ORIGINAL ARTICLE

Prevalence of Sleep Disorders in Moderate to Severe Type of Allergic Rhinitis

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Abstract

Aim and objective: To study the prevalence of sleep disorders in patients with moderate and severe types of allergic rhinitis (AR).

Materials and methods: Patients presenting to the ENT OPD of a tertiary care hospital were evaluated using validated tools. Those with symptoms of allergic rhinitis and having a score of >7 using the score for allergic rhinitis (SFAR) questionnaire, were assessed for severity of allergic rhinitis using allergic rhinitis and its impact on asthma (ARIA) classification. A total of 210 patients with moderate to severe AR were included. Associated sleep disorders were assessed using self-administered questionnaires—French version (HD 42) and Epworth sleepiness scale score (ESS). The data was compiled into IBM SPSS statistics 2.0 windows and correlated.

Results: Among 210 patients included in this study, the sleep disorders reported were insomnia in 59%, hypersomnia in 38.6%, and obstructive sleep apnea (OSA) in 2.4% with no gender or age significance ($p = 0.153$ and 0.173, respectively). A total of 83.3% of patients complained of tiredness on waking up in the morning and 54.3% of patients reported daytime somnolence. Snoring was correlated with OSA and was seen to be higher in males (45%, $p = 0.001$) and middle aged (42.96 years, $p = 0.002$).

Conclusion: There is a significant prevalence of sleep disorders in patients with moderate to severe allergic rhinitis. Early detection and treatment of these will improve their quality of life.

Clinical significance: Patients presenting with AR symptoms should be routinely questioned about their sleep quality and daytime somnolence so that early detection and aggressive treatment of AR can help in controlling the resultant sleep disturbances and thereby significantly improve the quality of life in these individuals.

Keywords: Allergic rhinitis, Cross-sectional study, Prevalence, Quality of life, Sleep disorders.

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Introduction

Allergic rhinitis (AR) is a very common disease affecting around 10–25% of the world's population.[1] It is characterized by inflammatory changes of the nasal mucosa in response to inhaled allergens. It is a multifactorial disease with interplay of genetic and environmental factors. Asthma and AR have closely related phenotypes. They are often seen to occur with atopy. This symptom complex is described as the "Allergic March". ARIA (allergic rhinitis and its impact on asthma) guidelines classify AR into mild, moderate, or severe depending on the effect it has on a person's work, school, and social life. Although not a severe disease, it can significantly affect the quality of life, academic achievements, and work productivity.

The inflammatory mediators are documented to cause the classic symptoms of allergic rhinitis, such as sneezing, itching, rhinorrhea, and nasal block. Other significant but often unappreciated symptoms are fatigue, mood changes and impairment of sleep, and cognitive function. Nasal congestion is the most bothersome symptom of AR and affects approximately 90% of patients[2] and contributes to sleep-disordered breathing (SDB).

Sleep is known to be essential for physical and mental health. Approximately 35% of adults with AR experience transient sleep difficulties and 10–20% suffer from chronic sleep disturbances.[2] The association of allergic rhinitis and sleep has been rarely studied. Nasal congestion is the most important etiologic factor for sleep disturbances in AR patients, causing them to wake up in-between sleep or making it difficult to fall asleep. AR is seen to impair sleep and poor sleep worsens allergic symptoms, resulting in a vicious cycle. Patients with severe AR and poor control of symptoms appear to have the worst outcome in terms of sleep. It is also a health hazard as it is linked with an increased risk of driving accidents, reduced work efficacy, and reduced concentration arising from sleep disturbance.

The present study attempts to evaluate the prevalence of sleep disorders in patients with moderate to severe AR.

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Materials and Methods

Study Design

Prospective cross-sectional study.

Patient Selection

Inclusion Criteria

Age between 18 and 50 years, presenting with symptoms suggestive of allergic rhinitis for at least 1 year duration.

The score of 7 or higher on a self-administered score for allergic rhinitis questionnaire.

Exclusion Criteria

Pre-existent nasal pathologies, such as grade 3 or 4 nasal polyps, and significant DNS.

Body mass index of > 35, neck circumference > 43 cm in males and >37 cm in females.

Sample Size

Based on the prevalence rate of insomnia (all types) and hypersomnia among moderate to severe (intermittent or persistent) AR reported in an earlier study and with 95% confidence and 20% allowable error, the minimum sample size was found to be 100 for insomnia and 200 for hypersomnia. In this study, 210 cases of moderate to severe AR were included.

