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Original Research Article

Patient satisfaction to evaluate the efficacy of mandibular advancement device in a treatment modality for mild to moderate sleep apnea patient in Indore Region

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ABSTRACT

Context: Obstructive sleep apnea (OSA) represents the most severe syndrome associated with obstruction of the upper airway. People with obstructive sleep apnea (OSA) repeatedly stop breathing during their sleep for a moment or longer and as several as many times throughout one night.
Aims: The Aim of study was to evaluate the efficacy of mandibular advancement devices in different age group, between male and female and according to body mass index in mild to moderate obstructive sleep apnea patient.
Setting and Design: cross sectional study.
Materials and Methods: 30 patients of different gender and age group were selected with mild to moderate OSA and asked to fill the Berlin questionnaire for diagnosis of obstructive sleep apnea after obtaining the necessary consent.
Statistical analysis used: The analysis was done by using SPSS, IBM version 20.0. The level of significance was fixed at 5% and $p \leq 0.05$.
Result: On evaluation of berlin questionnaire revealed that 83% of patients (including male and female) shows the significant improvement after the MAD treatment 16.7 % patient are not satisfied with the MAD.
Conclusion: Study shows that the patient with OSA showed Positive Berlin Questionnaire before the MAD treatment and after 2 month it was revealed that MAD treatment showed statically significant improvement in OSA.

1. Introduction

Obstructive sleep apnea (OSA) represents the most severe syndrome associated to obstruction of the upper airway. Factors recognized to increase the risk of OSA development include aspects of upper airway anatomy and function (obstruction and large tonsils), gender, obesity, ethnic origin, personal habits. If left untreated, it will result too many systemic disorder like CVS complications, cerebral and mental complications due to insufficient oxygenation, and hormonal complications due to a reduction of thyroid hormones, aldosterone, cortisol, and testosterone. Disruption of normal sleep architecture, caused by hypopneic-apneic events during the night and the resulting daytime sleepiness, causes a poor job performance, an increased risk of traffic accidents, headaches, and neurocognitive deficits. [1]

It is important to diagnose obstructive sleep apnea, if present, before any active treatment is begun. A diagnosis of obstructive sleep apnea can be made by Berlin questionnaire followed by a sleep study, sleep study are usually carried out by a specialist department of respiratory medicine.

The Berlin questionnaire is a survey that has been used to identify patients with OSA. It was developed in 1996 in Germany by a group of respiratory and primary

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care physicians through consensus. The initial version was then validated in the questionnaire is self-administered and consists of 10 questions in three categories related to the presence and severity of snoring, frequency of daytime sleepiness, and the presence of obesity or hypertension.[2]

2. Material and Methods

The study was conducted in the Department of prosthodontics in Sri Aurobindo College of dentistry Indore with 30 patients were selected who were diagnosed of mild to moderate obstructive sleep apnea after answering the Berlin Questionnaire Selection of desired samples was done by using simple random sampling technique according to inclusion-exclusion criteria.

2.1. Inclusion criteria

1. Age above 15 years
2. Both male and female
3. Patients having history of snoring day time sleepiness, fatigue
4. Subject answering to berlin questionnaire

2.2. Exclusion criteria

1. Pregnant or lactating women
2. Prior craniofacial surgery related to OSA
3. Any other respiratory disorder.

2.3. Procedure

After necessary instructions and information about the study, the selected 30 patients of age group 28 -65 years and both male and female were asked to answer the Berlin questionnaire for diagnosis of obstructive sleep apnea. Berlin Questionnaire (BQ) investigates three categories: snoring, daytime sleepiness and/or while driving and diagnosis of systemic hypertension or obesity. Berlin Questionnaire (BQ) was administered at the time of the patient's initial visit when the patient's family member or bed partner was available to confirm the accuracy of responses to the questions about snoring. Patients were scored as being at high-risk for OSA if they had a positive score on two or more categories, while those who did not were scored as being at low-risk.

Once the patient was diagnosed with mild to moderate obstructive sleep apnea, all subjects were radio graphically evaluated and non titrable mandibular advancement device were given to each patient. After the 2 month of follow up again berlin questionnaire was given

After answering the Berlin Questionnaire (BQ) the questionnaire was reviewed for completeness and analyzed statistically. The answers were represented in the form of percentage.

3. Results

Cross-sectional Study was designed and Selection of desired samples was done by using simple random sampling technique according to inclusion-exclusion criteria which includes 30 patients who were diagnosed with mild to moderate obstructive sleep apnea with positive berlin questionnaire.

The analysis was done by using Statistical Package for Social Sciences (SPSS, IBM version 20.0). The level of significance was fixed at 5% and $p \leq 0.05$ was considered statistically significant. Paired t test was performed for quantitative variables for comparing the pre-operative and post-operative CBCT. The mean age of patients in present study was found to be 49.36+ 11.78 years Minimum age was found to be 25 years and maximum age of 68 years. (Table 1) On evaluation berlin questionnaire revealed that 83% of patients (including male and female) shows the significant improvement after the MAD treatment 16.7 % patient are not satisfied with the MAD.

On statistical evaluation of 30 patient suffering from obstructive sleep apnea were asked to answer the berlin questionnaire. After answering the Berlin Questionnaire (BQ) the questionnaire was reviewed and found that the male are more prone to obstructive sleep apnea as compare with female. Before the treatment male score was found 5.06 ±0.70and in female before treatment score was 3.80 ± 0.41.After treatment male score was found 1.60±2.26 and in female before treatment score was 2.20 ±2.27. After comparing evaluation of the before and after it was found that male are more prone to obstructive sleep apnea and on the other hand after treatment with the mandibular advancement device the recovery is fast in male when compared with female. (Table 2)

3.1. Category analysis

The three categories of the Berlin questionnaire were analyzed to evaluate the risk of the OSA. 12 participants were classified by the Berlin questionnaire as being low risk for obstructive sleep apnea, and the rest were classified as high risk.

