*Original Research Article*

Indian Journal of Emergency Medicine
Volume 4 Number 4, October - December 2018
DOI: http://dx.doi.org/10.21088/ijem.2395.311X.4418.13

# Clinical Profile of Patients with Obstructive Sleep Apnea Attending Tertiary Care Hospital

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**Received on** 20.12.2018,
**Accepted on** 31.12.2018

**Abstract**

Respiratory disorders like Chronic obstructive pulmonary disease (COPD), Bronchial asthma, Interstitial lung diseases (ILD), Post infective fibrosis etc. have been known to be associated with nocturnal hypoxemia, poor sleep quality and disrupted sleep. The sleep related physiological disturbances may be associated with abnormal ventilatory control and upper airway instability during sleep. The study was a prospective study conducted in the department of Pulmonary Medicine, at a tertiary care hospital. Before proceeding for the study, the proforma and plan of the study were submitted to the Institutional Ethics committee for Research on Human Subjects and approval was obtained. 2 among 23 patients with low risk, 1 among 9 patients with intermediate risk, 12 among 18 patients with high risk on SACS had OSA. Based on the Sleep Apnea Clinical Score (SACS), 23 patients were found to have low risk of OSAS, 9 patients intermediate risk and 18 patients high risk of OSA.

**Keywords:** Obstructive Sleep Apnea; Sleep Apnea Clinical Score; COPD.

## Introduction

Sleep-disordered breathing (SDB) is a very common and important comorbidity of various diseases, which is under-diagnosed and under-treated. Research of sleep has led to the staging of sleep and uncovering sleep related disorders - of which Obstructive Sleep Apnea (OSA) is very common clinical problem. Though Obstructive Sleep Apnea has been mentioned in literature since the time of Charles Dickens [1], 1837 in his character description of "fat & sleepy boy joe" in The Posthumous papers of Pickwickian Club, it is only in the past 4 decades that this entity has been clinically defined. OSA is a common condition that is characterized by repetitive episodes of closure and/ or narrowing of upper airway reducing the airflow during sleep, leading to intermittent hypoxemia, arousal and sleep fragmentation [2]. Population based epidemiological studies have uncovered a high prevalence of undiagnosed OSA and have consistently found that even mild obstructive sleep apnea is associated with significant morbidity.

Polysomnography studies are essential tool for the physician and aid in the diagnosis and treatment of sleep disorders. The term polysomnography [3] refers to the comprehensive continuous and simultaneous recording of multiple physiological variables during sleep which include EEG (Elecro-encephalogram), EOG (Electro-oculogram), EMG (Electromyogram), ECG (Electrocardiogram), oro-nasal airflow, snoring, pulse oxymetry, thoracic and abdominal movement, and body position.

In 1985, David Flenley [4] studied the association between obstructive lung diseases and OSA and coined the term overlap syndrome - to describe patient having both Chronic Obstructive Pulmonary Disease and Obstructive Sleep Apnea.

Respiratory disorders like Chronic obstructive pulmonary disease (COPD), Bronchial asthma, Interstitial lung diseases (ILD), Post infective fibrosis etc. have been known to be associated with nocturnal hypoxemia, poor sleep quality and disrupted sleep. The sleep related physiological disturbances may be associated with abnormal ventilatory control and upper airway instability

during sleep. A number of studies have suggested that the co-existence of respiratory disorders with obstructive sleep apnea (OSA) leads to more blood gas and pulmonary haemodynamic disturbance than found in individuals with either disease alone, both qualitatively and quantitatively. Further complicating the issue is the fact that both share common risk factors like advancing age, obesity, etc. This common combination has important implications for diagnosis, treatment, and outcome [5,6].

Over the years, various studies have shown a high occurrence of Obstructive sleep apnea in various respiratory disorders (e.g. Asthma, COPD, ILD, Post infective Fibrosis, etc.). The overlap in clinical presentation creates a significant risk of misdiagnosis & treatment dilemma. It suggests that a diagnostic evaluation for sleep-disordered breathing (SDB) should be conducted in all patients with respiratory disorders.

## Methodology

The study was a prospective study conducted in the department of Pulmonary Medicine, at a tertiary care hospital. Before proceeding for the study, the proforma and plan of the study were submitted to the Institutional Ethics committee for Research on Human Subjects and approval was obtained.

*Inclusion Criteria*

1. Diagnosed patients of respiratory diseases i.e. Chronic obstructive pulmonary disease (COPD), Bronchial asthma, Interstitial lung diseases (ILD), Post infective fibrosis;
2. Patients aged above 18 years;
3. Patients of either gender.

