International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

A Survey of Obstructive Sleep Apnoea Hypopnea Syndrome among Edentulous Patients based on Modified Berlin Questionnaire

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Abstract: ***Aim: The intend of the survey was to look at the percentage of people in high risk of obstructive sleep apnea-hypopnea syndrome (OSAHS) in completely edentulous of upper and lower arch using the modified Berlin questionnaire (MBQ), to recognise the sex difference in percentage of edentulous people at high risk of OSAHS, and to examine the occurrence rate of OSAHS-related symptoms (polyuria, night sweating, dry sore mouth) that were not included in the MBQ in this group of people. Method: Fifty patients were enrolled to participate in this study. Demographic data, nocturnal denture wearing habit were noted. The subjects completed the modified Berlin questionnaire in which participants' snoring behaviour, wake-time sleepiness or fatigue, and the presence of hypertension were investigated. Subjects were divided into high risk and low risk categories on the basis of modified Berlin questionnaire and risk categorization as described under Berlin study results. Results: Totally 49 participants' completed questionnaire was included in the study. Out of which 30 were male and 19 were female. Among 4 9subjects, 35 subjects (21 male, 14 female) were recognised as low risk category for OSA and 14 subjects (9 male, 5 female) were recognized as high risk category for OSA. Conclusion: According to the MBQ, about 28.6% of the edentulous population were identified as high risk for OSAHS.***

Keywords: Obstructive sleep apnea-hypopnea syndrome (OSAHS). Obstructive sleep apnea (OSA), Modified Berlin questionnaire (MBQ), risk factors, edentulism

1. Introduction

Sleep apnea is clinically defined as frequent episodes of apnea (cessations) and hypopnea (discrete reductions) and symptoms of functional impairment, which could be life threatening and associated with extremedaytime hyper somnolence, dysfunction, discrements in health related quality of life, automobile accidents, andcardiovascular morbidity and mortality. Obstructive sleep apnea (OSA) is a disorder characterized by repetitive collapse and reopening of the upper airway during sleep, which impairs ventilation and can result in intermittent hypoxemia and hypercapnia.[1]

Various global epidemiologic studies have demonstrated the prevalence of OSA to vary widely from 6·5% and 9% in women and between 17% and 31% in men.Udwadia *et al*. have estimated the prevalence of OSA in urban Indian population as 7.5%, whereas increased prevalence of 13.5% was noted by Sharma *et al.* [4, 5]

Edentulism results in loss of vertical dimension of occlusion, and edentulous people suffer from reduction of lower third facial height, rotation of mandible, and lack of facial support.

These anatomical changes may have influences on thestomatognathic system. [7]Literature review reveals that in a patient with obstructive sleep apnea, extraction of all teeth manifested worsening of the cardio-respiratory symptoms associated with almost doubling of the number of episodes of apnea / hyponea per hour. [8]

2. Material and Methods

The inclusion criteria for the questionnaire study were male and female population, 60–90 years old, Wearing complete denture in upper and lower arch, able to understand and respond to the questionnaires used in the study. The exclusion criteria were unaccustomed to wearing complete denture, suffering from severe disease of respiratory system, suffering from uncontrolled internal medicine diseases, such as heart, kidney, or liver failure or any terminal disease, not in a normal mental state.

Fifty patients were enrolled to participate in this study based on the inclusion criteria Demographic information like age, gender, BMI and nocturnal denture wearing habit were noted. The subjects completed the modified Berlin questionnaire in which participants' snoring behaviour, wake-time sleepiness or fatigue, and the presence of hypertension were investigated. Subjects were divided into high risk and low risk categories on the basis of modified Berlin questionnaire and risk categorization as described under Berlin study results.

The OSAHS – related symptoms not included in questionnaire like polyuria, night sweating, dry sore mouth was also noted down and checked for prevalence.

3. Result

Descriptive analysis included expression of study variables in terms of frequency and proportions. Chi Square test was used to compare prevalence of type of OSA based on the gender and also OSA related symptoms based on the type of OSA among study subjects. The level of significance was set at P<0.05.

