Section: Pulmonary Medicine

Original Research Article

A STUDY ON TYPES OF SLEEP DISORDER BREATHING PATTERN ON PATIENTS COMING TO A TERTIARY CARE HOSPITAL IN WESTERN ODISHA

Bhanjan Kumar Meher[1], Gopabandhu Patra[2], Rakesh Ranjan Swain[3], Sasmita Meher[4]

[1]Assistant Professor, Department of General Surgery, BBMCH, Balangir, Odisha, India.
[2]Assistant Professor, Department of Orthopedics, BBMCH, Balangir, Odisha, India.
[3]Assistant Professor, Department of General Surgery, BBMCH, Balangir, Odisha, India.
[4]Assistant Professor, Department of Pulmonary Medicine, BBMCH, Balangir, Odisha, India.

Received : 28/07/2023
Received in revised form : 01/09/2023
Accepted : 15/09/2023

Keywords:
Obstructive Sleep Apnea; Sleep-Disordered Breathing; Epidemiology; Sleep Disorder; Continuous Positive Airway Therapy; Epworth Sleepiness Score.

Corresponding Author:
Dr. Sasmita Meher,
Email: dr.sasmitameher@gmail.com

DOI: 10.47009/jamp.2023.5.5.63

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2023; 5 (5); 316-320

Abstract

Background: Sleep disorder breathing (SDB) is common problem worldwide. Its strong association with obesity makes it likely that sleep related breathing disorders (SRBDs) will continue to rise exponentially in the future. Previously it was thought that it affects only adult population but now we know that it is a disease of pediatrics population and even the newborns. It affects both genders although male are more affected by SRBDs. **Materials and Methods:** 100 participants taken into study, their Symptomatology collected by ESS, BERLIN QUESTIONAIR AND BMI measured,and correlated with polysomnography . Symptom varies from no symptoms to sleeping during driving, resulting in injuries and even death of an individual. It has association with many systemic diseases and this list is growing day by day as we are gaining more and more knowledge of SRBDs. **Result:** various correlation developed, which shows that there is definite relationship of sleep and related breathing disorder. In general, weight loss is single most effective strategy but it is difficult to achieve and maintain. **Conclusion:** Continuous positive airway pressure (CPAP) is first line medical therapy but compliance is the main issue with this therapy. More public, medical, social and electronic awareness is required for early diagnosis and treatment of SRBDs particularly in developing world like WESTEN PART OF ODISHA that is BALANGIR**.**

INTRODUCTION

Every person on this planet sleeps whether more or less. However, because of our changing life styles and stress, one of the most common entity that is suffering is sleep. This was not fully aware until 1969. From there on, slowly and steadily work on sleep and its effect on respiratory system started. As time is passing, we are becoming more and more aware of poor quality sleep effects. Obstructive sleep apnea (OSA) is probably the most common respiratory disorder, with latest data from the United States and Europe suggesting that between 14% and 49% of middle-aged men have clinically significant OSA This prevalence will likely to increase further in future because of strong relationship between OSA and obesity A small study in Indians showed OSA is still the most prevalent disorder in category of sleep related breathing disorders (SRBDS).[1,5]

Our present study is to identify the characteristics (demography and symptomatology) of patients presenting to a public sector tertiary care hospital regarding SBD.[6,7]

MATERIALS AND METHODS

To evaluate the demography and symptomatology of patients with SDB in a public sector hospital. It is a retrospective study involving hundred patients. These patients are those who were referred to our sleep lab through OPD, indoor, other pulmonologist or tertiary care hospitals. The data is collected from December 2017 to November 2019. These patients include both male, female, adult as well as pediatric population. Exclusion criteria is refusal to participate in the study. Exclusion criteria is refusal to participate in the study.

