ORIGINAL RESEARCH

Clinical profile of patients with obstructive sleep apnea attending tertiary care hospital

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ABSTRACT
Background: Obstructive sleep apnea (OSA) is being recognized as an important public health problem worldwide. The timely diagnosis and treatment of OSA with underlying etiology leads to decreased symptoms and increases quality of life among OSA patients. Present study was aimed to study clinical profile of patients with obstructive sleep apnea attending tertiary care hospital. Material and Methods: Present study was single-center, prospective, observational study, conducted in patients more than 18 years of age, had symptoms suggestive of Sleep Disordered Breathing such as, excessive daytime somnolence, disruptive snoring, fragmented sleep, choking and gasping, un-refreshing sleep, morning headache, personality changes and Impaired concentration, insomnia, daytime headache. Sleep study parameters collected from polysomnography were Apnea–Hypopnea Index (AHI). Results: During study period, total 66 patients underwent evaluation. Mean age was 47.9 ± 14.2 years. Majority were male (62.12 %) as compared to female (37.88 %). Mean body measurements such as mean height was 1.59 ± 0.14 meters, mean weight 91.2 ± 23.3 kgs, mean Body Mass Index was 30.4 ± 6.1 kg/m^2, mean neck circumference was 35.2 ± 4.2 cms & lowest saturation % in sleep study was 82.2 ± 9.6 %. Common co-morbidities noted were hypertension (57.58 %), overweight (48.48 %), smoking (31.82 %), obesity (30.3 %), diabetes mellites (25.76 %), asthma (13.64 %) & COPD (10.61 %) In present study, majority patients had Severe OSA (56.06 %) followed by moderate OSA (28.79 %), mild OSA (9.09 %) while 4 patients had no OSA (6.06 %). Conclusion: Obesity, Hypertension and diabetes were common associations in patients with significant obstructive sleep apnea. Polysomnography is a useful investigation which helps in diagnosis of OSA.
Keywords: obstructive sleep apnea, obesity, hypertension, diabetes

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INTRODUCTION
Obstructive sleep apnea (OSA) is being recognized as an important public health problem worldwide, with the a prevalence of 9% of middle aged men and 4% of women adult population.[1] Prevalence of OSA varies in different population. In most of the studies it varies

from 3-7 %. India prevalence of obstructive sleep apnea is 7.5% in males and that of 4.5% in females.[2]

Obstructive sleep apnea syndrome (OSAS) is a sleep-related breathing disorder (SRBD), hallmarked by upper airway collapsibility and obstruction leading to nocturnal hypoxia and sleep fragmentation.[3] Signs and symptoms of OSA are snoring, frequent episodes of sleep interruption, excessive daytime sleepiness, hypoxemia, hypercapnia, swings in the intra-thoracic pressure and increased sympathetic activity.[4,5]

Obstructive sleep apnea (OSA) leads to significant impairment in quality of life of affected subjects and is associated with a number of potential negative health consequences.[6] The timely diagnosis and treatment of OSA with underlying etiology leads to decreased symptoms and increases quality of life among OSA patients. Present study was aimed to study clinical profile of patients with obstructive sleep apnea attending tertiary care hospital.

MATERIAL AND METHODS

Present study was Multi-center, prospective, observational study, conducted in Department of Medicine. Study duration was of 1 year (January 2021 to December 2021). Study approval was obtained from institutional ethical committee.

Inclusion criteria

- Patients more than 18 years of age, had symptoms suggestive of Sleep Disordered Breathing such as, excessive daytime somnolence, disruptive snoring, fragmented sleep, choking and gasping, un-refreshing sleep, morning headache, personality changes and Impaired concentration, insomnia, daytime headache & willing to participate in present study.

Exclusion criteria

- Patients with Acute Myocardial Infarction and Acute Stoke.
- Patients admitted from emergency room life threatening deterioration including acute respiratory failure, critical metabolic acidosis, altered sensorium and LVF.
- Patients with active Pulmonary Tuberculosis.
- Patients not ready to participate in the study.

Study was explained to patients in local language & written consent was taken for participation & study. The detailed history (prior medical history especially systemic hypertension, diabetes mellitus and ischemic heart diseases, history of comorbidities like deviated nasal septum, allergic rhinitis, tonsillitis, history of endocrine disorder like thyroid disorder, Cushing syndrome, history of psychiatric illness like depression, history of addictions like smoking or alcohol consumption and medication history) and clinical examination were noted.