Out of 50 questionnaires filled, 1 participant failed to fill the complete questionnaire i.e. snoring behavior and therefore not included in study. Totally 49 completed questionnaires were included in the study. Out of which 30 were male and 19 were female. Among 40 subjects, 35 (21 male, 14 female) came under low category OSA and 14 (9 male, 5 female) came under high category OSA.

OSAHS-related symptoms that were not included in the MBQ: Over 60 % of the people in high-risk group had experience of dry or sore mouth, polyuria during sleep while the occurrence rates of these symptoms in the low-risk group ranged from 20 to 45 %.

Gender wise distribution of study subjects

Variable	Category	n	%
Gender	Males	30	61.2%
	Females	19	38.8%

Distribution of study subjects based on the type of OSA

Variable	Category	n	%
OSA Type	Low	35	71.4%
	High	14	28.6%

Comparison of type of OSA among study subjects based on the gender using Chi Square Test

Variable	Category	Males		Females		χ^2 Value	P-Value
		n	%	n	%		
Risk of OSA	Low	21	70.0%	14	73.7%	0.077	0.78
	High	9	30.0%	5	26.3%		

Figure 1

Comparison of OSA related symptoms based on the type of OSA among study subjects using Chi Square Test

Variable	Category	Low		High		χ^2 Value	P-Value
		n	%	n	%		
Wearing denture in night	Yes	1	2.9%	0	0.0%	0.408	0.52
	No	34	97.1%	14	100.0%		
Night sweating	Yes	1	2.9%	2	14.3%	2.272	0.13
	No	34	97.1%	12	85.7%		
Polyuria	Yes	3	8.6%	6	42.9%	7.840	0.005*
	No	32	91.4%	8	57.1%		
Dry sore mouth	Yes	4	11.4%	7	50.0%	8.546	0.003*
	No	31	88.6%	7	50.0%		

