

OBSTRUCTIVE SLEEP APNOEA- A STUDY OF POLYSOMNOGRAPHIC CHARACTERISTICS AMONG PATIENTS ATTENDING NEW CIVIL HOSPITAL, SURAT AND ITS CORRELATION WITH VARIOUS MEDICAL COMORBIDITIES

Parul Vadgama¹, Sabarinath Ravichandar², Mahendra Zaverbhai Patel³

¹Associate Professor, Department of Pulmonary Medicine, New Civil Hospital, Surat.

²Junior Resident, Department of Pulmonary Medicine, New Civil Hospital, Surat.

³HOD, Department of Pulmonary Medicine, New Civil Hospital, Surat.

ABSTRACT

BACKGROUND

Obstructive Sleep Apnoea (OSA) is a common sleep-related breathing disorder, which is caused by recurrent collapse of the upper airway during sleep and is an underdiagnosed condition due to low level of suspicion. Patients with OSA suffer from poor sleep quality, increased daytime sleepiness and depression.

The aim of the study is to diagnose obstructive sleep apnoea and its correlation with various medical comorbidities like hypertension, obesity, diabetes, road traffic accident and cardiovascular events among patients of South Gujarat population.

MATERIALS AND METHODS

Study Setting- Level 1 Sleep Laboratory, Department of Pulmonary Medicine.

Study Design- Cross-sectional study.

Selection of Study Participants- 40 patients screened for symptoms of OSA like snoring, witnessed apnoeas and excessive daytime sleepiness with Epworth sleep score (>10) was taken for overnight sleep study.

Data Entry and Analysis- Data entry was done in Microsoft Excel Sheet, 2010. Graphs were presented in MS Excel, 2010.

RESULTS

Obesity was important risk factor. Higher and middle economic classes were affected more. Hypertension was most common comorbid condition associated followed by diabetes and heart attack. Most common symptom of OSA is snoring followed by excessive daytime sleepiness. Epworth sleeping score has high specificity for screening compared to STOP-Bang. Most common arrhythmia noted was atrial fibrillation. Left Ventricular Hypertrophy was associated with all OSA patient with hypertension. As the Body Mass Index increases, Apnoea-Hypopnea Index (AHI) also increases. As the neck circumference increases, AHI also increases.

CONCLUSION

To conclude in country like India, sleep disordered breathing is still an iceberg disease where patients gets treated for its secondary effects like hypertension and diabetes without proper control in spite of being in two to three drugs, but where the primary cause is OSA.

KEYWORDS

Obstructive Sleep Apnoea, Epworth Score, Polysomnography, Comorbidities.

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BACKGROUND

Sleep-related breathing disorders include disorders caused by a reduction or suspension in breathing during sleep. These disorders are a primary cause of excessive daytime sleepiness. There are three main types of sleep-related breathing disorders- Obstructive Sleep Apnoea Syndrome (OSAS), central sleep apnoea syndrome and Sleep-Related

Hypoventilation Syndromes (SRHS).¹ In country like India, sleep disordered breathing is still an iceberg disease where patients get treated for its secondary effects like hypertension and diabetes without much cure, but where the primary cause is different. So, it is the duty of all doctors and government to create awareness to public regarding these disorders. OSA is defined by the presence of repetitive episodes of upper airway obstruction during sleep.² Globally, disease prevalence are in the range of 3% to 7% with certain subgroups of the population bearing higher risk.^{3,4} In 2006, a population-based survey from north India had estimated the prevalence of OSAS at 3.6 percent (males and females being 4.9 and 2.1%, respectively).^{5,6} In our study, we had made an attempt to create awareness in public regarding this sleep disordered breathing among south Gujarat population and brought this

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Corresponding Author:

Dr. Sabarinath Ravichandar,

Junior Resident, Department of Pulmonary Medicine,

New Civil Hospital, Surat.

E-mail: sabaridr4u@gmail.com

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disease out to limelight. We had documented lots of patients who were getting treated for hypertension and diabetes for many years as obstructive sleep apnoea.^{7,8} All these patients after starting treatment for OSA with Continuous Positive Airway Pressure (CPAP) therapy.^{9,10} Their hypertension and diabetes came to control, their pill burden reduced and they were mentally and emotionally happy.

MATERIALS AND METHODS

1. **Study Design-** Cross-sectional study.
2. **Study Setting-** Sleep Laboratory, Department of Pulmonary Medicine at J3 Ward.
3. **Selection of Study Participants-** Patients will be screened for symptoms of OSA like snoring, witnessed apnoeas and excessive daytime sleepiness and patients coming Epworth score positive was taken for overnight sleep study.
4. **Sample Size-** 40 patients with symptoms of OSA coming to various departments of New Civil Hospital, Surat.
5. **Study Period-** Study was conducted over a period of 12 months (September 2016 - September 2017).
6. **Study Tool-** A pretested standardised semi-structured questionnaire was used.
7. **Data collection-** Data was collected in sleep register at Department of Pulmonary Medicine, NCH, Surat, presenting to various departments.
8. **Data Entry and Analysis-** Data entry was done in Microsoft Excel Sheet, 2010. Graphs were presented in MS Excel, 2010.
9. **Ethical Consideration-** Study was approved by Human Research Ethics Committee of Government Medical College, Surat. Study participants were included in the study only after written informed consent was obtained from them.