Investigations performed included complete hemogram, fasting blood sugar, blood urea nitrogen, lipid profile, thyroid profile, arterial blood gas, chest X-ray, spirometry with flow volume (FV) loop, 2D echocardiography and ENT examination. Body measurements like height, weight, BMI, Mallampati score, waist, and hip circumference were taken. Arousals were scored according to the American Sleep Disorders Association criteria.[7] Sleep study parameters collected from polysomnography were Apnea–Hypopnea Index (AHI),[8] Respiratory Disturbance Index, total sleep time, Stage 1, Stage 2, Stage 3, and rapid eye movement (REM) stage. OSA was defined as an AHI >5/h with daytime symptoms or AHI >15 without daytime symptoms which is diagnosed from full-channel polysomnography. The severity was graded by the number of these episodes that a patient has per hour of sleep.

Descriptive statistics including frequencies, percentages, mean and standard deviation were calculated for the parameters taken into account. Statistical analysis was done using descriptive statistics.

RESULTS

During study period, total 66 patients underwent evaluation. Mean age was 47.9 ± 14.2 years. Majority were male (62.12 %) as compared to female (37.88 %). Mean body measurements such as mean height was 1.59 ± 0.14 meters, mean weight 91.2 ± 23.3 kgs, mean Body Mass Index was 30.4 ± 6.1 kg/m^2, mean neck circumference was 35.2 ± 4.2 cms & lowest saturation % in sleep study was 82.2 ± 9.6 %.

Table 1: General characteristics

Characteristics	No. of patients (%)/ Mean ± SD
Mean age (years)	47.9 ± 14.2
Gender	
Male	41 (62.12 %)
Female	25 (37.88 %)
Height (meters)	1.59 ± 0.14
Weight (kgs)	91.2 ± 23.3
Body Mass Index (kg/m^2)	30.4 ± 6.1
Neck Circumference (cms)	35.2 ± 4.2
Lowest Saturation % in Sleep study	82.2 ± 9.6

Common co-morbidities noted were hypertension (57.58 %), overweight (48.48 %), smoking (31.82 %), obesity (30.3 %), diabetes mellites (25.76 %), asthma (13.64 %) & COPD (10.61 %).

Table 2- Co-morbidities

Co-morbidities	No. of patients	Percentage
Hypertension	38	57.58
Overweight	32	48.48
Smoking	21	31.82
Obesity	20	30.3
Diabetes mellites	17	25.76
Asthma	9	13.64
COPD	7	10.61

In present study, majority patients had Severe OSA (56.06 %) followed by moderate OSA (28.79 %), mild OSA (9.09 %) while 4 patients had no OSA (6.06 %).

Table 3: Distribution of the severity of OSA

Severity of OSA	AHI Scores	Frequency	Percentage
No OSA	<5	4	6.06
Mild OSA	5-15	6	9.09
Moderate OSA	15.1-30	19	28.79
Severe OSA	>30	37	56.06

DISCUSSION

Obstructive sleep apnea syndrome (OSAS) is a clinical disorder which is characterised by collapsibility of the upper airway during sleep. In a symptomatic patient, OSA is defined by at least five obstructive events (apneas, hypopneas) per hour through sleep.[9] This results in sleep disturbance leading to excessive daytime sleepiness, mood changes, decreased concentration, and fatigue.[9]

Kapse V et al.,[10] noted that risk factor of OSA have gender differences in their distribution. Female patient is older with significantly higher mean age compared to male patients with OSA (52.9 vs 44.7 years). Females are having significantly higher BMI compared to male OSA(38.2 vs 31.5) but neck circumference is higher in males (44.7 Vs 38.1 cm).The prevalence of Smoking and Alcoholism as a risk factor is higher in male patients while endocrine disorder are more common in females. ENT abnormalities are present more or less equally in both the sexes.

Obstructive sleep apnea (OSA) is highly relevant to patients with hypertension (HTN). These 2 conditions frequently coexist (an estimated 50% of patients with HTN have concomitant OSA), and recent evidence supports the notion that OSA represents the most prevalent secondary contributor to elevated blood pressure (BP) in patients with resistant HTN.[11]

In study by Gajanan VH,[12] amongst patients with COPD and asthma, majority had moderate to severe COPD. Amongst COPD & asthma patients, 22 (28.20%) and 12 (33.33%) patients were found to have obstructive sleep apnea. In patients having severe OSA, (10out 12 patients) had more severe grade of bronchial asthma with FEV1 <80%. This suggest that presence of asthma may lead to worsening of sleep apnea and vice versa.