Procedure: After taking the patients informed contest, they were evaluated by Epworth Sleepiness Score (ESS) and by Berlin questionnaire for sleep apnea. The patient's height, weight. Body Mass Index (BMI), neck circumference and abdominal girth were measured. They were asked about their smoking status, history of snoring, morning headaches, daytime sleepiness, memory impairment, personality change, sore throat, fatigue, symptoms of Gastroesophageal Reflux Disease (GERD), nocturia, nocturnal sweating and depression. History of

witnessed apnea was asked from spouse or accompanying person, and if he or she did not know then information was taken telephonically. The history of co-morbidities including hypertension, diabetes mellitus, ischemic heart disease, thyroid dysfunction and CVA were also noted. Patients underwent Level 1 Polysomonography (Philips Alex 6). A trained technician under supervision of trained doctor remained at the lab throughout the study. It recorded continuous polygraphic recordings for electroencephalography, chin EMG, eye movements, electrocardiography, nasal and oral airflow (thermistors and nasal pressure transducer), laryngeal sounds for snoring by microphone, thoracic and abdominal effort (by inductance plethysmography), limb movement, body position, oxyhemoglobin level (pulse oxymeter) and continuous video recording. The polysomnographic records were manually scored by a trained doctor in the morning. An abnormal breathing event was defined as a complete cessation of airflow for 10 seconds or more(apnea) or a discernible 50% reduction in respiratory airflow accompanied by a decrease of 4% or more in oxyhemoglobin saturation (hypopnea). The apnea hypopnea index (AHI) was defined as total number of apneas and hypopneas divided by the number of hours of sleep. SDB was defined as an AHI of 5 or more and OSAHS as SDB with daytime hypersomnolence. These definitions are per as AASM guidelines BMI is classified as 18.5±24.9 = normal, 25.0±29.9= over weight, 30.0±34.9= obesity class 1, 35.0±39.9= obesity class 2,40.0+= obesity class 3. This classification is based on National heart, lung and blood institute of America endorsed by WHO also Descriptive statistics of all continuous variables were calculated as means and standard deviation, whereas categoric data were expressed as percentages.

Statistical Analysis: All analyses were done with SPSS version 20.0 for Windows.

RESULTS

Out of one hundred participants, ninety-nine patients were included in the study, only one patient refused to include his study data. The mean age in our study was 48.28±12.92 years. There were 67.7% (n=67) males and 32.3% (n= 32) were females. The most common symptom was excessive daytime sleepiness (94.9%) followed by snoring (92.9%), fatigue (87.9%), witness apnea (85.9%), and morning headache (80.8%). The details of all factors are shown in [Table 1]. On evaluation of associated diseases with SDB.

GERD was the commonest 56.6%, followed by depression in 48.5%. Only 29.3% were smokers. The details of all the associated co-morbidities are shown in the [Table 2]. No case of cerebral vascular accident was noted in our study. On evaluation of obesity majority of our patients were obese. Only 6.06% were of normal weight. Extreme obesity was predominating which was 38.8%. This is shown in [Figure 1]. In our study mean ESS was 16.71±5.38. Most frequent ESS score was 20, while one patient had ESS score of zero [Figure 2]. Correlation evaluation between the ESS and BMI, reveals no significant difference in BMI class and ESS score. Patients with normal BMI and extreme obesity had similar mean ESS score i.e. 17.6 and 17.02 respectively [Table 3]. When shown in pie chart statistically all have similar percentage. This is shown in [Table 3]. On evaluation of ESS with daytime sleepiness, patients with no day time symptoms had higher mean ESS score 19.6±4.56 compared to patients with daytime sleepiness 16.55±5.39. This shown in [Table 4 & 5]. Upon evaluation of Berlin questionnaire with day time sleepiness, patients with day time sleepiness had slightly higher score 2.72±0.57 compared to nondaytime sleepers 2.6±0.89. Patients with day time sleepiness were more with category 3 than category 1 or 2. Correlation between Berlin questionnaire and mean ESS score was poor. More ESS score was present in Berlin questionnaire category 1 (21.5%) as compared to category 3 where it is 16.98%. This is shown in [Table 5]. In diagnostic part of polysomnography, various events were noted such as total sleep duration, stages of sleep, respiratory events, leg movements and snoring in the form of snoring index. The mean AHI in diagnostic portion in our study was 40.24±28.08. Out of ninety-nine patients who underwent polysomnography, seventy nine patients required treatment either in the form of CPAP or BPAP. CPAP therapy was commonest mode of NIV therapy used in 68 patients. Eleven patients were finally titrated with BPAP. In evaluation of NIV therapy with reference to snoring, CPAP was the most appropriate form of therapy as shown in the [Table 6].

