.92%
Females		
Bulky tongue with FTP (3/4)	6	8.95%
Allergic rhinitis	6	8.95%
CRS with polyps	4	5.97%
Inferior turbinate hypertrophy	4	5.97%

DISCUSSIONS

Snoring was once seen as just a common phenomenon in both adults and in children which is in general ignored. But now it is recognized as part of the spectrum of sleep disordered breathing. It can occur alone or may be one of the major symptoms of SDB. In chronic conditions it can affect not only the quality of sleep but also general condition of the affected person. And also, it can lead to physical and cognitive impairment in the children.

Hence the aim of this study is to study the otorhinolaryngological causes of snoring and the risk factors of snoring. The study participants were assessed based on clinical history, sleep questionnaires and local examination of ear, nose and throat.

The study participants consist of 45 children and 67 adults. About 61.6% were males and 38% were females. The ratio of male: female is 1: 0.62, nearly close to the study done by udwadia et al.[5]

Most of the snoring children are in age group of 0-10 years (55.55%) in this study. The study conducted by David gozal et al,[6] has recognised a peak prevalence around 2-8 years probably due to Adeno-tonsillar hypertrophy. Udwadia et al,[5] in their study found high prevalence in age group of 45 – 54 years. Franklin et al,[7] noted that in men, prevalence of snoring increased up to age of 50-60 years. In this study, the prevalence in adults was high in the age group of 51-60 years (20.53%) especially in the men.

Snoring is significantly associated with obesity and so with high BMI and increased neck circumference. 29.85% of the male subjects and 19.4% of female subjects were obese in this study. Whereas in children, most of them are found to be underweight in contrast to the adult participants. There was no adult in underweight category. No female child participant was in obese category in this study. Neck circumference is independently considered as risk factor of snoring. It is presumed to be due to external compression of the pharynx by fat accumulation. In this study, 15 adult males and 6 adult females had high neck circumference.

Cielo CM et al showed neck fat is associated with obesity and neck circumference in adolescents and is greater in females versus males, it does not appear to correlate with presence and severity of obstructive sleep apnea syndrome.

Alcohol consumption is one of the risk factors of worsening symptoms of snoring and OSA. About 25.37% of the male snorers in the present study had alcohol addiction and only 5.94% of females had alcohol addiction. A study conducted by Franklin et al,[7] have found that current smoking, previous history of smoking, and passive smoking are all major risk factors for habitual snoring especially in the male population. smoking is mainly associated with snoring in men <60 years of age. About 22.38% of adult males in this study had smoking addiction, most of them seen in age group of 50-60 years.

Snoring is one of the risk factors for developing hypertension with 20% increased likelihood of uncontrolled hypertension in those aged >50 years.[9] In this study, 19.4% of adult males had hypertension mostly in age group of 40-60 years. The snoring habits of the study participants were assessed based on pediatric sleep questionnaire in children and berlin questionnaire in adults. Both the questionnaires in common enquired about habitual snoring, quit breathing during sleep, daytime sleepiness and high BMI of the participants to assess the risk of developing OSA.

Around 37.31% of males and 23.88% of females in adult population were habitual snorers similar to the study conducted by Prasad R, Garg R et al,[10] Among children, only 15.5% of males and 11.1% of females are habitual snorers.

Based on PSQ, 5 male children and only one female child had high risk of developing OSA. Based on berlin questionnaire, about 14 men (20.89%) and 9 women (13.43%) had high risk of developing OSA. 16.41% of males and 5.97% of females snore very loudly history of apneic episodes during sleep. 4 males (5.97%) and 2 females (2.98%) had daytime sleepiness. 3 males (4.47%) had history of nodding off during driving vehicle.

The most common cause of snoring in children is adeno-tonsillar hypertrophy. It is thought that Inflammatory or infectious processes can trigger the growth of tonsillar or adenoid tissue, leading to upper airway obstruction, snoring, mouth breathing, and subsequent OSA in the children. In this study the most common finding in children was adeno-tonsillar hypertrophy. About 35% of males and 35% of

females had adeno-tonsillar hypertrophy which is not significant. Tonsillar hypertrophy can alone cause snoring in children due to mechanical obstruction either by large size or recurrent attacks of tonsillitis.
In this study tonsillar hypertrophy was majorly seen in children than in adults.
About 12 males (26.66%) and 14 females (31.11%) had grade 3 tonsillar hypertrophy. About 7 males (15.55%) and 3 females (6.66%) had grade 4 tonsillar hypertrophy. The most common finding in adults was bulky tongue with FTP class III/IV. About 15 males (22.38%) and 6 females (8.95%) had bulky tongue with FTP class III/IV. The most common clinical finding in males was bulky tongue with FTP III/IV followed by DNS, CRS with polyps and inferior turbinate hypertrophy. The most common finding in adult women was bulky tongue with FTP III/IV and allergic rhinitis followed by CRS with polyps and inferior turbinate hypertrophy. Nasal obstruction is an independent risk factor for developing snoring. Men and women with nasal obstruction, especially chronic nighttime symptoms of rhinitis, are significantly more likely to be habitual snorers.[11,12]
In children upon examination, Inferior turbinate hypertrophy was found in 4 males (8.88%) and 3 females (6.66%). Allergic rhinitis was diagnosed in 2 males (4.44%) and 3 females (6.66%). Chronic rhinosinusitis (CRS) was diagnosed in 2 of male children (4.44%) and one male child (2.22%) had Antro choanal polyp causing CRS. Deviated nasal septum (DNS) was found only in one male (2.22%) and one female children (2.22%). Deviated nasal septum (DNS) was found in 11 males (16.41%) and 2 females (2.98%). 10 males (14.92%) and 4 females (5.97%) had CRS with nasal polyps. Without nasal polyps, CRS was diagnosed in 2 males (2.98%) and 1 female (1.49%).
Inferior turbinate hypertrophy was found in 10 males (14.92%) and 4 females. Allergic rhinitis was diagnosed in 5 males (7.46%) and 6 females (8.95%).

Limitation of this study

This study is done in participants with complaints of snoring and does not include non- snoring participants. Hence comparison with other studies couldn't be done. The P value of common risk factors such as addictions, high BMI and high neck circumference in this study was insignificant probably due to small sample size.

CONCLUSION

Based on the results, we can conclude that male gender (61.6%) has higher prevalence of snoring than in females with male to female ratio of 1: 0.66. Snoring was more common in age group of 0-10 years in children and 51-60 years in the adults. Most of the child snorers were underweight unlike in adults who were more in overweight – obese category. Adult males have associated co morbidities such as hypertension (25.37%) and diabetes mellitus (19.4%). Among children, 15.5% of males and 11.1% of females were habitual snorers. In adults, 25 males (37.31%) and 16 females (23.88%) were habitual snorers. 5 male children (11.11%) and one female child (2.22%) were at high risk of developing OSA. whereas14 men (20.89%) and 9 women (13.43%) had high risk of developing OSA. The most common cause in children regardless of gender was adeno-tonsillar hypertrophy (71%). The most common cause in adults was bulky tongue with FTP class III/IV. Second common cause of snoring in adult males is deviated nasal septum.
The second common cause in females was allergic rhinitis.

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