Well-defined risk factors for OSA include older age, male gender, obesity, craniofacial and upper airway abnormalities.[13] Other, risk factors include smoking, family history, and nasal congestion. The risk of OSA correlates well with body mass index (BMI). In one study, a 10 percent increase in weight was associated with a six-fold increase in risk of OSA.[14]

Reddy S et al.,[15] out of 148 patients,. 116 patients were obese and 32 were nonobese with a mean BMI of 33.66 ± 5.3 versus. 25.17 ± 2.2 kg/m2 respectively. Female sex (70.7% vs. 43.4%), larger neck circumference (37.99 ± 3.93 vs. 33.67 ± 5.5 cm), loud snoring (94.8% vs. 81.3%), excessive daytime sleepiness (53.4% vs. 9.4%), fatigability (94.8% vs. 75%), high Epworth Sleepiness Scale score (16% vs. 8%), and hypertension (77.6% vs. 46.9%) were significantly ($P < 0.05$) more common among obese OSA patients while as smoking and sedative use was more prevalent among nonobese OSA group. However, no significant difference in median apnea-hypopnea index and severity of OSA between obese and nonobese group was observed. At the same time, the median oxygen desaturation index was significantly higher in obese patients (26.1 vs. 12.7, P = 0.005).

Utpat K et al.,[16] studied 130 patients, 92 (71%) were male patients, mean age was 49.5 years. 39 patients (30%) were overweight, while 35 (27%), 23 (17.7%) and 15 (11.5%) patients had mild, moderate and morbid obesity respectively. Average neck circumference in our group of patients was 40.1 (±4) cm. Average Epworth sleepiness score (ESS) was 13.8 (±3.5). Average adjusted neck circumference score (ANCS) was 47.6 (±5.2). Average STOP-BANG score was 5.3 (±1.4). The average APNEIC score was 4 (±1.2), and average Berlin score was 2.4 (±0.89). Of all the comorbidities present in these OSAS patients, hypertension was the commonest, present in 86 patients (66%), followed by GERD in 80 patients (61.5%), diabetes mellitus in 56 patients (43%), ischemic heart disease in 31 patients (24%), and hypothyroidism in 22 patients (17%). Mild pulmonary artery hypertension (PH) was present in 94 (72%), 20 patients had no PH (15.4%), while 11 patients (8.5%) had moderate PH. 73 patients (56%) had a normal spirometry, 36 patients (27.7%) had a restrictive, while 17 (13%) patients had an obstructive abnormality. Four patients had a spirometry suggestive of upper airway obstruction. PSG

revealed 29 patients with mild OSAS (22%). 38 patients had moderate OSAS (29%), while 63 patients had severe OSAS (48.5%).

Ninan M et al., studied 140 patients, 87.9% (123) of the patients were detected to have moderate or severe OSAS (Apnea Hypopnea Index AHI>15 episodes/hour), 81 % (100) of these patients with significant (moderate or severe) sleep apnea were males having a mean age of 47.9 years, mean body mass index of 33.6 kg/m2and an average neck circumference of 41.2 cm. 80% of patients with moderate to severe OSAS were between the ages of 31-60 years.61.7% and 41% of patients with significant OSAS had hypertension and diabetes respectively. Body mass index and neck circumference had a direct correlation with the severity of OSAS.

Untreated OSA can cause nocturnal hypoxemia, pulmonary hypertension, heart failure, cardiac arrhythmia, and insulin resistance. [18] Patients with OSA have high levels of tumor necrosis factor-alpha and interleukin 6 which causes inflammation.[19] This chronic inflammatory stimulus may result in worsening of respiratory status in patients with underlying COPD, which is also characterized by chronic inflammation throughout the airways, parenchyma, and pulmonary vasculature.[20]

CONCLUSION
Obesity, Hypertension and diabetes were common associations in patients with significant obstructive sleep apnea. Polysomnography is a useful investigation which helps in diagnosis of OSA. Treatment of OSA may improve symptoms, quality of life, and help control pulmonary pressures and hypertension modestly.

