

A STUDY ON EXCESSIVE DAYTIME SLEEPINESS IN OBSTRUCTIVE SLEEP APNEA PATIENTSGEETHA KANDASAMY*¹, ABHAY DHARAMSI²

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ABSTRACT

Objective: The study was aimed to find the association of Excessive Daytime Sleepiness (EDS) among obstructive sleep apnea patients.

Methods: It was a prospective observational study conducted in the department of Respiratory and Sleep Medicine, Kovai Medical Center and Hospital, Coimbatore, Tamilnadu. The study was conducted over a period of one year between, August 2009 to August 2010. The data was collected from various sources such as patient's case reports, treatment charts, and polysomnographic reports and also through direct patient interview.

Results: Evaluation of the demographic data of subjects revealed that among the 65 patients included in the study 56 were male (86.36%) 9 were female (13.63%). The mean age of total population was 52±10.5 years. The mean age of male and female were 50.92±10.05 and 58.83±11.63 respectively. Distribution of patients evaluated as mild, moderate and severe obstructive sleep apnea with respect to apnea hypopnea index (AHI) was established as 18%, 33% and 49% respectively. The mean Epworth sleepiness scale score for the sample as a whole was 7.39±6.10.

Conclusion: We found that Epworth sleepiness scale score correlated positively and significantly with apnea hypopnea index [r=0.431, p=0.003]. Evaluation of the association between Epworth sleepiness score (ESS) and apnea hypopnea index revealed that the excessive day time sleepiness positively correlated with obstructive sleep apnea patients.

Keywords: EDS, OSA, Apnea Hypopnea Index.

INTRODUCTION

Obstructive sleep apnea (OSA) is a disorder characterized by repetitive complete or partial upper airway collapse occurring during sleep with daytime sleepiness. Excessive day time sleepiness imposes a substantial burden on quality of life, morbidity and mortality in patients with OSA. Sleep disordered breathing impairs the quality of wake time in a variety of ways. Excessive Daytime Sleepiness (EDS) is the most important symptom seen during waking in patients with OSA. The combination of OSA and EDS is a public health problem. It leads to cognitive impairment and reduced reflexes, thereby increasing the risk of traffic accidents and other mishap. In addition, EDS can have significant repercussions for work, social life and quality of life. However, the factors associated with EDS are not well known.

Excessive daytime sleepiness (EDS) is a serious effect of obstructive sleep apnea. Its clinical features are a strong feeling of abnormal daytime tiredness, reduced wakefulness and vigilance. In addition to this higher risk of internal and neurological disease (1). EDS may also lead to problems at work and to deterioration in psychosocial and cognitive function (2). In general, EDS can have a major impact on quality of life. EDS in OSA is caused by altered quantity and quality of night sleep. Different aspects of disturbed sleep, such as changes in breathing like apnea/hypopnea or hypoxia (3).

Objective

The study was aimed to find the association of Excessive Daytime Sleepiness (EDS) among obstructive sleep apnea patients.

METHODS**Study Design**

The study was conducted in the department of Respiratory and sleep medicine in a corporate hospital in Coimbatore, Tamilnadu. The study was conducted over a period of one year between, August 2009 to August 2010.

Study Population

Adult patient with obstructive sleep apnea diagnosed by physician

Study Protocol

The study protocol was approved by the Ethics committee and written informed consent was obtained from all patients prior to

enrollment. The diagnosis of Obstructive sleep apnea was supported by polysomnography in every patient. A detailed questionnaire of Epworth sleepiness scale was used to find out the presence and severity of EDS. An ESS Score of 0-9 is taken to be normal score and scores higher than 10 indicate greater sleepiness, suggesting significant daytime sleepiness (4). The data was collected from various sources such as patient's case reports, treatment charts, and polysomnographic reports and also through direct patient interview. Polysomnography will be performed between 9pm to 7.am.

Polysomnography

All enrolled subjects underwent an overnight sleep study, which started at 10 pm and ended at 6 am the next day with the use of a computerized polysomnogram system (Somnologica). The surface electrodes were applied using standard techniques and following signals electrooculogram (right & left): submental electromyogram, and anterior tibialis electromyogram additionally, EEG and heart rate were recorded simultaneously. Snoring was recorded by a microphone placed at the jugular vein, and airflow was recorded by combined oronasal thermistors, and arterial oxyhemoglobin saturation was recorded by a finger pulse oximeter. Thoracic cage and abdominal motion were recorded by inductive plethysmography.

Apnea was defined as a complete cessation of air flow lasting greater than 10 seconds, Hypopnea was defined as a discernible fall in airflow, lasting for greater than or equal to 10 seconds, accompanied by a decrease in oxygen saturation of atleast 3% or by an EEG-recorded arousal. Apnea Hypopnea Index (AHI) was defined as the total number of apneas and hypopneas occurring per hour of EEG sleep. Patients with pure or mainly central apneas were excluded from the study.

Statistical Analysis

Data's were stored and analyzed using statistical software (SPSS version 12.0). Comparison between groups was achieved by one way ANOVA. Pearson's correlation test was used.