Figure 2

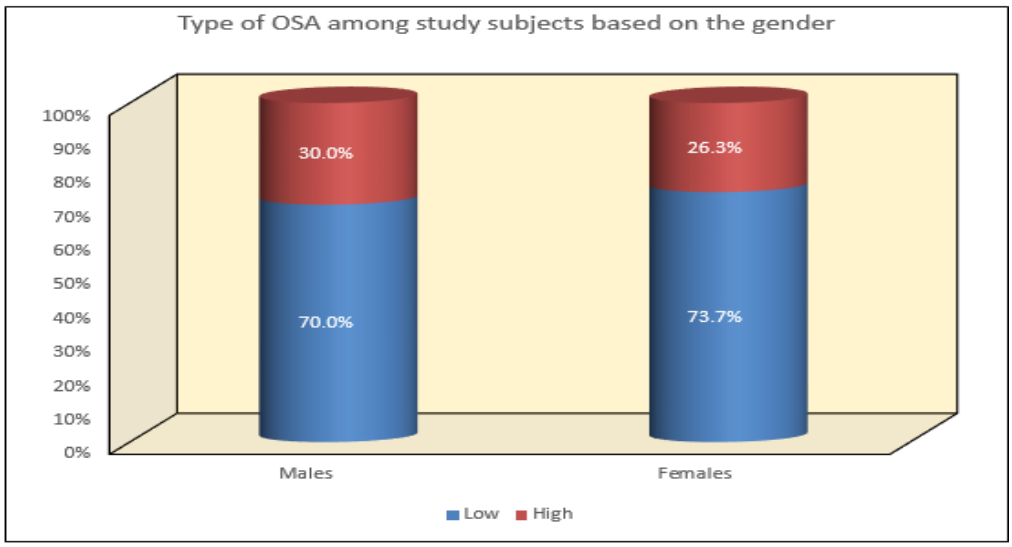

Figure 3

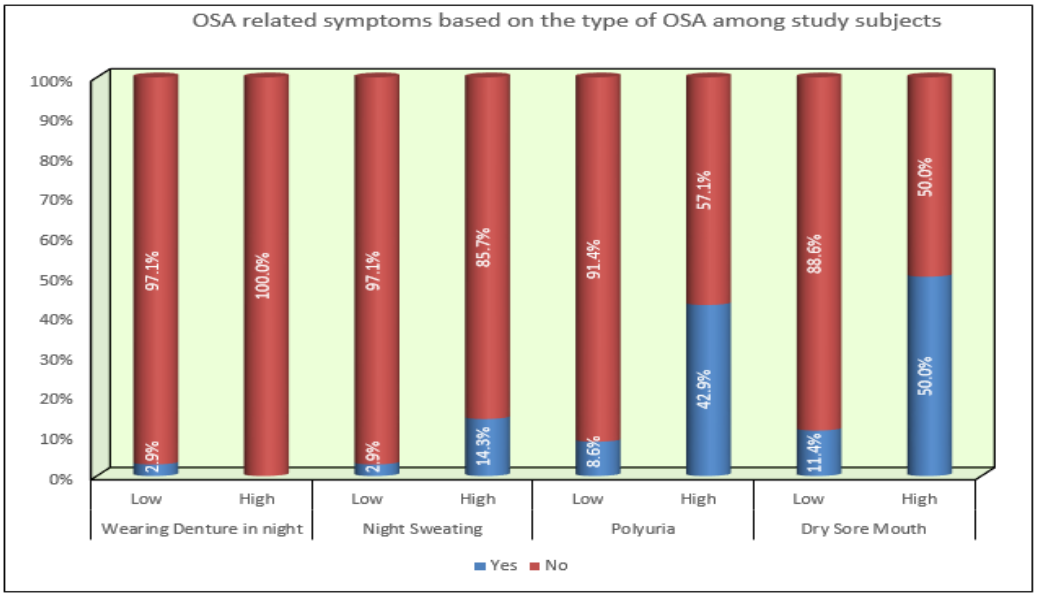

Figure 4

4. Discussion

Overnight polysonography is considered to be the golden standard for diagnosis of OSAHS. However, due to high cost of the test it is not used regularly,. Sleep specialists proposed the Berlin questionnaire as a screening tool of OSAHS in 1996. The questionnaire was made up of three parts: snoring behaviour, wake-time sleepiness or fatigue, and presence of obesity or hypertension, with a sensitivity of 86 % and a specificity of 77 %. [9] Sharma modified the questionnaire according to country development and oriental physical status. The modified Berlin questionnaire was proved equally validated to the original one and suitable [1]

When dentures were delivered to patients, dentists usually gave instructions as follows: “Denture should not be used during night as to provide rest to the residual ridges.”. In our study only one person appeared to wear denture and he was recognised to have low prevalence for OSA. Researchers supporting that edentulism can aggravate OSAHS symptoms pointed out that, due to decreased vertical dimension of occlusion (VDO) caused by missing dentition, edentulous individuals could experience prominent anatomical changes such as reduction of lower face height and mandible rotation. These anatomical changes could negatively influence the dimension and function of the upper airway [10]. Tongue modification related to dentures induced changes of epiglottis posture. Without denture epiglottis increases its distance from the pharynx. This could be useful for the correct passage of air to the lower airway. [6]

In our study, the percentage of the edentulous people who were at high risk of OSAHS was 28.6 % [FIGURE 1]. This is quite similar to a study done in China where 31 % of the subjects were classified as high risk of OSAHS in a questionnaire study with 540 participants.[2]

However, OSAHS morbidity varies in different races and so far, there is no sizable sample epidemiological survey using the Berlin questionnaire among the general population in Asia available for reference. In our study 30 % of males had a higher risk for OSA and 26. 3 % of females had a higher

risk for OSA. No significant difference in the percentage of people at high risk of OSAHS was found between male and female subjects. [FIGURE 3]

In our study, we found that among OSAHS-related symptoms, which were not mentioned in the MBQ as a related factor like dry or sore mouth and throat, polyuria during sleep, and difficult to fall asleep/easy to wake up showed high occurrence rate equal to or higher than 60 % in the high-risk group and should be paid more attention during the OSAHS screening process. These items supported the results of MBQ and can be used as references in diagnosing OSAHS in edentulous population. [Figure 2, 4]

5. Conclusion

According to the MBQ, about 28.6% of the edentulous population was identified as high risk of OSAHS. Equal attention should be given to elderly edentulous female and male since they are also high level of risk of developing OSAHS.

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