Inclusion Criteria

- Patients with suggestive symptoms of OSA.
- ESS of score more than 10 will undergo a polysomnography.
- Age >14.
- Patient referred for sleep study as a part of health check-up.

Exclusion Criteria

- Critically-ill patients oxygen therapy and on ventilator support.
- Patients with end-stage organ disease and malignancy.
- Not willing to participate.

Patients were screened for symptoms of OSA like snoring, witnessed apnoeas and excessive daytime sleepiness. The following data were compiled in all patients - Clinical history and demographic data, BMI (weight in kg/height in m²), neck circumference, blood pressure (recorded after at least 5 minutes of rest in both arms sitting/supine position), waist circumference (measured in

a horizontal plane midway between the inferior margin of the ribs and superior border of the iliac crest), blood samples of 5 mL were drawn after 12 hours overnight fasting for the measurement of lipid profile, fasting plasma glucose, Epworth sleepiness scale and STOP-Bang questionnaire were used to screen for EDS, physical examination and ENT opinion will be taken to look for upper airway anatomy, ECHO, PFT and ECG for all patients. Following counselling were done to the patient. Patients will be asked to come one hour before study. Patient will be asked to have head bath and clean shave of beard, one person will be allowed to accompany the patient, patients will be advised to come in night dress that they wear daily during sleep, patient will be instructed that she is being observed during procedure.

RESULTS

Age	Frequency
23	1
32	3
41	6
50	10
59	9
68	9
More	2

Age Distribution among Study Patients

History	Total
Excessive daytime sleepiness	37
No excessive daytime sleepiness	3
Hypertension	21
No hypertension	19
Diabetes mellitus	10
No diabetes mellitus	30
Road traffic accident	2
No road traffic accident	38
Cardiovascular events	9
No cardiovascular events	31
Snoring	38
No snoring	2
Table 1. Distribution of Various Comorbidities among Study Patients	

AHI/RDI	Total
More than 30	20
16-30	10
5 to 15	8
<5	2
Table 2. AHI Distribution Among Study Patients	

	BMI Less Than 30	BMI More Than 30
Mean	24.72	37.23
Variance	337.27	400.25
Observations	11	29
Table 3. Association Between BMI and Apnoea-Hypopnea Index among Study Participants		

P (T<=t) one tail 0.037685829.

t-test- Two-sample assuming unequal variances.