Methodology

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Patients presenting to ENT OPD with symptoms of allergic rhinitis and having a score of >7 using the SFAR questionnaire were assessed for severity of allergic rhinitis using ARIA classification. Informed consent was taken from all patients and subsequently, 210 patients with moderate to severe AR were included in this study. They were assessed for sleep disturbances using one-time self-administered questionnaires—French Version Hotel Dieu-42 (HD 42) and Epworth sleepiness scale score (ESS).

Tools

The score for allergic rhinitis (SFAR)[3] is a validated and easy to use a scoring system for diagnosing AR without the need for any laboratory tests. It consists of 10 items with a score ranging from 0 to 16. Subjects who score greater than or equal to seven are classified as having AR.

Allergic Rhinitis and its Impact on Asthma Classification (ARIA): AR is classified into intermittent (IAR) or persistent (PAR) disease, seasonal or perennial, and in terms of severity into mild, moderate, severe depending on the impact on the patient's social life, work, school, and sleep.[4]

French version (HD-42) is used to assess the main sleep disorders according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-V), Fifth Edition, and the International Classification of Sleep Disorders (ICS-III), third edition. Sleep disorders were defined using the categories of items and criteria.[5]

DSM-V is the 2013 update to the Diagnostic and Statistical Manual of Mental Disorders, the diagnostic and taxonomic tool published by the American Psychiatric Association on psychiatric diagnoses.[6] The third edition of ICS is a key reference manual for identifying seven major categories that include insomnia disorders, sleep-related breathing disorders, central disorders of hypersomnolence, circadian rhythm sleep-wake disorders, sleep-related movement disorders, parasomnias, and other sleep disorders.[7] Epworth sleepiness scale is a well-recognized and accepted tool to measure the average daytime sleep propensity of patients during 8 normal to low activity situations.[8]

All the above tools were administered once each. Patients presenting with symptoms of allergic rhinitis were evaluated using the SFAR questionnaire first. Those with a score of ≥7 were assessed for the severity of AR by the ARIA guidelines. Among them, those with moderate to severe AR were evaluated for sleep disturbances using the HD-42 and Epworth sleepiness scale.

Statistical Analysis

Statistical analysis was done using IBM SPSS statistics 2.0 windows (SPSS Inc., Chicago, USA). For all the continuous variables the results are given as mean ± standard deviation and for categorical variables as a percentage. To compare the mean difference of numerical variables between two groups sample t-test was applied. To test the statistical significance of the difference in percentages with respect to categorical variables between the two groups, a Chi-square test was applied. A probability value (*p*-value) less than 0.05 was considered statistically significant.

Results

The mean age of subjects in our study was 38.8 years. Out of 210 patients included in the study, 52.8% (111) were males and 47.2% (99) were females (Table 1). The prevalence of sleep disorders in our study showed the prevalence of insomnia as 59%, hypersomnia to be 38.6%, and OSA to be 2.4% (Table 2). The mean age of patients diagnosed with insomnia, hypersomnia, and OSA were 39 years, 37 years, and 47 years, respectively. Out of 124 patients diagnosed with insomnia, 58% were males and 42% were females. Out of 81 patients diagnosed with hypersomnia, 45.4% were males and 55.6% were females. Among the 5 OSA patients, 60% were males and 40% were females (Table 4). The association between gender and sleep disorder ($p = 0.153$) and age and sleep disorders ($p = 0.173$) was not statistically significant.

The frequency of the various sleep complaints showed that 49% of patients reported taking more than 30 minutes to sleep (sleep latency), 48% of patients reported that they woke up >2 times at night, 37% of patients complained that they were unable to sleep

Table 1: Prevalence of sleep disorders: hypersomnia, insomnia, and OSA

Diagnosis	*Percentage (%)*
Hypersomnia	38.6
Insomnia	59
OSA	2.4

Table 2: Association of snoring with gender

	Snoring		
Gender	*No n (%)*	*Yes n (%)*	*p-value*
			<0.001
Male	61 (55%)	50 (45%)	
Female	81 (81.8%)	18 (18.8%)	

Table 3: Association of snoring and mean age

Snoring	*n*	*Mean ± SD*	*p-value*
Yes	68	42.96 ± 13.135	0.002
No	142	36.94 ± 12.745	

Table 4: Association of gender with sleep disorders

Gender	*Diagnosis*			*p-value*
Male (111)	Hypersomnia ($n = 81$)	Insomnia ($n = 124$)	OSA ($n = 5$)	0.153
	36 (45.4%)	72 (58%)	3 (60%)	
Female (99)	45 (55.6%)	52 (42%)	2 (40%)	

after waking up, 83.3% of patients were tired after waking up in the morning, 54.3% of patients reported daytime somnolence, and 20% of patients reported memory disturbances associated with sleep complaints.

