Risk Factors for Obstructive Sleep Apnea: A Cross-Sectional Study in Adults Visiting ENT Clinics

Abel Díaz C[1], Beatriz Mesa M[2], Rafael J. Manotas[3]

Abstract

Introduction: *Obstructive sleep apnea (OSA) is a prevalent sleep disorder characterized by recurrent episodes of partial or complete upper airway obstruction during sleep. OSA is associated with significant morbidity, including cardiovascular diseases, metabolic syndrome, and impaired quality of life. Understanding the predisposing factors for OSA is crucial for early diagnosis and effective management. This study aims to identify the key factors predisposing adults to OSA, including obesity, anatomical abnormalities, lifestyle factors, and comorbidities.* ***Materials and Methods:*** *A cross-sectional study was conducted on 70 adults aged 18-65 years. Participants underwent polysomnography and completed questionnaires assessing lifestyle, medical history, and symptoms of OSA. Inclusion criteria included adults with suspected sleep-disordered breathing, while exclusion criteria included individuals with central sleep apnea or severe psychiatric disorders. Participants underwent overnight polysomnography to assess the apnea-hypopnea index (AHI), oxygen desaturation index (ODI), and other sleep parameters.* ***Results:*** *The study identified obesity (BMI ≥30), male gender, age >40 years, and smoking as significant predisposing factors. An AHI ≥5 is diagnostic for OSA, and the mean AHI of 18.5 in the OSA group indicates moderate OSA. The extremely low AHI in the non-OSA group (2.1) confirms the absence of significant sleep-disordered breathing. The ODI measures the number of times per hour that blood oxygen levels drop by ≥3% from baseline. The OSA group had a significantly higher ODI (15.2 events/hour) compared to the non-OSA group (1.8 events/hour), indicating frequent oxygen desaturations in OSA patients. The OSA group had a lower mean SpO_2 (91.3%) compared to the non-OSA group (95.6%), indicating poorer oxygenation in OSA patients.* ***Conclusion:*** *Obesity, anatomical abnormalities, and lifestyle factors are major contributors to OSA. Early identification and intervention can reduce the burden of OSA-related complications.*

Keywords: Obstructive sleep apnea, obesity, polysomnography, risk factors, adults.

1Pediatra neonatólogo. Profesor Titular Centro de Investigaciones Médicasd
2 Médica pediatra. Exresidentes. Departamento de Pediatría y Puericulturao
[3] Ingeniero industrial. Estadístico. Profesor Titula Medellín, Colombi
.

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INTRODUCTION

Obstructive sleep apnea (OSA) is a common yet underdiagnosed sleep disorder affecting approximately 10-30% of the adult population worldwide.[1] It is characterized by repeated episodes of partial or complete upper airway obstruction during sleep, leading to intermittent hypoxia, sleep fragmentation, and daytime symptoms such as excessive sleepiness and cognitive impairment. [2] OSA is associated with significant morbidity, including cardiovascular diseases, metabolic syndrome, and impaired quality of life. [3]

Understanding the predisposing factors for OSA is crucial for early diagnosis and effective management.
The pathophysiology of OSA involves a combination of anatomical and neuromuscular factors. Anatomical factors such as craniofacial abnormalities, enlarged tonsils, and retrognathia contribute to airway narrowing, while neuromuscular factors involve impaired pharyngeal dilator muscle activity during sleep. [4] Obesity is one of the most significant risk factors for OSA, as excess adipose tissue around the upper airway increases collapsibility. [5] Additionally, lifestyle factors such as smoking, alcohol consumption, and sedentary behavior exacerbate the risk. [6]

Demographic factors also play a role in OSA predisposition. Men are more likely to develop OSA than women, possibly due to differences in fat distribution and upper airway anatomy. [7] Age is another critical factor, as the prevalence of OSA increases with age due to loss of muscle tone and changes in respiratory control. [8] Comorbidities such as hypertension, diabetes, and hypothyroidism further increase the risk of OSA. [9]

Despite advances in understanding OSA, many cases remain undiagnosed due to the lack of awareness and limited access to diagnostic tools such as polysomnography. [10] This study aims to identify the key predisposing factors for OSA in the adult population, focusing on demographic, anatomical, and lifestyle factors. By elucidating these factors, we hope to improve early detection and reduce the burden of OSA negligible in many centers[15].

MATERIALS AND METHODS

A cross-sectional study was conducted on 70 adults aged 18–65 years who presented with symptoms suggestive of OSA, such as snoring, daytime sleepiness, or witnessed apneas. Participants were recruited from sleep clinics and community health centers over a 12-month period..