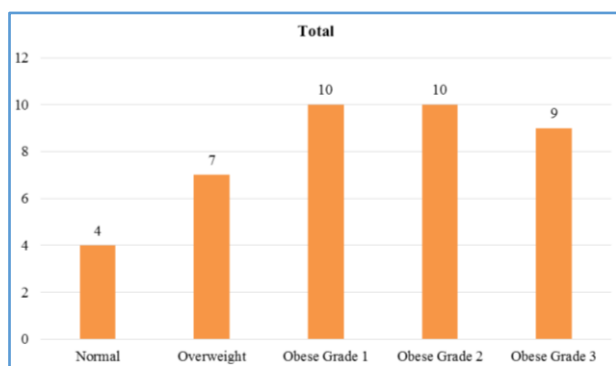


Figure 1. Body Mass Index Distribution among Study Patients

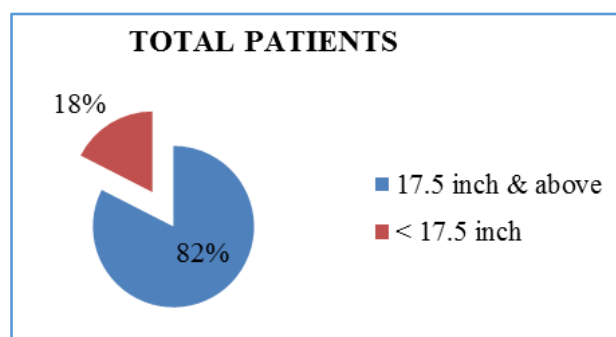


Figure 2. Pie Chart Showing Distribution of Neck Circumference

This study was conducted in patients after screening with Epworth sleep score and subjected to overnight polysomnography. In this study, among 40 patients, 62.5% of the patients were belonging to 40 to 60 years age group, 77.5% of patients were male and 22.5% of patients were females. Out of 40 (100%) patients, 75% presented to Department of Pulmonary Medicine followed by 17.5% to Department of Medicine followed by 5% to Neurology and 2.5% to Psychiatry. Out of 40 patients, 72.5% are obese according to International Grading System of obesity in which 25% of patients fall in grade 1, 25% in grade 2 and 22.5% in grade 3, 17.5% fall in overweight category (Figure 1). Among 40 patients, 65% of patients belong to high socioeconomic class, 30% belong to middle class and 5% belong to low class. Sedentary lifestyle was important risk factor. 82.5% of patients had neck circumference above 17.5 inches (Figure 2). Among 40 patients, 92.5% of patients was having history of excessive daytime sleepiness, 95% of patients were snorers, 52.5% of patients were hypertensives, 25% were diabetic, 5% suffered from traffic accidents, 22.5% suffered from cardiovascular events like heart attack and stroke (Table 1). STOP-Bang questionnaire score among study patient, 70% patients taken for study were having score above 6/8. Among 40 patients, 55% were having Epworth Score (ESS) between 10 to 16, 40% were having score of more than 16 and 5% were having score less than 10. 80% of patients were having heart rate in a range between 130 to 180. 50% patients were having AHI more than 30, 25% of patients were having AHI between 16 to 30, 40% of patients were having AHI between 5 to 15, and 5% of patients were having less than 5 (Table 2). 92.5% were having sinus

tachycardia and 7.5% were having atrial fibrillation. 70% of the patients are having saturation below 90%. 90% of patients have snoring index more than 10% that is 10% of their sleep time is spent in snoring. Among 40 patients, 21 patients (52.5%) were having normal ECHO, 14 patients (35%) were having Left Ventricular Hypertrophy (LVH), 2 patients (5%) were having LVH with reduced ejection fraction, 1 patient (2.5%) was having LVH with RVH and 1 patient (2.5%) LVH with diastolic dysfunction. LVH was associated with all OSA patient with hypertension. The mean AHI in patients with BMI less than 30 is 24.72, mean AHI in patients with BMI more than 30 is 37.23 (Table 3). By applying t-test, p value using one-tail analysis is 0.037, which is statistically significant. The mean AHI in patients with neck circumference less than 17.5 inches is 23.9 and mean AHI in patients with neck circumference more than 17.5 inches is 35.89. This confirms that there is direct association between neck circumference and AHI.

DISCUSSION

Out of 40 patients, 72.5% are obese according to International Grading System of obesity in which 25% of patients fall in grade 1, 25% in grade 2 and 22.5% in grade 3. 7 patients (17.5%) fall in overweight category (Figure 1). Overall, 90% of patients are overweight, which agrees with Martica H Hal, NCBI, 2012,¹¹ where more than 80% of patients were overweight. 52.5% of patients were hypertensives, 25% were diabetic, 5% suffered from traffic accidents, 22.5% suffered from cardiovascular events like heart attack and stroke (Table 1), which agrees with Micha T Meader vascular health and management 2016 where more than 30% of OSA had metabolic syndrome.^{7,8} Among 40 patients, 55% were having Epworth Score (ESS) between 10 to 16, 40% were having score of more than 16 and 5% were having score less than 10. ESS has high specificity for screening compared to STOP-Bang, which agrees with Rosemarie L Passmonte, University of Massachusetts, 2015.¹² 50% patients were having AHI more than 30, 25% of patients were having AHI between 16 to 30, 40% of patients were having AHI between 5 to 15 and 5% of patients were having less than 5 (Table 2). So, AHI is specific indicator for diagnosing OSA, which agrees with Epstein LJ C Resto, 2009.¹³ The mean AHI in patients with BMI less than 30 is 24.72, mean AHI in patients with BMI more than 30 is 37.23 (Table 3). By applying t-test, p value using one-tail analysis is 0.037, which is statistically significant. This confirms that there is direct association between BMI and AHI, which agrees with Peppard PE et al. Prospective study of the association between sleep-disordered breathing and hypertension, N Engl J Med, 2000.⁷

CONCLUSION

In present study, to diagnose obstructive sleep apnoea in south Gujarat population coming to New Civil Hospital, Surat, and its correlation with various medical comorbidities, we found that awareness to all departments is required for active case tracing (sir, there is no specific

study, but I have attached my data that how other department contribute to the diagnosis). Obesity was important risk factor, higher and middle economic classes were affected more; hypertension was most common comorbid condition associated followed by diabetes and heart attack; most common symptom of OSA is snoring followed by excessive daytime sleepiness; STOP-Bang questionnaire score is a good screening tool, but Epworth sleeping score has high specificity for screening compared to STOP-Bang; most common arrhythmia noted was sinus tachycardia, but other arrhythmias like atrial fibrillation also coexist and left ventricular hypertrophy was associated with all OSA patient with hypertension. As the body mass index increases, Apnoea-Hypopnea Index (AHI) also increases. As the neck circumference increases, AHI also increases.

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