Section: Psychiatry

Original Research Article

A STUDY OF CLINICAL FEATURES OF PATIENTS WITH DEPRESSION SUFFERING FROM OBSTRUCTIVE SLEEP APNEA

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ABSTRACT

Background: Depression and obstructive sleep apnea (OSA) often coexist, complicating diagnosis and treatment due to overlapping clinical features. This study aims to evaluate the clinical features and prevalence of OSA risk in patients with depression, specifically in an Indian population.

Materials and Methods: A hospital-based, observational, cross-sectional study was conducted in a tertiary care psychiatric outpatient department. Patients diagnosed with depression were assessed for OSA risk using the Berlin Questionnaire, and depression severity was evaluated using the HAM-D scale.

Results: Among the 30 participants, 56.7% were at high risk for OSA. Male patients (63.3%) and those above 60 years (43.3%) were more likely to be at high risk. Cognitive impairment and fatigue were common in both depression and OSA patients. Anxiety symptoms showed a significant association with high OSA risk ($p = 0.048$). The mean BMI was 27.8, and body weight was significantly higher in the high-risk OSA group ($p = 0.032$).

Conclusion: The study highlights a high prevalence of undiagnosed obstructive sleep apnea among patients with depression, particularly in older, overweight males with comorbid anxiety symptoms. Routine screening for OSA using validated tools in psychiatric settings is essential for early identification and may contribute to improved clinical outcomes through integrated management of both conditions.

Keywords: Depression, Obstructive Sleep Apnea, Cognitive Impairment.

INTRODUCTION

Depression and obstructive sleep apnea (OSA) are two of the most prevalent and debilitating conditions affecting individuals worldwide. Both conditions have far-reaching implications on health, productivity, and quality of life. The relationship between depression and OSA is complex, complicated, and increasingly recognized in both psychiatric and sleep medicine literature.[1] Understanding the clinical features of patients with coexisting depression and OSA is vital for accurate diagnosis, effective treatment, and improved patient outcomes.

Obstructive sleep apnea is characterized by repeated episodes of complete or partial upper airway obstruction during sleep causing disruption of normal sleep architecture and intermittent hypoxia[2] Common symptoms of OSA include loud snoring, witnessed apneas & gasping during sleep, excessive daytime sleepiness, fatigue, morning headaches, and impaired concentration.[3] In India, the rising burden of lifestyle-related risk factors has contributed to an increasing prevalence of OSA.[4]

Depression, on the other hand, is a mood disorder characterized by persistent sadness, loss of interest or pleasure, fatigue, cognitive impairments, sleep disturbances, and somatic complaints.[5] It is one of the leading causes of disability worldwide and contributes significantly to the global burden of disease.[6] In India, depression affects a substantial proportion of the population, often underdiagnosed due to cultural, social, and systemic barriers.[7] The overlap in symptoms between depression and OSA such as fatigue, poor concentration, and sleep disturbances—can complicate the diagnostic process.[8]

Several studies have suggested a bidirectional relationship between OSA and depression.[9] OSA contributes to the development or worsening of depressive symptoms through mechanisms such as sleep fragmentation, hypoxia-induced neuroinflammation, and dysregulation of neurotransmitters like serotonin and dopamine.[10] Conversely, depression may increase the risk of developing OSA by influencing sleep patterns, reducing airway muscle tone, and increasing the likelihood of weight gain due to lifestyle changes.[11] The co-occurrence of these two conditions is associated with more severe clinical manifestations of depressive disorder, greater functional impairment, and poorer treatment response than either condition alone.[12]

Neurobiological theories propose that chronic intermittent hypoxia in OSA may lead to structural and functional changes in brain regions involved in mood regulation, including the prefrontal cortex, hippocampus, and amygdala.[13] These changes may exacerbate depressive symptoms and contribute to treatment resistance of depressive disorder.[14,15]

In depression, these patients with untreated OSA may have a suboptimal response to antidepressant therapy, highlighting the importance of evaluating for sleep disorders in cases of treatment-resistant depression.[16] The Indian context presents unique challenges in managing comorbid depression and OSA. Cultural stigma, limited awareness, resource constraints, and underdeveloped sleep medicine infrastructure contribute to underdiagnosis and undertreatment.[17] Primary care physicians and psychiatrists play a crucial role in recognizing the interplay between mental health and sleep disorders.[18]