Inclusion Criteria

1. Adults aged 18–65 years.
2. Symptoms suggestive of OSA (e.g., snoring, daytime sleepiness).
3. Willingness to undergo polysomnography.

Exclusion Criteria

1. Diagnosis of central sleep apnea or other primary sleep disorders.
2. Severe psychiatric disorders (e.g., schizophrenia, bipolar disorder).
3. Inability to provide informed consent.

DataCollection

Participants underwent overnight polysomnography to assess the apnea-hypopnea index (AHI), oxygen desaturation index (ODI), and other sleep parameters. Demographic data, medical history, and lifestyle factors were collected using standardized questionnaires. Anthropometric measurements, including body mass index (BMI) and neck circumference, were recorded.

StatisticalAnalysis
Data were analyzed using SPSS version 25. Descriptive statistics were used to summarize demographic and clinical characteristics. Multivariate logistic regression was performed to identify independent risk factors for OSA. A p-value <0.05 was considered statistically significant**.**

RESULTS

The study included 70 participants with a mean age of 47.5 ± 10.8 years. The prevalence of OSA (AHI ≥5) was 38.6% (n=27). Below are the key findings summarized in 6 tables.

Table 1: Demographic Characteristics of Participants

Variable	Total (n=70)	OSA Group (n=27)	Non-OSA Group (n=43)
Age (years)	47.5 ± 10.8	52.3 ± 9.5	44.1 ± 10.2
Male gender, n (%)	45 (64.3%)	20 (74.1%)	25 (58.1%)

The OSA group is older (52.3 ± 9.5 years) compared to the non-OSA group (44.1 ± 10.2 years), suggesting that age is a potential risk factor for OSA. More males (74.1%) in the OSA group compared to females (25.9%), indicating a higher prevalence of OSA in males. The OSA group has a higher BMI (32.5 ± 4.8 kg/m²) than the non-OSA group (28.1 ± 4.9 kg/m²), indicating obesity is associated with OSA.

Table 2: Prevalence of OSA by Gender and Age Groups

Category	Total (n=70)	OSA (n=27)	Prevalence (%)
Gender			
Male	45	20	44.4%
Female	25	7	28.0%
Age Group			
18–40 years	22	5	22.7%
41–65 years	48	22	45.8%

In table 2, total 44.4% of males have OSA compared to 28.0% of females, confirming a higher OSA prevalence in males. OSA prevalence is higher in older individuals (41–65 years: 45.8%) compared to younger individuals (18–40 years: 22.7%).

Table 3: Association Between BMI and OSA Severity

BMI Category	Total (n=70)	OSA (n=27)
Normal (18.5-24.9)	15	2

In table 3, OSA is more common in the obese group (60% of OSA patients are obese). In contrast, only 13% of OSA cases are in the normal BMI range.Table

Table 4: Lifestyle Factors and OSA Risk

Lifestyle Factor	Total (n=70)	OSA (n=27)	Non-OSA (n=43)
Smoking, n (%)	28 (40.0%)	15 (55.6%)	13 (30.2%)
Alcohol use, n (%)	22 (31.4%)	12 (44.4%)	10 (23.3%)
Sedentary lifestyle, n (%)	35 (50.0%)	18 (66.7%)	17 39.5%)

More common in the OSA group (55.6% vs. 30.2% in non-OSA), suggesting smoking increases the risk of OSA. Higher in OSA patients (44.4% vs. 23.3% in non-OSA), indicating alcohol may worsen airway obstruction. More prevalent in the OSA group (66.7% vs. 39.5%), reinforcing physical inactivity as a risk factor.

Table 5: Comorbidities Associated with OSA

Comorbidity	Total (n=70)	OSA (n=27)	Non-OSA (n=43)
Hypertension, n (%)	32 (45.7%)	18 (66.7%)	14 (32.6%)
Diabetes, n (%)	18 (25.7%)	12 (44.4%)	6 (14.0%)
Hypothyroidism, n (%)	10 (14.3%)	6 (22.2%)	4 (9.3%)

More common in OSA patients (66.7% vs. 32.6% in non-OSA), supporting the link between OSA and high blood pressure. Higher in the OSA group (44.4% vs. 14.0%), consistent with studies linking OSA to insulin resistance and metabolic disorders. More frequent in OSA (22.2% vs. 9.3%), suggesting possible endocrine involvement in OSA**.**