REFERENCES
1. Al Lawati NM, Patel SR, Ayas NT. Epidemiology, risk factors, and consequences of obstructive sleep apnea and short sleep duration. Prog Cardiovasc Dis 2009;51:285e93.
2. Udwadia ZF, Doshi AV, Lonkar SG, Singh CI. Prevalence of sleep disordered breathing and sleep apnea in middle aged urban Indian men. Am J RespirCrit Care Med 2004; 169:168-173.
3. Punjabi NM. The epidemiology of adult obstructive sleep apnea. Proc Am Thorac Soc. 2008;5(2):136-143.
4. Epstein LJ, Kristo D, Strollo Jr PJ, Friedman N, Malhotra A, Patil SP, et al. Clinical guideline for the evaluation, management and long-term care of obstructive sleep apnea in adults. J Clin Sleep Med 2009;5:263e76.
5. Lloberes P, Duran-Cantolla J, Martinez-Garcia MA, Marin JM, Ferrer A, Corral J, et al. Diagnosis and treatment of sleep apnea-hypopnea syndrome. Spanish society of pulmonology and thoracic surgery. Arch Bronconeumol 2011;47: 143e56.
6. Lacasse Y, Godbout C, Series F. Health-related quality of life in obstructive sleep apnoea. Eur Respir J 2002;19:499e503.
7. Bonnet MH, Doghramji K, Roehrs T, Stepanski EJ, Sheldon SH, Walters AS, et al. The scoring of arousal in sleep: reliability, validity, and alternatives. Jr.J Clin Sleep Med. 2007;3:133-45.
8. Malhotra RK, Kirsch DB, Kristo DA, Olson EJ, Aurora RN, et al. American Academy of Sleep Medicine Board of Directors. Polysomnography for Obstructive Sleep Apnea Should Include Arousal-Based Scoring: An American Academy of Sleep Medicine Position Statement. J Clin Sleep Med. 2018;15(7):1245–7
9. Park, J.G.; Ramar, K.; Olson, E.J. Updates on definition, consequences, and management of obstructive sleep apnea. Mayo Clin. Proc. 2011, 86, 549–554.

10. Kapse V, Patel V, Mhaisekar D, Kulkarni M. To study the gender differences in clinical profile and risk factors for obstructive sleep apnea in a public health care setting. Int J Res Med Sci 2019;7:2808-12.

11. Pedrosa RP, Drager LF, Gonzaga CC, Sousa MG, de Paula LK,. Obstructive sleep apnea: the most common secondary cause of hypertension associated with resistant hypertension. Hypertension. 2011;58:811–817.

12. Gajanan Vaijnath Halkanche, D G Mhaisekar, Study of correlation between obstructive sleep apnea and obstructive airway disease. MedPulse – International Medical Journal. February 2017; 4(2): 217-221

13. Young T, Skatrud J, Peppard PE. Risk factors for obstructive sleep apnea in adults. JAMA 2004;291:2013-6.

14. Peppard PE, Young T, Palta M, Dempsey J, Skatrud J. Longitudinal study of moderate weight change and sleep-disordered breathing. JAMA 2000;284:3015-21.

15. Reddy S, Koul PA, Bhat MH, Shah S, Ganie MA. Comparison of clinical, biochemical, and polysomnographic parameters between obese and nonobese obstructive sleep apnea. Lung India 2022;39:261-6.

16. Utpat K, Bansal S, Desai U, Joshi J. Clinical Profile of Obstructive Sleep Apnea Syndrome in a Tertiary Care Hospital in Western India. Indian Sleep Med 2019;14(1):1-6

17. Ninan M, Krishna S V, Balachandran J , Sukumaran P, Thomas B. Clinical profile of patients with moderate to severe obstructive sleep apnea syndrome in a centre from South Kerala. IP Indian J Immunol Respir Med 2020;5(3):146-151.

18. Weitzenblum E, Chaouat A, Kessler R, Canuet M. Overlap syndrome: Obstructive sleep apnea in patients with chronic obstructive pulmonary disease. Proc Am Thorac Soc 2008;5:237-41.

19. Bassetti CL. Obstructive sleep apnea and atherosclerosis: "Guilt by association". Am J Respir Crit Care Med 2005;172:518-9.

20. Nair S, Paul T, Mehta AA, Haridas N, Kunoor A, Sudhakar N. Prevalence of overlap syndrome in patients with obstructive sleep apnea in a quaternary care center of Kerala. Indian J Public Health 2022;66:S12-6.