



## Pulmonary Medicine

### A STUDY ON THE RELATIONSHIP BETWEEN THE MALLAMPATI SCORING SYSTEM, THE BERLIN QUESTIONNAIRE, AND EPWORTH SLEEPINESS SCALE IN ADULT PATIENTS WITH SYMPTOMS OF SLEEP DISORDERED BREATHING IN A TERTIARY CARE CENTRE

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**ABSTRACT** **BACKGROUND :** Sleep is a natural process in the body characterized by altered sensorium and inhibition of sensory pathways along with voluntary muscular activities in the body and a state of disengagement from environment . Sleep is a dynamic activity controlled by extensive and precise mechanism of brain<sup>1,2</sup>.Epidemiological surveys estimate that this condition affects 3 – 7% males and 2 – 5% females in the 30 to 60 year age group in western countries and Asia, including India<sup>3,4</sup>.OSA is more common in older individuals as compared to younger people (Older men > older women).

**AIMS AND OBJECTIVES:** To Study the relationship between the Mallampati Scoring,the Berlin Questionnaire and Epsworth sleepiness scale in adult patients with symptoms of sleep disordered Breathing.

**METHODS:** This was an Cross Sectional study was conducted in the New Medical College and Hospital, Kota over a period of one year from Oct 2018 to sept 2019 On 100 subjects.

**RESULTS:** Chi square analysis of this data suggest significant correlation between ESS score, Mallampati score,Berlin score and diagnosis of OSA (p value of <0.05).Chi square analysis of this data suggest significant correlation between MSS score and BSQ (p value of <0.05).This analysis shows that MSS score has a positive correlation with Predicting High risk for OSA diagnosis

**CONCLUSION:** This study concludes that the Epworth Sleepiness Scale,Mallampati score and Berlin questionnaire has good utility in predicting the presence of sleep related breathing disorder in patients with symptom complex of sleep disordered breathing who visit the routine respiratory clinical services .

**KEYWORDS :** Sleep , OSA , ESS, Berlin , Mallampati

#### INTRODUCTION

- Sleep is a natural process in the body characterized by altered sensorium and inhibition of sensory pathways along with voluntary muscular activities in the body and a state of disengagement from environment . Sleep is a dynamic activity controlled by extensive and precise mechanism of brain<sup>1,2</sup>.
- Epidemiological surveys estimate that this condition affects 3 – 7% males and 2 – 5% females in the 30 to 60 year age group in western countries and Asia, including India<sup>3,4</sup>.
- OSA is more common in older individuals as compared to younger people (Older men > older women).
- Prevalence of sleep apnea in elderly population is nearly 24%<sup>4</sup>. Gender disparity in occurrence of OSA is mainly related to hormonal factor, difference in body fat deposition ,upper airway anatomy etc.
- Ethnicity can alter the risk and severity of OSA due to cultural and social factors, differences in genetics, craniofacial structure, upper airway anatomy and pattern of fat deposition.
- Post menopause prevalence of OSA in women is similar to that in men and peaks in 5<sup>th</sup> or 6<sup>th</sup> decade. Earlier large number of sleep disordered breathing patients were not identified because of lack of awareness among patients and doctors and lack of resources for diagnosis and treatment<sup>5</sup>.
- OSA is a serious condition that diminishes quality of life and is also associated with many co-morbidities. Patients with OSA will have increased incidence of coronary artery disease, systemic hypertension, congestive cardiac failure, cerebrovascular disease, gastroesophageal reflux disease. The average life span of a patient with untreated OSA is reduced.

#### AIMAND OBJECTIVE

To Study the relationship between the Mallampati Scoring,the Berlin Questionnaire and Epsworth sleepiness scale in adult patients with symptoms of sleep disordered Breathing.

#### METHODOLOGY

Cross sectional study  
Number of patients-100

#### Criteria of inclusion

All patients with symptoms of sleep breathing disorder who are offered Polysomnography with age more than 18 years and who have consented to take part in the study.

#### Criteria of Exclusion:

- Age less than 18 years
- Patients not consenting to participate in the study.
- Patients who are not in a position physically or mentally to undertake sleep study or give an appropriate response to questionnaire.
- Patients with known congenital and structural malformations of Thorax and upper airway.

#### Data Collection:

- Patients were asked to complete the three portions of the research.
- Patients were asked to complete both the BSQ and the ESS as truthfully as possible.
- Upon completion of the questionnaires, each subject was assessed using the Mallampati score through direct visual examination of the oral cavity by asking the subject to open his/her mouth.
- Type 2 Polysomnography was done for all patients

- Following polysomnography, the final manually scored Apnoea – Hypopnoea Index (AHI) was documented.