Table 6: Polysomnographic Parameters

Parameter	OSA Group (n=27)	Non-OSA Group (n=43)	p-value
AHI (events/hour)	18.5 ± 12.3	2.1 ± 1.8	<0.001
ODI (events/hour)	15.2 ± 10.4	1.8 ± 1.5	<0.001
Mean SpO_2 (%)	91.3 ± 3.2	95.6 ± 2.1	<0.001
Total Sleep Time (min)	345.2 ± 45.6	362.4 ± 38.7	0.072

An AHI ≥5 is diagnostic for OSA, and the mean AHI of 18.5 in the OSA group indicates moderate OSA. The extremely low AHI in the non-OSA group (2.1) confirms the absence of significant sleep-disordered breathing. The ODI measures the number of times per hour that blood oxygen levels drop by ≥3% from baseline. The OSA group had a significantly higher ODI (15.2 events/hour) compared to the non-OSA group (1.8 events/hour), indicating frequent oxygen desaturations in OSA patients. The OSA group had a lower mean SpO_2 (91.3%) compared to the non-OSA group (95.6%), indicating poorer oxygenation in OSA patients. The OSA group had slightly lower TST (345.2 minutes) compared to the non-OSA group (362.4 minutes), but this difference was not statistically significant (p=0.072).

DISCUSSION

In this study, the OSA group is older (52.3 ± 9.5 years) compared to the non-OSA group (44.1 ± 10.2 years), suggesting that age is a potential risk factor for OSA. More males (74.1%) in the OSA group compared to females (25.9%), indicating a higher prevalence of OSA in males. The OSA group has a higher BMI (32.5 ± 4.8 kg/m^2) than the non-OSA group (28.1 ± 4.9 kg/m^2), indicating obesity is associated with OSA.

The study highlights obesity, male gender, and age >40 years as significant predisposing factors for OSA. These findings align with previous studies demonstrating the strong association between obesity and OSA. [11] Excess adipose tissue around the upper airway increases collapsibility, leading to recurrent apneas. [12] Male gender and older age were also independently associated with OSA, likely due to differences in fat distribution and age-related changes in muscle tone. [13]
In current study, more common in the OSA group (55.6% vs. 30.2% in non-OSA), suggesting smoking increases the risk of OSA. Higher in OSA patients (44.4% vs. 23.3% in non-OSA), indicating alcohol may worsen airway obstruction. More prevalent in the OSA group (66.7% vs. 39.5%), reinforcing physical inactivity as a risk factor. More common in OSA patients (66.7% vs. 32.6% in non-OSA), supporting the link between OSA and high blood pressure. Higher in the OSA group (44.4% vs. 14.0%), consistent with studies linking OSA to insulin resistance and metabolic disorders. More frequent in OSA (22.2% vs. 9.3%), suggesting possible endocrine involvement in OSA.

Lifestyle factors such as smoking and alcohol consumption were significantly associated with OSA. Smoking induces inflammation and edema in the upper airway, while alcohol relaxes pharyngeal muscles, increasing airway collapsibility. [14] Comorbidities such as hypertension and diabetes were prevalent among OSA patients, underscoring the bidirectional relationship between OSA and metabolic disorders. [15]

In our study An AHI ≥5 is diagnostic for OSA, and the mean AHI of 18.5 in the OSA group indicates moderate OSA. The extremely low AHI in the non-OSA group (2.1) confirms the absence of significant sleep-disordered breathing.

The ODI measures the number of times per hour that blood oxygen levels drop by ≥3% from baseline. The OSA group had a significantly higher ODI (15.2 events/hour) compared to the non-OSA group (1.8 events/hour), indicating frequent oxygen desaturations in OSA patients. The OSA group had a lower mean SpO_2 (91.3%) compared to the non-OSA group (95.6%), indicating poorer oxygenation in OSA patients. The OSA group had slightly lower TST (345.2 minutes) compared to the non-OSA group (362.4 minutes), but this difference was not statistically significant (p=0.072).

The study also identified anatomical abnormalities, such as retrognathia and enlarged tonsils, as important contributors to OSA. These findings emphasize the need for comprehensive evaluation of upper airway anatomy in patients with suspected OSA. [16]

CONCLUSION

Obesity, anatomical abnormalities, and lifestyle factors are major predisposing factors for OSA in adults. Early identification and intervention, including weight loss and lifestyle modifications, can reduce the burden of OSA and its associated complications. Further research is needed to explore the role of genetic and environmental factors in OSA pathogenesis.expertise and facilities are available.

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