Deciphering Obstructive Sleep Apnoea Syndrome: A Clinical Profile Analysis of Patients in a Tertiary Care Hospital in Eastern Nepal

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ABSTRACT

Background: Obstructive Sleep Apnoea Syndrome (OSAS) is a common disorder comprising repeated events of partial or complete obstruction of the upper airway during sleep, thereby disturbing sleep and other physiological events and leading to long-term consequences. The condition is often left underdiagnosed, particularly in regions like Eastern Nepal, where awareness and access to diagnostic tools are limited.

Objective: This paper will examine the clinical profile of OSA in the eastern region of Nepal, focusing on its risk factors and associated comorbidities.

Methods: This study was conducted as a hospital-based descriptive cross-sectional study at Nobel Medical College and Teaching Hospital from November 2023 to November 2024. A sample of thirty adults diagnosed with OSA by polysomnography (PSG) according to American Academy of Sleep Medicine diagnostic criteria were included. Patients with untreated OSAS were included; those with respiratory failure, heart failure, shock, and recent ICU admission were excluded. Data regarding demographics, risk factors, co-morbidities, spirometry, and PSG data were collected and analyzed with SPSS version 25.

Results: A total of 30 OSA patients were enrolled in the study, comprising 20 males (66.7%) and 10 females (33.3%). The mean age was 54.07 years, with the 40–60 age group being the most common. Among the participants, 14 (46.7%) had mild OSA, 11 (36.7%) had moderate OSA, and 5 (16.7%) had severe OSA. Additionally, 7 patients (23.3%) had hypertension, and 4 (13.3%) had diabetes. Regarding spirometry findings, restrictive patterns (46.7%) were predominant among patients, followed by obstructive patterns (20%) and normal findings (33.3%).

Conclusion: OSA is a complex, multifactorial disease with distinct phenotypes commonly prevalent among the Nepalese population, which needs early diagnosis and proper treatment. OSA evaluation should comprise both sleep-related complaints and nonspecific symptoms simultaneously.

Keywords: Obstructive Sleep Apnea Syndrome, Polysomnography

INTRODUCTION:

Obstructive Sleep Apnoea (OSA) stands as a significant yet often underdiagnosed health concern worldwide, characterized by repetitive episodes of partial or complete upper airway obstruction during sleep[1]. Its prevalence varies widely across different populations and regions, influenced by genetic predispositions, lifestyle factors, and underlying medical conditions[2]. In recent years, the understanding and recognition of OSA have evolved, highlighting its profound impact on both individual health and public health systems[3].

In the context of Nepal, a country undergoing rapid demographic and epidemiological transitions, the burden of OSA remains relatively less explored, particularly in regions such as Eastern Nepal. This study endeavours to fill this gap by providing a comprehensive clinical profile analysis

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of patients diagnosed with OSA at a tertiary care hospital in Eastern Nepal. By examining demographic patterns, clinical characteristics, associated comorbidities, and treatment modalities, this research aims to elucidate the nuanced presentation and management of OSA within this specific regional context.

METHODS

A Hospital-based cross-sectional study was carried out in the Department of Critical Care and Sleep Medicine at Nobel Medical College and Teaching Hospital, a tertiary care center in the eastern region of Nepal. 30 patients diagnosed with OSA according to American Academy of Sleep Medicine (AASM) criteria by standard polysomnography (PSG) and giving informed consent were enrolled in the study. The study was conducted from November 2023 to November 2024 after taking approval from the Institutional Review Committee. Participants included in the study were adults over the age of 18 who had a diagnosis of OSA according to the criteria set forth by the AASM. Participants further qualified through documented evidence of OSA as assessed by laboratory-based PSG, with full qualifications recorded. Furthermore, the study included only individuals whose OSA was not treated via continuous positive airway pressure (CPAP) therapy, oral appliances, or other forms of treatment. Patients with respiratory failure or heart failure, shock, or admitted to the ICU were excluded from the study.