*Exclusion Criteria*

1. Patients with exacerbation of underlying respiratory disease;
2. Patients with Congestive cardiac failure;
3. Patients with Valvular heart disease;
4. Patients with Severe illnesses;
5. Patients with Renal failure;
6. Patients not willing to enroll for the study.

Patients who fit into these criteria were selected and explained the study.

*History and clinical examination*

These enrolled patients` medical history was recorded and a clinical examination was performed. The medical history chiefly included inquiry about respiratory symptoms - dyspnea, cough, expectoration, wheeze, chest pain and symptoms of OSAS, namely, snoring and its intensity, presence of choking or witnessed breathing pauses, recurrent awakenings from sleep, excessive daytime sleepiness (measured by using the Epworth Sleepiness Scale score), non-refreshing sleep, morning headache, increased irritability and lapses in concentration. It also included prior medical history especially tuberculosis, systemic hypertension, diabetes mellitus and ischemic heart diseases, history of comorbidities like gastro-oesophageal reflux diseases, thyroid-related disorders and allergic rhinitis, history of addictions like smoking or alcohol consumption and medication history.

Pre-test probability of OSA was assessed in all patients using clinical prediction scores such as ESS and SACS. The physical examination included measurement of height, weight, Body Mass Index (kg/m2), neck circumferences.

## Results

Amongst the study group of 50 patients, the mean age was 51.54 years with a standard deviation of 10.38. 9 (18%) patients belong to age group 20-40 years, 33 (66%) to age group 41-60 years and 8 (16%) to age group 61-80 years.

**Table 1:** Age wise distribution of patients

| Age group | No. of patients | Percentage | Had OSA | Percentage |
|---|---|---|---|---|
| 20-40 yrs | 9 | 18% | 2 | 22.22% |
| 41-60 yrs | 33 | 66% | 9 | 27.27% |
| 61-80 yrs | 8 | 16% | 4 | 50% |
| Total | 50 | 100% | 15 | 30% |

In the age group 20-40 years out of 9, 2 (25%) had OSA, 41-60 years out of 33, 9 (26.6%) had OSA and 61-80 years out of 8, 4 (50%) had OSA. OSA was more common in the age group 61-80 years (Table 1).

**Table 2:** Gender wise distribution of patients

| Gender | No. of Patients | Percentage | Had OSA | Percentage |
|---|---|---|---|---|
| Male | 31 | 62% | 10 | 32.25% |
| Female | 19 | 38% | 5 | 26.31% |
| Total | 50 | 100% | 15 | 30% |

Pearson Chi-Square test p-value = 0.656

Amongst 31 male 10 (32.25%) had OSA and out of 19 female 5 (26.31%) had OSA. Pearson Chi-square test (p value 0.656) shows no significant gender difference. No sexual preponderance OSA was found (Table 2).

**Table 3 (a):** Age group and OSA severity wise distribution

| OSA severity Age | Normal | Mild | Moderate | Severe | Total |
|---|---|---|---|---|---|
| 20-40 yrs | 7 | 1 | 0 | 1 | 9 |
| 41-60 yrs | 24 | 2 | 3 | 4 | 33 |
| 61-80 yrs | 4 | 1 | 1 | 2 | 8 |
| Total | 35 | 4 | 4 | 7 | 50 |

**Table 3 (b):** Statistical test results

| Test | Correlation coefficient( r ) | p-value |
|---|---|---|
| Pearson Chi-Square | -- | 0.829 |
| Pearson Correlation | 0.156 | 0.279 |

There was no correlation between age group and severity of OSA, though; OSA was common in age group 61-80 years (Table 3a,b).

**Table 4 (a):** ESS and OSA severity distribution

| OSA severity ESS | Normal | Mild | Moderate | Severe | Total |
|---|---|---|---|---|---|
| <9 | 3 | 0 | 0 | 0 | 3 |
| 10-15 | 24 | 0 | 1 | 1 | 26 |
| >16 | 8 | 4 | 3 | 6 | 21 |
| Total | 35 | 4 | 4 | 7 | 50 |

Based on the Epworth Sleepiness Scale (ESS) total 3 patients were found to have low risk, 26 patients were found to have moderate risk and 21 patients were found to have high risk of OSA. None among 3 patients with low risk, 2 among 26 patients with moderate risk, 13 among 21 patients with high risk on ESS had OSA (Table 4a).