RESULTS AND DISCUSSION

A total of 65 OSA patients who visited the outpatient sleep department of the hospital. Out of 65 patients 56 were male

(86.15%) 9 were female (13.84%). The mean age of total population was 52±10.5 years. Family history compatible with obstructive sleep apnea was present in 20.45% of the study population. Symptoms were evaluated for each patient and 69.62% had snoring, 22.17% breathing problem and 57.36% day time sleepiness. The patients were classified into three groups based on with apnea hypopnea index; mild (5-14.9), moderate (15-29.9) and severe (≥30). AHI 17.71% (31) had mild OSA (AHI 5-14.9), 33.14% (58) had moderate OSA (AHI 15-29.9 Events/hour) and 49.14% (86) were found to have severe OSA (AHI≥30). The mean Apnea Hypopnea Index for the sample as a whole was 34.08±26.26. Based on AHI as mild, moderate and severe OSA groups had BMI's of 30.42±7.48 kg/m², 30.29±5.84kg/m², 33.38±7.08 kg/m² respectively. In the present study 88.63% of patients were having higher BMI ≥ 25 and only 11.36 % of patients were Ideal Body Mass Index. Patients with OSA

show excessive daytime sleepiness as a result of repeated arousals at night. Many studies have reported that ESS score (>10) are very high in OSA patients (5, 6, 7). The excessive daytime sleepiness score was evaluated for each patient and the mean ESS Score for, mild, moderate, severe obstructive sleep apnea groups were 4±4.05, 6±5.92, 10.25±6.11 respectively. The presence of Excessive daytime sleepiness is common in severely obese subjects (8, 9). The mean values of oxygen desaturation events for the study groups namely mild, moderate and severe group were 19.45±20.85/hour, 22.20±12.80/hour and 47.93±27.23/hour respectively. From this study we found that oxygen desaturation events are high in all the three groups. Significant difference was found between Mild OSA, Moderate OSA and Severe OSA groups; oxygen desaturation events/hour (p<0.036); ESS Scores (p<0.010) (Table:1).

Table 1: Polysomnographic Variables of Study Population

| Variables | Mild OSA(n=16) | Moderate OSA (n=19) | Severe OSA (n=31) | p value |
|-------------------------------------|----------------|---------------------|-------------------|---------|
| BMI (kgs/m ²) | 30.42±7.48 | 30.29±5.84 | 33.38±7.08 | 0.661 |
| Average oxygen Saturation (%) | 95.36±1.96 | 95.48±2.41 | 93.69±3.60 | 0.978 |
| Oxygen desaturation (events / hour) | 19.45±20.85 | 22.20±12.80 | 47.93±27.23 | 0.036* |
| Snoring time (min) | 22.99±26.50 | 24.56±18.34 | 31.36±32.71 | 0.669 |
| ESS Scores | 4±4.05 | 6±5.92 | 10.25±6.11 | 0.010** |

**p<0.01, *p<0.05

Data are presented as mean ± SD

ANOVA using the scheffe method for post hoc analysis

Nocturnal hypoxemia was an important factor related for the presence of daytime sleepiness (10,11,12) the microarousal index appeared to be most important determining factor. While in other studies it was related to sleep fragmentation (13,14,15). Marie Jose reported in their study that daytime sleepiness was associated with oxygen tension (16). Evaluation

of the association between Epworth sleepiness score and apnea hypopnea index revealed that the excessive day time sleepiness positively correlated with obstructive sleep apnea patients (r=0.431) (p<0.01). There was no correlation between Apnea Hypopnea Index and Body Mass Index (r=-0.152; p<0.203) (Table: 2) (Figure:1).

Table 2: Pearson's Correlation values of AHI and ESS with variables

| Variables | AHI 'r' value | ESS 'r' value |
|---------------------------|---------------|---------------|
| AHI (Events/hour) | — | 0.431** |
| BMI (kgs/m ²) | -0.152 | 0.203 |

**p<0.01

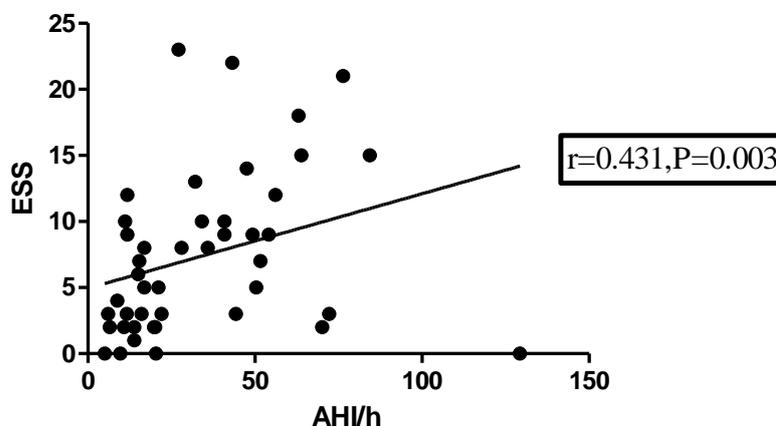


Fig. 1: Correlation of ESS and Apnea Hypopnea Index

CONCLUSION

The presence of ESS excessive daytime sleepiness is most commonly seen in obese and severe OSA patients. We found that patients with severe OSA had highest Score and correlated with apnea hypopnea index. From the observation, it is evident that excessive daytime sleepiness will increase the severity of OSA.

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