Understanding the sociodemographic and clinical features of patients with depression who are at risk for obstructive sleep apnea can aid in identifying high-risk individuals, facilitate early screening, and inform tailored management strategies, thereby improving overall clinical outcomes.[19]

The present study aims to examine the clinical features of patients diagnosed with depressive disorders and to assess the prevalence and risk of obstructive sleep apnea among them, with the objective of identifying common patterns and supporting correct diagnosis and integrated treatment approaches.

MATERIALS AND METHODS

Study Design: This was a hospital-based, observational, cross-sectional study designed to assess the association between obstructive sleep apnea (OSA) and clinical features in patients diagnosed with depressive disorders.

Study Setting: The study was conducted in the psychiatry outpatient department of a tertiary care hospital in Sangli, Maharashtra, where patients with depressive episodes routinely receive psychiatric evaluation and treatment.

Study Duration: The study was carried out over a period of three months, from August 2024 to October 2024, during which eligible patients were recruited and assessed.

Participants – Inclusion & Exclusion Criteria: Participants included adults over 18 years diagnosed with depressive disorders (ICD-10: F31.3–F31.5, F32, F33). Patients in remission, those with other primary psychiatric diagnoses, or those unwilling to give consent were excluded.

Study Sampling: Convenience sampling was used to include all eligible and consenting patients attending the psychiatry OPD during the study period.

Study Sample Size: All patients with depressive disorders meeting the inclusion criteria and presenting during the three-month study period were enrolled; no fixed sample size was pre-determined.

Study Groups: Based on responses to the Berlin Questionnaire, participants were classified into high-risk or low-risk groups for obstructive sleep apnea for analytical comparison.

Study Parameters: Data collected included demographic variables, clinical features such as sleep, appetite, libido, symptom profile, BMI, and assessment scores from HAM-D and Berlin Questionnaire.

Study Procedure: After obtaining informed consent, patients were interviewed using a structured format. Depression severity was assessed with HAM-D, and OSA risk was screened using the Berlin Questionnaire.

Study Data Collection: Data was collected by the investigator during routine OPD visits using standardized forms and tools. All information was recorded and coded for analysis.

Data Analysis: Data was analyzed using appropriate statistical software. Descriptive statistics and tests of association (chi-square, t-test) were applied with a significance threshold of $p<0.05$.

Ethical Considerations: Ethical approval was obtained from the institutional ethics committee. Written informed consent was taken, and all patient data was kept confidential with no risks involved.

RESULTS

The majority of participants were male (63.3%), above 60 years (43.3%), and reported disturbed sleep (66.7%) and cognitive impairment (66.7%). Over half (56.7%) were at high risk for obstructive sleep apnea [Table 1].

Participants had a mean depression score (HAM-D) of 20.03, indicating moderate depression; the average BMI was 27.8, suggesting that most were overweight [Table 2].

Table 1: Demographic and Clinical Features of Patients with Depression and Obstructive Sleep Apnea

Category	Frequency	Percent
Age (in years)18 – 30	3	10
31 - 45	8	26.7
46 – 60	6	20
> 60	13	43.3
Sex Female	11	36.7
Sex Male	19	63.3
(Sleep) Disturbed	20	66.7
(Sleep) Normal	10	33.3
(Appetite) Decreased	17	56.7
(Appetite) Normal	13	43.3
(Libido) Decreased	20	66.7
(Libido) Normal	10	33.3
Severity of Depression Mild	8	26.7
Severity of Depression Moderate	9	30
Severity of Depression Severe	13	43.3
Type of Depression Bipolar	11	36.7
Type of Depression Recurrent	7	23.3
Type of Depression Unipolar	12	40
(Fatigue) Absent	12	40
(Fatigue) Present	18	60
(Cognitive Function) Impaired	20	66.7
Unimpaired (Cognitive Function)	10	33.3
(Anxiety Symptoms) Absent	12	40
(Anxiety Symptoms) Present	18	60
(Psychotic Symptoms) Absent	23	76.7
(Psychotic Symptoms) Present	7	23.3
Risk of Sleep Apnea High	17	56.7
Risk of Sleep Apnea Low	13	43.3