**Table 4 (b):** Statistical test results

| Test | Correlation coefficient ( r ) | p-value |
|---|---|---|
| Pearson Chi-Square | -- | 0.006 |
| Pearson Correlation | 0.575 | 0.000 |

Significant positive correlation was found between ESS and OSA severity. As the ESS score increases, the severity of OSA increases (Table 4b).

**Table 5(a):** SACS and OSA severity distribution

| OSA severity SACS | Normal | Mild | Moderate | Severe | Total |
|---|---|---|---|---|---|
| <43 | 21 | 1 | 1 | 0 | 23 |
| 43-47.9 | 8 | 0 | 1 | 0 | 9 |
| >48 | 6 | 3 | 2 | 7 | 18 |
| Total | 35 | 4 | 4 | 7 | 50 |

Two (2) among 23 patients with low risk, 1 among 9 patients with intermediate risk, 12 among 18 patients with high risk on SACS had OSA. Based on the Sleep Apnea Clinical Score (SACS), 23 patients were found to have low risk of OSAS, 9 patients intermediate risk and 18 patients high risk of OSA (Table 5a).

**Table 5(b):** Statistical test results

| Test | Correlation coefficient ( r ) | p-value |
|---|---|---|
| Pearson Chi-Square | -- | 0.002 |
| Pearson Correlation | 0.579 | 0.000 |

Significant positive correlation was found between SACS and OSA severity. As the risk assessed by SACS increases, severity of OSA increases (Table 5b).

## Discussion

This study was done to assess obstructive sleep apnea (OSA) in patients with pre-existing Respiratory disorders like Chronic obstructive pulmonary disease (COPD), Bronchial asthma, Interstitial lung diseases (ILD), Post infective fibrosis. It was also purported to study the result of CPAP titration on those who were diagnosed as having OSA.

The study was conducted on 50 patients attending Pulmonary Medicine Out Patients' Department in a tertiary care hospital. These patients fulfilling the inclusion and exclusion criteria were evaluated for the presence of obstructive sleep apnea by polysomnography studies. A conventional measure of AHI was used to define presence of OSA, as per ASSM guidelines. An AHI of more than 5 was considered to be suggestive of OSA.

Patients selected for the study were 18 years and above and mean age was 51.54 years. A correlation was sought between OSA severity and age. It was found to be statistically insignificant in our study (p-value 0.365). The proportions of OSA patients were more in age group 61-80 years than other age groups. However this finding was in accordance with the findings of the study by Ariel B. Neikrug, Sonia Ancoli-Israel et al. (2010) [7] and Bixler EO, Vgontzas AN, Lin HM et al. (2001) [8] which states that prevalence of OSA is two to three times higher in older age as compared to middle age group.

Of the 50 patients, 31 were males and 19, females. After conducting polysomnography studies it was

found that out of the 29 males, 10 (32.25%) had OSA and 5 out of 17 females (26.31%) had OSA. Chi-square test was applied to find out statistical association of gender and OSA. The Chi-square test was not statistically significant (p value 0.656). Both males and females had a similar prevalence of OSA and we found no gender predisposition for OSA. However Young T, Peppard PE, Taheri S (2005) [9] found that the prevalence of OSA in obese adults aged 30 to 69 years have ranged from 11 to 46% in women and 33 to 77% in men. Thus our study does not corroborate with the findings of the above study.

Regarding the pretest probability of OSA calculated by various pretest probability scores for OSA like ESS and SACS, statistically significant correlation was found between AHI and pre-test probability scores i.e. ESS ($r=0.575$, $p<0.05$) and SACS ($r=0.579$, $p<0.05$). Also severity of OSA positively correlates with pre-test probability scores as found out by correlation test. Walter TJ, Foldvary N et al. 2002) [10] and Anamelia Costa Faria et al. (2015) [11] have shown ESS and SACS are better predictors of OSA.

Anthropometric parameters such as BMI and neck circumference have been found to be good predictors of OSA. A correlation was sought between BMI ($r=0.343$, $p<0.05$) and OSA severity and also between Neck circumference ($r=0.624$, $p<0.05$) and OSA severity, which had a significant positive correlation, i.e. as BMI and neck circumference increase OSA severity increases. The studies conducted by Sonsuwan N, Ameiam S, Sawanyawisuth K et al. (2013) [12] found the same results.

## Conclusion

Pre-test probability scores, Epworth sleepiness scale and Sleep Apnea Clinical Score were good predictors of OSA; both have significant positive correlation with severity of OSA

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