Snoring was noted in 32.4% of patients but 95.7% of them were unaware that they snored at night. The mean age of snorers was 42.96 years. A total of 45% of males (50/111) and 19% (18/99) of females had snoring. The association of age and gender with snoring was found to be statistically significant ($p = 0.002$ and 0.001, respectively) (Table 3 and 4). Daytime sleepiness was reported more among females with a score of 8.40 on the Epworth sleepiness scale (ESS) score compared to males whose mean score was 7.49. The association between ESS score and gender was not significant ($p = 0.189$).

Discussion

This study provides important information on the relationship of AR to sleep complaints and sleep disorders. The mean age of our population was 38.8 years that included both males (52.8%) and females (47.2%) with moderate to severe AR in almost equal proportion, which is similar to various other studies.[2,5,6]

Prevalence of insomnia (59%) was found to be higher than hypersomnia (38.6) in this study, with OSA being reported only in 2.4% of the population, which may be due to the small sample size and comparatively low prevalence of this sleep disorder in the general population. This is comparable to the study done by Léger et al.[8] using the same methodology. The frequency of sleep complaints, such as difficulty in falling asleep, nocturnal awakening, early awakening, non-restorative sleep, and ESS score of patients in this study were found to be comparable to a similar study.[8] However, the frequency of the feeling of lack of sleep and frequency of snoring were comparatively lower in this study (14.7 and 13.6% lower, respectively) which may be due to the subjectivity in the experience of these symptoms.

Various studies have used different tests to assess sleep impairment in AR patients.[2,9–12] A study using the Pittsburgh sleep quality index (PSQI) to assess sleep impairment showed that 53.8% of moderate to severe AR patients had poor sleep and daytime sleepiness was seen to be 25.3%.[2] Our study included only patients with existing sleep complaints, hence the overall burden of sleep complaints in moderate to severe AR might not have been accounted for. The frequency of daytime sleepiness in this study was higher that may be because they were evaluated when they had the symptoms of AR. This is comparable to the study done by Stuck et al.[11], where daytime somnolence is correlated to higher ESS scores during the symptomatic period. The sedative effect of antihistamines (available as over-the-counter medication) used to treat AR could not be ruled out completely. The subjectivity of questionnaires used also may have influenced results.

The increased prevalence of OSA in males and middle-aged population in this study is similar to studies by Kremer et al. (mean age 60 years and 58% males)[12] and Gadi et al. (mean age 48years and 65% males).[13] Snoring has a strong association with OSA (90%).[13] The high prevalence of snoring among middle-aged individuals (42.96 years) and males (45%), point towards a higher predisposition to develop OSA in such patients. This is comparable to the study by Gadi et al. (mean age 48 years and 65% males)[13] and Kramer et al. (mean age 60 years and 58% males).[14]

In the present study, questionnaires were used as a screening tool to assess for sleep disorders. However, this might not be accurate enough to assess sleep disorders like OSA that requires confirmation by a gold standard diagnostic test like polysomnography.[13] As this is expensive, it was decided not to use it as part of this study, with the patient presenting primarily with AR symptoms. Symptoms experienced by patients are subjective, hence are less reliable. Furthermore, other factors affecting sleep were also not assessed.

Alleviation of nasal congestion by the use of intranasal corticosteroids like fluticasone[15], budesonide,[16] and triamcinolone acetonide[17] are seen to significantly improve sleep impairment and consequently the quality of life of patients. The effect of treatment of allergic rhinitis on sleep disorders or the intake of concomitant drugs by these patients was not assessed in this study.

Conclusion

There is a high prevalence of sleep disorders among patients with moderate to severe type of allergic rhinitis. Insomnia is the most prevalent type of sleep disorder in such cases. Routine use of screening questionnaires to detect sleep disorders is indicated in an ENT and allergy clinic.

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