Table 2: Descriptive Statistics of Clinical Measures in Patients with Depression and OSA

Descriptive Statistics					
	No. of patients	Minimum	Maximum	Mean	Std. Deviation
Body Weight (kg)	30	56.43	97.47	79.8020	13.87086
Height (m)	30	1.51	1.86	1.6757	0.11076
BMI	30	18.96	33.99	27.8073	4.68863
HAM-D Score	30	8	30	20.03	5.359

A significant association was observed between anxiety symptoms and high risk of OSA ($p = 0.048$); other factors did not show significant associations [Table 3].

Table 3: Chi-Square Test Results for Demographic, Clinical, and Biological Variables

Variable	High	Low	Total	Chi-Square Value	p-value
Age > 60	6	7	13	3.099	0.377
Age 18 - 30	1	2	3		
Age 31 - 45	5	3	8		
Age 46 - 60	5	1	6		
Sex Female	4	7	11	2.916	0.088
Sex Male	13	6	19		
(Sleep) Disturbed	11	9	20	0.068	0.794
(Sleep) Normal	6	4	10		
(Appetite) Decreased	9	8	17	0.222	0.638
(Appetite) Normal	8	5	13		
(Libido) Decreased	9	11	20	3.326	0.068
(Libido) Normal	8	2	10		
Severity of Depression Mild	3	5	8	1.689	0.43
Severity of Depression Moderate	6	3	9		
Severity of Depression Severe	8	5	13		
Type of Depression Bipolar	6	5	11	0.034	0.983
Type of Depression Recurrent	4	3	7		
Type of Depression Unipolar	7	5	12		
(Fatigue) No	7	5	12	0.023	0.88
(Fatigue) Yes	10	8	18		
(Cognitive Function) Impaired	12	11	20	0.271	0.602
(Cognitive Function) Unimpaired	5	2	10		
(Anxiety Symptoms) Absent	9	3	12	3.738	0.048
(Anxiety Symptoms) Present	8	10	18		
(Psychotic Symptoms) Absent	12	11	23	0.81	0.368
(Psychotic Symptoms) Present	5	2	7		

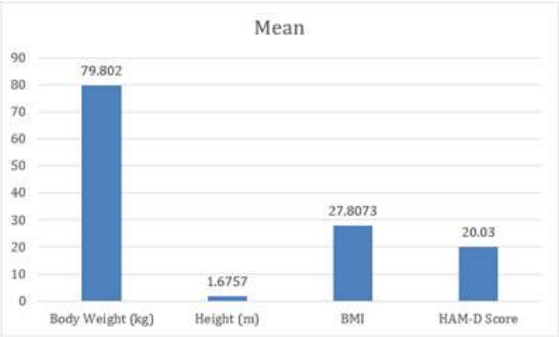

Figure 1: Mean of Clinical Measures in Patients with Depression and OSA

In the present study, comparison of anthropometric and clinical parameters between patients with high and low risk of sleep apnea revealed some notable observations. The mean body weight was slightly higher among the high-risk group (80.29 ± 16.13 kg) compared to the low-risk group (79.15 ± 10.82 kg), and this difference was statistically significant ($F = 4.508$, $p = 0.032$), suggesting that higher body weight may be associated with increased risk of sleep apnea. However, no significant differences were observed in mean height (1.65 ± 0.11 m in high-risk vs. 1.71 ± 0.10 m in low-risk group, $p = 0.674$) or BMI (28.00 ± 4.75 kg/m² vs. 27.55 ± 4.77 kg/m², $p = 0.676$), indicating that overall stature and BMI did not significantly discriminate between the two groups. Similarly, mean HAM-D scores, which reflect severity of depressive symptoms, were comparable between the groups (20.94 ± 5.21 in high-risk vs. 18.85 ± 5.52 in low-risk, $p = 0.717$), implying that the intensity of depression was not significantly different in relation to sleep apnea risk [Table 4].