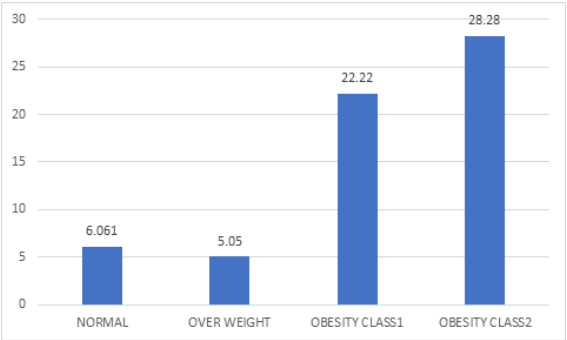

Figure 1: Stratification of patients according to BMI percentages

Table 1: Characteristics and prevalence of symptoms in sleep study.

Factor	Yes		NO	
	Number	Percentage%	Number	Percentage%
Morning Headache	80	80.8	19	19.2

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Daytime Sleepines	94	94.9	5	6.1
Memory Impairment	67	67.7	32	32.3
Personality Change Irritability	71	71.7	28	28.3
Fatigue	87	87.09	12	12.1
Snoring	92	92.9	7	7.1
Witnessed Apnea / Gasping / Choking Sensation	85	85.9	14	14.1
Nocturia	38	38.4	61	61.6
Nocturnal Sweating	38	38.4	61.6	61.6

Table 2: Characteristics and prevalence of associated diseases in sleep study

Factor	Yes		No	
	Number	Percentage%	Number	Percentage%
Smoking	29	29.3	70	70.7
Depression	48	48.5	51	51.5
GERD	56	56.6	43	43.4
Sexual Dysfunction	8	8.1	91	91.9
Ischaemic Heart Disease	7	7.1	92	92..9
Thyroid Dysfunction	3	3	96	97
Diabetes Melitus	27	27.3	72	72.7
CV Accidents	00	00	99	100

Table 3: Correlation of BMI and ESS score with standard deviation.

BMI Classification	Mean ESS score with Standard Deviation
Normal	17.6667±5.50151
Over weight	14.8± 5.4037
Obesity class 1	16.3182 ±5.7849
Obesity class 2	16.7143 ±6.24712
Extreme Obesity	17.0263 ±4.59428

Table 4: Daytime sleepiness and ESS relationship

Daytime Sleepiness	Mean ESS score with standard deviation
No (n=5)	19.6 ± 4.56
Yes (n=94)	16.55 ± 5.39

Table 5: Berlin questionnaire category and mean ESS score relation

Berlin Score	Mean ESS score
Category 1 (n=4)	21.5 ± 1.29
Category 2 (n=20)	14.7 ± 6.30
Category 3 (n=75)	16.98 ± 5.06

Table 6: Snoring and titration therapy.

		CPAP	BiPAP
Snoring	Yes	64	10
	No	4	1

DISCUSSION

The subject of SDB is still in infancy in our country. Only few sleep labs are working in our country, so that's why data is so scarce. Our attempt is to give some idea about the demographics and symptomatology of SDB in our patients to fill this gap.[8] The exact prevalence of OSA and OSAS is unknown. A study from Wisconsin city America, shows a prevalence of OSA is 9% in men and 4% in women aged 30- 60 years of age when AHI is considered 5 or more However, a study conducted in China by Ip and colleagues showed a prevalence of 4% in general population.[9-11] A study conducted by Naresh M. Punjabi et al showed prevalence of OSA of 7.5% for urban Indian males, which is slightly higher than the Chinese counterpart The main reason was selection of patients i.e. male and living in urban where they are more settled and better resources available.[12] The mean age in our study is 48±12 years, again in line with other regions data, that OSA is more prevalent in middle age group Study conducted in Saudi Arabia showed that the disease is more prevalent in age group 30 to 39, as compared to 40 to 49 and 50 to 60 age groups The reason may be study sample size age selection. They included only healthy person between 30 to 60 years of age. However, our study included few pediatrics and majority older age groups. Male patients in our study predominate, which is again in the line with other studies and epidemiological data, that OSA is more prevalent in male The main reasons.[13-15]

60 years of age when AHI is considered 5 or more However, a study conducted in China by Ip and colleagues showed a prevalence of 4% in general population A study conducted by Naresh M. Punjabi et al showed prevalence of OSA of 7.5% for urban Indian males, which is slightly higher than the Chinese counterpart The main reason was selection of patients i.e. male and living in urban where they are more settled and better resources available. The mean age in our study is 48±12 years, again in line