## OBSERVATION AND RESULTS

**Table 1: Showing Correlation Of Various Scores With Ahi Index**

AHI	ESS score		Mallampati score		Berlin score		Total (N=100)
	>=10	<10	>2	<=2	High >=2	Low <2	
>=5 (OSA)	51	14	53	12	61	4	65
<5(non OSA)	7	29	15	20	2	33	35
<b>Total</b>	<b>57</b>	<b>43</b>	<b>68</b>	<b>32</b>	<b>63</b>	<b>37</b>	<b>100</b>
$\chi^2$	34.89		10.92		43.71		
Df	1		1		1		
P value	<b>0.0001</b>		<b>&lt;0.001</b>		<b>&lt;0.001</b>		

**Table 2: Correlation Of Various Scores With Ahi Index**

Correlation	P value
ESS score vs AHI	<b>0.0001</b>
Mallampati vs AHI	<b>&lt;0.001</b>
Berlin vs AHI	<b>&lt;0.001</b>
Neck circumference vs AHI	<b>&lt;0.0001</b>

## DISCUSSION

The present study was conducted in the well-equipped Sleep Laboratory Department of TB and Respiratory Diseases, New Medical College Hospital Government Medical College, Kota. A total of 100 adult patients with symptoms of sleep disordered breathing were enrolled in study and they underwent overnight polysomnography and results were used for analysis. Epworth sleepiness score questionnaire and Berlin Questionnaire was given and patient were asked to fill the same.

- Mean age of the study population was 49.40 years (Standard deviation 6.49).
- Majority of the subjects who presented with symptoms of sleep disordered breathing in our hospital belongs to the age group between 41 -50 years (57%).
- In our study 79% of the subjects were males and 21% of the study subjects were Females.
- Mean BMI of the study subjects was 25.91 and Standard deviation of 5.99. Maximum BMI value among study subjects was 44 and minimum BMI value was 17.2 kg/m<sup>2</sup>
- Mean value neck circumference among study population was 37.72 cm and standard deviation 2.51
- Epworth sleepiness score was calculated from each study subject and mean value of ESS score for the study population was 11.26. Minimum score was 3 and maximum score was 20 among the study subjects
- In our study we found that 65 patients(65%) had AHI score more than 5 and hence were diagnosed as OSA. 35 subjects (35%) were having AHI values less than 5 and were labelled as Normal (Non OSA) subjects. In our study the prevalence of OSA was 65%
- In our study we found 30 subjects (30% of the study population) had severe OSA. Moderate OSA was diagnosed in 27 subjects (27%) and 8 subjects(8%) had mild OSA. Number of subjects with normal Polysomnography study was 35 (35%).
- In our study we found 44 subjects (44% of the study population) had class III and 24 subjects (24%) had class IV Mallampati scoring.
- In our study we found 61 subjects (61% of the study population) had Berlin scoring category I positive, 52 subjects (52%) had category II positive and 41 subjects (41%) had category III positive. 2 or more categories were positive in 64 subjects (64%)
- Analysis of Correlation between ESS response score and Age group has shown no significant correlation between ESS response and age group (p value 0.505).
- Analysis of relation between Mallampati score and Age group has shown no significant correlation between Mallampati score and age group (p value 0.546)
- Analysis of relation between Berlin score and Age group has shown no significant correlation between Berlin score and age group (p value 0.796).
- Analysis of ESS score and gender shows no significant correlation between Gender and ESS response (P value 0.328).
- Analysis of Mallampati score and gender shows no significant correlation between Gender and Mallampati score (P value 0.084).

- Analysis of Berlin score and gender shows significant correlation between Gender and Berlin score (P value 0.007).**
- Analysis of Occupation and ESS score shows that Occupation and ESS score has no statistical significant relationship. (p value 0.622)
- Analysis of Occupation and mallampati score shows that Occupation and Mallampati score has no statistical significant relationship. (p value 0.842)
- Analysis of Occupation and Berlin score shows that Occupation and Berlin score has statistical significant relationship. (p value 0.017)**
- Snoring was the most common symptom among study subjects(67%).
- Chi square analysis of this data suggest significant correlation between ESS score, Mallampati score, Berlin score and diagnosis of OSA (p value of <0.05)**
- Chi square analysis of this data suggest significant correlation between MSS score and BSQ (p value of <0.05). This analysis shows that MSS score has a positive correlation with Predicting High risk for OSA diagnosis**
- Analysis shows significant correlation between Category of OSA and ESS score, Mallampati, Berlin score (p value <0.05).**
- Analysis of data shows no statistical significance among any of the parameters (H/O Smoking, Diabetes Mellitus, Hypertension, Obstructive airway disease) with ESS score, Mallampati, Berlin score (p value >0.05).
- Analysis of data shows that Neck circumference is significantly related to occurrence higher AHI value in OSA subjects (P value <0.0001). Neck circumference could be considered a predictor of OSA**

## CONCLUSION

- This study concludes that the Epworth Sleepiness Scale, Mallampati score and Berlin questionnaire has good utility in predicting the presence of sleep related breathing disorder in patients with symptom complex of sleep disordered breathing who visit the routine respiratory clinical services.
- MSS score and Berlin score has a positive correlation with Predicting OSA diagnosis.**
- MSS score has a positive correlation with Predicting High risk for OSA diagnosis.**
- Excessive day time sleepiness (p value 0.032) and Dyspnea (p value 0.003) were significantly related to ESS score >10.**
- Neck circumference could be considered a predictor of OSA.**

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