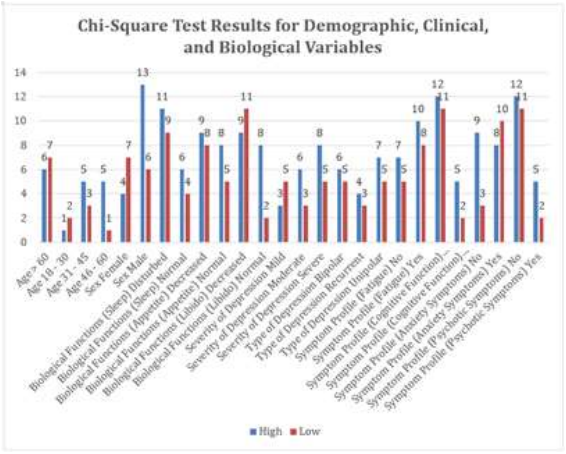

Figure 2: Chi-Square Test Results for Demographic, Clinical, and Biological Variables

Table 4: Group Statistics for Duration of Illness, Body Weight, Height, BMI, and HAM-D Score by Sleep Apnea Risk

Group Statistics						
	Risk of Sleep Apnea (High/Low)	**N**	**Mean**	**Std. Deviation**	**F value**	**P value**
Body Weight (kg)	High	17	80.2971	16.13430	4.508	0.032
	Low	13	79.1546	10.82035		
Height (m)	High	17	1.6494	0.11421	0.181	0.674
	Low	13	1.7100	0.10000		
BMI	High	17	28.0041	4.75639	0.178	0.676
	Low	13	27.5500	4.77864		
HAM-D Score	High	17	20.94	5.214	0.134	0.717
	Low	13	18.85	5.520		

The bar chart compares body weight, height, BMI, and HAM-D scores between patients at high and low risk of sleep apnea. It shows that the high-risk group consistently had slightly higher mean values for body weight, BMI, and HAM-D scores compared with the low-risk group, while height was lower in the high-risk group [Figure 3].

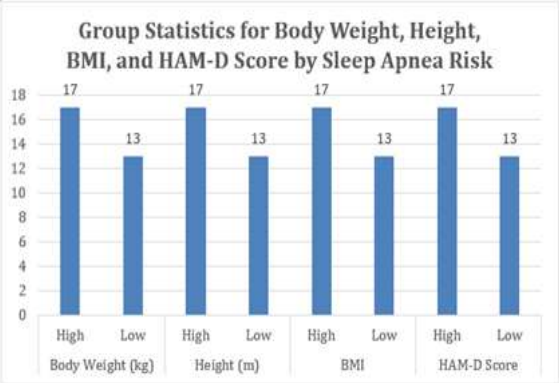

Figure 3: Group Statistics for Body Weight, Height, BMI, and HAM-D Score by Sleep Apnea Risk

DISCUSSION

The present study examined the clinical characteristics of patients with depression who were also at risk for obstructive sleep apnea (OSA). The findings indicated that the majority of participants were male, above 60 years of age, and had disturbed sleep and cognitive impairment. Over half were at high risk for OSA, and anxiety symptoms were significantly associated with higher OSA risk. Additionally, higher body weight was associated with increased OSA risk, whereas BMI, height, and severity of depression were not significantly different between high- and low-risk groups.

These results align with and expand upon previous research on the comorbidity between depression and OSA. Studies have long established that OSA is more prevalent among older adults and men, largely due to anatomical and hormonal factors contributing to airway collapsibility (Juan-Carmenates, 2023).[20] The present study's demographic trends are consistent with this pattern, reinforcing the notion

that age and male sex are strong risk factors for OSA in patients with depression.