ISSN (O): 2687-5365; ISSN (P): 2753-6556

with other regions data, that OSA is more prevalent in middle age group Study conducted in Saudi Arabia showed that the disease is more prevalent in age group 30 to 39, as compared to 40 to 49 and 50 to 60 age groups The reason may be study sample size age selection. They included only healthy person between 30 to 60 years of age. However, our study included few pediatrics and majority older age groups. Male patients in our study predominate, which is again in the line with other studies and epidemiological data, that OSA is more prevalent in male The main reasons may be more masculine physique and more referral of male patients for evaluation for OSA In our study EDS (excessive daytime sleepiness) is the most common symptoms. This is in contrast to study by Udwadia, Doshi, Lonkar, et al in which they showed the snoring was commonest symptom The reason may be that snoring is still tolerated in our society because of social norms, however when due to EDS their work suffer only then they are convinced to seek medical advice and treatment. Other reason that might be possible, as we are living in tropical region, there is strong habit of mid-day nap, and patient may required to explain better this aspect of EDS variation. There is now increasing evidence of association of GERD and OSA. Internationally the prevalence varies among the different studies. Study conducted by Green BT et al showed a prevalence of 58% to 62% GERD is the commonest symptoms associated with OSA in our study. Its frequency is 56.6% which is comparable to international studies. It is still undetermined whether the increase OSA symptoms are due to sleep disturbance by GERD or both have association of same problem i.e. obesity. Further studies are required to clarify this issue.[16-18] OSA has association with depression. In our study it is 48% which is significantly higher as compared to other studies that showed prevalence of major depression only 6% The reason for this difference is we used patient self-reported symptoms of depression without formal evaluation by psychiatrist, resulting higher percentage of depression. Larger sample size with formal evaluation by psychiatrist can better explain this issue. Obesity is a strong risk factor for development of OSA Higher prevalence of OSA in obese subjects is not only limited to adults but also to obese children, which have a 46% prevalence of OSA when compared with children seen in a general pediatric clinic (33%) Only 11% of our patient were not obese (either normal or over weight). Rest of 89% were obese. Extreme obesity was the commonest among the total obese patients. This shows obesity is the commonest risk factor for OSA. However, when the BMI is compared with mean ESS score there is not much difference between the extreme obese and normal person. Both account for 21%. Similar results are also obtained internationally. The explanation may be the patient's poor understanding of ESS which can cause either over estimation or under estimation in score determination. ESS score has been translated in many languages, but to our knowledge there is no approved ESS score in Urdu language. Although attempt was made by Dow University Sindh, but that version never got approved. This difference in language causes lot of understanding problem as Pakistan is developing country and we have low literacy rates. The mean ESS score is 16.71±5.38 in our study which is high. However, when EDS is compared with ESS to check correlation the results are not significant. Patients who have no EDS has higher score of ESS as compared to those who has EDS [Table 2]. Studies have shown a good correlation between EDS and ESS, being higher ESS score more likely to have EDS. Correlation between ESS and Berlin questionnaire (BQ) is poor. More ESS score is present for BQ category 1 as compared to category 3 (table 3). The reason for that is small sample size of patient in BQ category 1 and the language barrier. BQ has more correlation with EDS as compared to ESS. Internationally it is seen that BQ has more sensitivity and specificity than ESS Patients with EDS are more in category 3 than other categories. Patients without EDS has either category 1 or 2. None of them have category 3 score. Reason for this is BQ uses a nonlengthy question with yes or no, which resulted in better perception in our population. CPAP is first line therapy for OSA treatment recommended worldwide. In our study CPAP is also most common effective therapy use to treat the patients.[19-22]

CONCLUSION

SDB is a common respiratory disorder that is easily treatable, yet it is very much under-estimated in our population. Overall it is common in obese and middle age men. Patients presenting with excessive day time sleepiness, snoring and un-explained fatigue should be considered for diagnosis of OSA. ESS and Berlin questionnaire are useful screening tools but because of language barrier, they have poor sensitivity and specificity in our patients. We recommend that both these scores should be translated into odia and modified to our norms and socio-economic culture back ground, so that they give best results.

CPAP is most appropriate form of treatment modality for SDB.

There is still a great need to create awareness among general population, nurses, paramedics and doctors through electronic and print media about the effects of SDB. We need more sleep labs in public and private set up for the early diagnosis and appropiate management of SDB.