Detailed history, including risk factors, comorbidities, and examination, including waist circumference, was taken along with a 2D echo done to look for pulmonary artery pressure. Spirometry was carried out to look for obstructive/restrictive airway findings. Overnight PSG was conducted at Nobel Medical College Hospital in the sleep laboratory using a digital system (EMBLA S 4500; Embla Systems, Broomfield, CO). All the PSG studies were supervised and attended by an experienced sleep technician. Apnea, hypopnea, obstructive apnea, or central apnoea were diagnosed according to AASM criteria. The results were illustrated in tabular and graphical formats. Data were analyzed using SPSS version 25.

RESULTS

1. Baseline characteristics of study population:

Among our 30 subjects, 20 (66.7%) were male and 10 (33.3%) were female. The mean age of the patients was 54.7 ± 9.18. The characteristics of the study population are displayed in Table 1. Age and gender distribution of patients presenting with OSA are depicted in Figures 1 and 2.

Table 1. Baseline characteristics of the patients presenting with OSA

Characteristics	Category	Number (n)	Percentage (%)
Age (yrs)	<40	4	13.3
	40-60	15	50.0
	>60	11	36.6
Gender	Male	20	66.7
	Female	10	33.3
Occupation	Agriculture	4	13.3
	Business	22	73.3
	Student	1	3.3
	Household	3	10
Residence	Terai	22	73.3
	Hilly region	6	20.0
	Mountain region	2	6.7

Figure 1. Age distribution of patients presenting with OSA

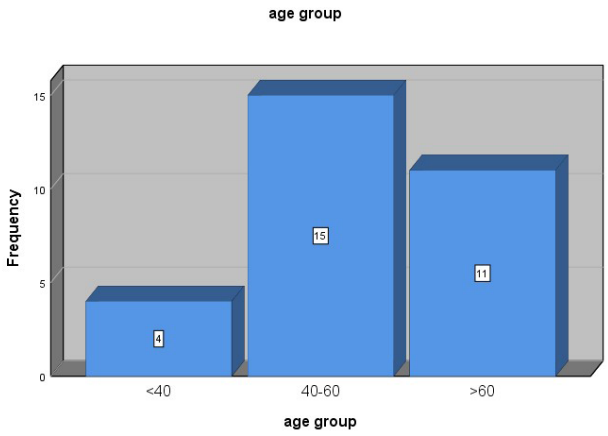
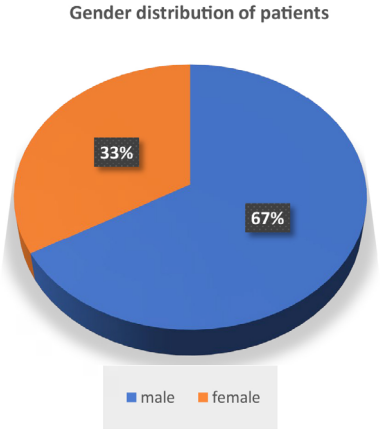


Figure 2. Gender distribution of patients presenting with OSA



2. Risk characterization of patients presenting with OSA

Most of our patients were obese, with an average BMI of 35.13 ± 4.39. Most patients had class II obesity. The mean waist circumference was 115 ± 5.14. Risk characterization of patients presenting with OSA is illustrated in Table 2.

Table 2. Risk characterization of patients presenting with OSA

Characteristics	Category	Number (n)	Percentage (%)
Obesity	Overweight	2	6.7
	Class I	5	16.7
	Class II	16	53.3
	Class III	7	23.3
Smoker		9	30
Alcohol consumption		10	33.3

3. Sleep-related complaints among the patients presenting with OSA

The most common sleep-related presenting complaint among patients in our study was snoring, which was present in 25 (86.2%) patients, followed by excessive daytime sleepiness and witnessed breathing pauses (both 72.4%). Sleep-related complaints among the patients presenting with OSA are depicted in Table 3.