The observed association between higher body weight and increased OSA risk echoes prior evidence that obesity and excess weight are major contributors to OSA pathophysiology. OSA is known to be closely linked to metabolic dysregulation, systemic inflammation, and obesity-related airway obstruction (Wen & Zhang, 2022).[21] The present study's findings of slightly elevated body weight among high-risk individuals, despite non-significant BMI differences, suggest that weight distribution or central obesity may be more predictive than BMI alone—consistent with literature highlighting that neck circumference and visceral fat accumulation are better indicators of OSA risk (Agha & Johal, 2017).[22]

Interestingly, the severity of depression (HAM-D scores) did not differ significantly between patients at high and low risk of OSA. This aligns with findings suggesting that while OSA and depression frequently coexist, the severity of one does not necessarily predict the other (Ahmed & Hussein, 2022).[23] The relationship between the two conditions appears to be bidirectional but complex: sleep fragmentation and hypoxia in OSA can worsen mood and cognitive symptoms, whereas depression itself can alter sleep architecture, mimicking or exacerbating OSA symptoms.

The significant association between anxiety symptoms and high OSA risk ($p = 0.048$) is particularly notable. This finding is supported by prior studies showing that OSA patients often experience comorbid anxiety due to recurrent nocturnal awakenings and hypoxemia, which activate stress pathways (Ali & Ramadan, 2024).[24] Chronic intermittent hypoxia has been shown to affect the hypothalamic-pituitary-adrenal (HPA) axis and inflammatory signaling, both implicated in anxiety and depression. Thus, anxiety symptoms may not only be a psychological response but also a physiological manifestation of OSA-related stress.

The cognitive impairment observed in two-thirds of participants is consistent with established literature demonstrating neurocognitive deficits in OSA patients, often attributed to repeated hypoxia, sleep fragmentation, and disrupted neural metabolism (Li & Wang, 2021).[25] Memory, attention, and executive function are particularly affected, which could compound depressive symptoms and reduce treatment adherence. The overlap of cognitive impairment between depression and OSA underscores the importance of screening depressed patients for OSA, especially those presenting with prominent cognitive complaints.

The study's observation that disturbed sleep and fatigue were prevalent among participants aligns with the clinical picture of OSA, characterized by disrupted sleep continuity, frequent awakenings, and reduced restorative sleep (Khamidjonov & Khodjanov, 2021).[26] These symptoms can exacerbate mood disturbances and impair daily functioning. The absence of significant associations between libido, appetite changes, or psychotic symptoms and OSA risk suggests that while biological rhythms are disrupted, the relationship may be mediated more strongly through fatigue and anxiety pathways.

The mean BMI of 27.8 in this sample indicates that most participants were overweight, consistent with international data showing that overweight and obese individuals are at higher risk of OSA (Xiong & Hu, 2023).[27] However, the lack of a statistically significant BMI difference between groups suggests that additional factors, such as craniofacial structure, airway anatomy, or epigenetic factors (e.g., DNA methylation changes), may play a role in OSA susceptibility (Li & Zhang, 2021).[28]

The prevalence of severe depression (43.3%) among participants underscores the clinical significance of comorbidity. Prior meta-analyses have shown that OSA patients are nearly three times more likely to exhibit depressive symptoms than non-OSA individuals, independent of obesity or chronic disease burden (Wu & Yang, 2018).[29] The presence of both conditions may synergistically worsen sleep quality and overall quality of life, emphasizing the need for integrated management strategies.

Finally, the study supports growing recognition of OSA as a multifactorial disorder involving metabolic, inflammatory, and neuropsychiatric pathways. Recent evidence suggests that OSA induces systemic inflammation and oxidative stress, contributing not only to cardiovascular morbidity but also to psychiatric manifestations (Liu & Zhang, 2024).[30] Therefore, addressing OSA in depressed patients may improve both physical and mental health outcomes.

In conclusion, the present study reinforces existing literature showing that OSA is common among older, overweight males with depression, and that anxiety symptoms may indicate higher OSA risk. While BMI alone was not a significant discriminator, body weight and disturbed sleep patterns remain important indicators. Given the intertwined physiological and psychological mechanisms linking depression and OSA, comprehensive screening and integrated treatment approaches are essential to improving patient outcomes.

CONCLUSION

This study underscores the high prevalence of obstructive sleep apnea in patients with depression, particularly in older, overweight males with anxiety symptoms. Early screening and diagnosis of OSA in psychiatric settings may enhance treatment outcomes, addressing both depressive and sleep-related symptoms.

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