REFERENCES

1. Young T Palta M, Dempsey J. The occurrence of sleep-disordered breathing among middle-aged adults. N Engl J Med 1993;328:1230-5.
2. Kapur VK. Obstructive sleep apnea: diagnosis, epidemiology, and economics. Respir Care 2010;55:1155-67.
3. Punjabi NM. The epidemiology of adult obstructive sleep apnea. Proc Am Thorac Soc 2008;5:136-43
4. Newman AB, Foster G, Givelber R. Progression and regression of sleep-disordered breathing with changes in

ISSN (O): 2687-5365; ISSN (P): 2753-6556

weight: the Sleep Heart Health Study. Arch Intern Med 2005;165:2408-13.
5. Vgontzas AN, Tan TL, Bixler EO. Sleep apnea and sleep disruption in obese patients. Arch Intern Med 1994;154:1705-11.
6. www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmi_dis.htm.
7. Young T Palta M, Dempsey J. The occurrence of sleep-disordered breathing among middle-aged adults. N Engl J Med 1993;328:1230-5. CONCLUSION REFERENCES sleep apnea in adults by AASM, 2009.
8. John F. Garvey. Epidemiological Aspect of sleep apnea J Thorac Dis. 2015 May; 7(5): 920-929.
9. Ip MS, Lam B, Lauder IJ, Tsang K, Chung K, Mok Y, Lam W. A community study of sleep-disordered breathing in middle-aged Chinese men in Hong Kong. Chest 2001;119:62-69.
10. Gottlieb DJ, Yenokyan G, Newman AB. Prospective study of obstructive sleep apnea and incident coronary heart disease and heart failure: the sleep heart health study. Circulation 2010;122:352-60.
11. Siraj O. Wali. Prevalence and predictors of habitual snoring in a sample of Saudi middleaged adults Saudi Med J. 2015 Aug; 36(8): 920- 927.
12. Evans J, Skomro R, Driver H. Sleep laboratory test referrals in Canada: sleep apnea rapid response survey. Can Respir J 2014;21:e4-10.
13. Zarir F. Udwadia. "Prevalence of Sleepdisordered Breathing and Sleep Apnea in Middleaged Urban Indian Men", American Journal of Respiratory and Critical Care Medicine, Vol. 169, No. 2 (2004), pp. 168-173
14. Green BT, Broughton WA, O'Connor JB. Marked improvement in nocturnal gastroesophageal reflux in a large cohort of patients with obstructive sleep apnea treated with continuous positive airway pressure. Arch Intern Med. 2003;163:41- 45.
15. Herr J. Chronic cough, sleep apnea, and gastroesophageal reflux disease. Chest. 2001;120:1036-1037.
16. Björnsdóttir E. The Prevalence of Depression among Untreated Obstructive Sleep Apnea Patients Using a Standardized Psychiatric Interview. J Clin Sleep Med. 2015 Aug 31. pii: jc00475-1.
17. Durán J, Esnaola S, Rubio R, Iztueta A. Obstructive sleep apnea-hypopnea and related clinical features in a population-based sample of subjects aged 30 to 70 yr. Am J Respir Crit Care Med. 2001;163(3 Pt 1):685-689.
18. Rudnick EF, Walsh JS, Hampton MC, Mitchell RB. Prevalence and ethnicity of sleep-disordered breathing and obesity in children. Otolaryngol Head Neck Surg. 2007;137(6):878-882.
19. Dixon JB. Daytime sleepiness in the obese: not as simple as obstructive sleep apnea. Obesity (Silver Spring) J, 2007;15(10):2504-11.
20. Iman Hassan El-Sayed. Comparison of four sleep questionnaires for screening obstructive sleep apnea Egyptian Journal of Chest Diseases and Tuberculosis Vol 61, Issue 4, October 2012, Pages 433-441.
21. Giles TL, Lasserson TJ, Smith BH, White J, Wright J, Cates CJ. Continuous positive airways pressure for obstructive sleep apnoea in adults. Cochrane Database Syst Rev. 2006;3:CD001106.
22. John F. Garvey. Epidemiological aspects of obstructive sleep apnea J Thoracic Dis. 2015 May; 7(5): 920-929.

ISSN (O): 2687-5365; ISSN (P): 2753-6556