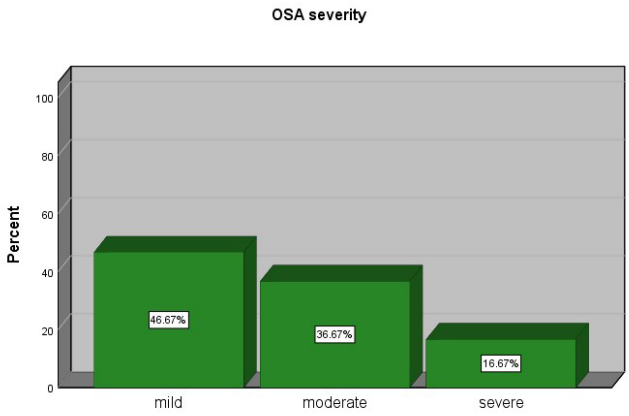
Table 3. Sleep-related complaints among the patients presenting with OSA

Sleep-related complaints	Frequency (n)	Percentage (n)
Loud Snoring	25	86.2
Witnessed breathing pauses	21	72.4
Daytime sleepiness	21	72.4
Morning headache	13	44.8
Decreased concentration	17	58.6

4. Severity characterization of patients presenting with OSA based upon polysomnography:

An overnight PSG was done to assess the severity of OSA. Based on the AHI index, mild OSA (46.7%) was the most common, followed by moderate (36.7%) and severe OSA (16.7%), respectively (Figure 3).

Figure 3: Categorization of OSA severity based upon polysomnography



5. Comorbidities associated with OSA

Hypertension (23.3%) was the most common associated comorbidity, followed by diabetes mellitus (13.3%), ischemic heart disease (3.3%), and hypothyroidism (3.3%), respectively (Table 4).

Table 4: Comorbidities

Comorbidities	Number of patients	Percentage (%)
Hypertension	7	23.3
Diabetes mellitus	4	13.3
Ischemic heart disease	1	3.3
Hypothyroidism	1	3.3

6. Findings on spirometry in patients with OSA

On spirometry, 14 patients (46.7%) had a restrictive abnormality, while 10 patients (33.3%) had normal spirometry (Table 5).

Table 5: Spirometry findings

Spirometry findings	No. of patients	Percentage (%)
Normal	10	33.3
Obstructive	6	20
Restrictive	14	46.7

DISCUSSION:

In our study, we have discussed the contemporary clinical presentation and demographics of patients presenting with OSA in Nepal. The Majority (73.3%) of patients presenting with OSA in our study were from the geographical area of the plain Terai in Nepal. This is similar to the study done by Verma et al.[4] Recent studies reported that ambient temperature modulates the severity of OSA.[5] In addition, another reason which could explain this finding is that the Terai region is

more developed than other regions. Moreover, obesity is common in the Terai region due to the higher concentration of urban areas.[6] The prevalence of OSA seems to gradually rise with middle age, just like the mean age of OSA patients in our group, being 54 years. The Majority of the patients (50%) fell between the ages of 40 and 60. This concurs with many of the international and Indian studies, which show that aging is a risk factor for OSAS, which is still highly prevalent in the elderly, and gender differences decreased significantly post-menopause[7–9]. Similarly, male gender is another important risk factor associated with OSAS. Clinical-based studies had previously reported a significant gender gap in the prevalence of OSA, but a few of the latest studies demonstrated that the prevalence of OSAS is only 1.5-3 times higher in men than in women, and this gender gap narrows even further after menopause.[10] Women may not present with the 'classic' symptoms of OSAS, leading to fewer referrals for a formal evaluation.[11,12] However, our study shows male predisposition as far as OSAS is concerned. Sixty-seven percent (67%) of OSA patients were males, whereas thirty-three percent (33%) were females, suggesting an odds ratio of 2. The most common OSA symptoms listed by Spicuzza L et al. 13 were snoring and daytime sleepiness. Consistently, the most common symptoms in our patients were loud snoring, observed apnea by a bed partner, daytime sleepiness, morning headache, and reduced concentration. Most of the patients visited our center due to snoring, particularly when it was loud following disturbances to their bed partners. However, upon further questioning, symptoms such as daytime sleepiness, morning headaches, and decreased concentration were also reported by a substantial number of patients. These atypical presentations are likely to be misdiagnosed and treated as other conditions, such as depression or subclinical hypothyroidism. In contrast to the study conducted by Verma et al., we observed a significant number of patients reporting witnessed breathing pauses and decreased concentration.[4] Besides, a considerable proportion of patients reported experiencing morning headaches. This new evidence, highlighting gender-related differences in the clinical presentation of OSA in female patients, particularly the search for surrogate features such as insomnia and poor sleep quality, may enhance clinicians' awareness of the condition. This, in turn, could lead to improved screening and more frequent referrals for OSA diagnosis in patients. The severity of OSA in women seems to be attenuated in the postmenopausal years of the fifth to sixth decade, as menopause may influence the sleep architecture.[4,12] It is crucial to consider menopausal status in female patients during OSA evaluation, which is helpful to analyze the higher risk of OSA along with early diagnosis and proper treatment among Nepalese patients. Obesity is a well-established risk factor for OSA, and higher body mass index (BMI) is correlated with OSA severity. In our study, the majority of patients had class II obesity, with the mean BMI being 35 kg/m^2.

In our study, 30% of patients were smokers, whereas 33% had a history of alcohol abuse. In comparison to the study conducted by Kandasamy et al., the prevalence of smoking was higher in our patients, while the rate of alcohol abuse was comparable.[1] Alcohol drinking habit was found to be an independent risk factor for OSA.[14] Hence, it is recommended to abstain from drinking in order to lessen the risk and severity of OSA. Multiple studies from various countries have shown an increased prevalence and severity of OSA among smokers, possibly due to the heightened risk of respiratory diseases, which are well-established risk factors for OSA.[15] However, there is a lack of studies specifically addressing the prevalence of smoking among patients with OSA.

Most studies conducted globally on obstructive sleep apnea (OSA) have reported a predominance of moderate to severe cases. For instance, studies by Uyar et al. in Turkey and Bansal et al. in India have highlighted a higher prevalence of moderate to severe OSA among diagnosed individuals.[9,16] In contrast, our study found that mild OSA constituted the majority of cases, representing a notable deviation from the existing literature. Various medical comorbidities are known to contribute to the development and progression of OSA, which may influence the severity distribution observed across different populations. In a study by Utpat et al., 66% of patients had hypertension, 24% had ischemic heart disease (IHD), and 43% had diabetes mellitus (DM). Similarly, our study also reported hypertension being the most common comorbidity, followed by DM. Emerging evidence and studies suggest that a causal association between OSAS and hypertension exists, whereby hypertension is an independent risk factor in OSAS patients[17]. In terms of the severity of OSA, 47% of our patients had mild OSA, followed by moderate and then severe OSA, respectively. This contrasts with most of the other studies, where moderate to severe OSA is more prevalent. A study by Utpat et al. also reported that moderate to severe OSA was more common. Increasing evidence suggests mild OSA is associated with reduced quality of life, including general tiredness, fatigue, difficulty concentrating on task completion, and poor quality of sleep. This may explain why complaints like morning headaches and decreased concentration were common in our study, as mild OSA was the most prevalent severity level among our patients. Several studies have demonstrated that patients with OSA frequently exhibit spirometry abnormalities. A prospective study involving 50 patients with OSA found that 70% had abnormal spirometry results, with restrictive patterns being notably more prevalent than obstructive ones.[18] This suggests that lung function impairment is a significant concern in this population. These findings align with our study, where restrictive patterns were more predominant than obstructive among patients.

CONCLUSION

In conclusion, OSA is a complex, multifactorial disease with distinct phenotypes. Our study concluded that the milder form of OSA is the most common, which needs early evaluation considering both sleep-related complaints and nonspecific symptoms simultaneously. We believe that our findings from this study may have both prognostic and public

health significance. Although OSA is highly prevalent in Nepal, it largely remains undetected due to a lack of OSA awareness, proper polysomnography facilities, and experienced sleep technicians, and following a symptom-based approach only during OSA evaluation. The study is limited by the fact that it represents only one hospital experience. Nevertheless, this preliminary data may serve to raise the awareness among physicians and the public of OSAS and its repercussions.

FUNDING

None

DATA AVAILABILITY STATEMENT

The data of this study are available from the corresponding author upon request.

ETHICS CONSIDERATIONS

An ethical clearance was taken from Nobel Medical College and Teaching Hospital.

CONFLICT OF INTEREST

None

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