On evaluation of BMI from berlin questionnaire revealed that 66.7% of patients in this study were overweight and 13.3 % were obese. And 20% of the patients were found to be healthy (Table 3)

The satisfaction level among the patients as assessed by same Berlin Questionnaire 50% of patients were moderately satisfied after oral appliance treatment. Amongst the patients 33.3% were very satisfied and only 6.7 % patients were not satisfied with the oral appliance. 10% patients did not know about their satisfaction level. (Table 4).

Table 3 Shows the different BMI among the patients. Majority of patients were overweight 20 (66.7), 4 patients were obese and only 6 patients were found to be healthy in

Table 1: Age-wise distribution of the patients

	N	Minimum	Maximum	Mean	Standard Deviation
Age	30	25	68	49.36	11.78

Table 2: Comparison of male and female before and after treatment

Gender		No.	Mean	Standard Deviation	P value
Male	**Before**	15	5.06	0.70	**0.01***
	After	15	1.60	2.26	
Female	**Before**	15	3.80	0.41	**0.01***
	After	15	2.20	2.27	

Table 3: Distribution of different B.M.I. among patients

BMI	N	Percentage
Overweight	20	66.7
Healthy	6	20
Obese	4	13.3

Table 4: Satisfaction level of patients after oral appliance

Satisfaction Level	N	Percentage
Moderately Satisfied	15	50
Very Satisfied	10	33.3
Did not know	3	10
Not satisfied	2	6.7

the present study.

Table 4 Shows the satisfaction level among the patients as assessed by control Questionnaire. The results of the present study revealed that half of the patients were moderately satisfied (50%) after oral appliance. Only 2 patients reported no satisfaction after oral appliance.

4. Discussion

The Berlin Questionnaire is a validated patient survey that helps to identify Obstructive Sleep Apnea (OSA). It was developed in 1998 at a medical conference in Berlin, Germany, by a group of family practice physicians and sleep researchers. The purpose of the Berlin Questionnaire identifies patients who are at high risk for OSA and to identify those snoring patients who have a low risk for OSA. It is a simple, self-administered patient questionnaire and a validated predictive assessment tool designed to assess three OSA risk categories: the presence and frequency of snoring behaviour, wake time sleepiness or fatigue, a history of obesity and/or hypertension.[3]

It is important to diagnose (OSA) obstructive sleep apnea, if present, before any active treatment is begun. Some studies have revealed that Obstructive sleep apnea are more in prone to male as in female because of increased fat deposition around pharyngeal airway in male as compared with women.[4] Besides, hormonal differences may play a role in the predisposition to abnormal breathing during sleep.[5] Premenopausal female are relatively protected from Obstructive sleep apnea even if they have other known risk factors for Obstructive sleep apnea. And interestingly, in postmenopausal women taking hormonal replacement therapy, the prevalence of Obstructive sleep apnea is similar to premenopausal women.[6] In our study total 15 women patients with mild to moderate obstructive sleep apnea were reported. Out of 15 women patients 10 were postmenopausal women & 5 were pre-menopausal women.

Selection of desired samples was done by using simple random sampling technique according to inclusion-exclusion criteria. Both male and female was selected and found that the male (66.7%) has more prevalence of obstructive sleep apnea as compare to female (33.3%) Similar results were shown by Punjabi NM et al (2008)[7] and Patel M et al (2008)[8] found OSA is more common in male, approx. 2 to 3 times that of women. Young et al. (1993)[9]noted that regardless of severity, women did not report symptoms that differed significantly from those of men and snoring was still the most sensitive and strongest predictor of OSA**.** .Lopes Neto JM(2013)[10] found that the frequency of obstructive sleep apnea (OSA) in obese patients scheduled for bariatric surgery.

On evaluation of BMI from Berlin Questionnaire out of 30 patients 20 were overweight 4 patients were obese and only 6 patients were found to be healthy in the study. Revealed that patient with overweight and obese has the more prevalence rate of obstructive sleep apnea. Similar study was conducted by Sharma SK et al (2006)[11] andTeculescu et al (2007)[12]stated that male

gender, age, obesity (defined by a high body mass index), as significant risk factors for OSAS and he demonstrated that the risk factors and prevalence rate 13.74% and 3.57%, in overweight and obese for OSA.

After 2 months of treatment, patients were again asked to fill berlin Questionnaire to evaluate the efficacy of mandibular advancement device on lifestyle quality and for the patient awareness and improvement in their sleep as well as a decrease in the initial symptoms. Patient who were satisfied with the treatment shows reduction in snoring, daytime sleepiness, discomfort during the night, and an improvement of lifestyle and sleep.50% of patients were moderately satisfied after oral appliance treatment. Amongst the patients 33.3% were very satisfied and only 6.7% patients were not satisfied with the oral appliance. 10% patients did not know about their satisfaction level. Fabiana B et al (2015)[13] and Paola et al (2008)[14] found the similar results from his study when he received a Control Questionnaire to evaluate the efficacy of MAD on lifestyle quality.

Taken together, in the geographic region, which has a high prevalence of OSA in general population, it is important for primary care medical and dental practitioners to have a practical and valid screening tool to identify patients at high risk of OSA. Madhavan C et al(2016)[15] and Dixit R et al (2018)[16]and found that BQ is more sensitive and has predictive parameters for picking up OSA, especially the so-called "occult cases" of OSA and may help in improving the quality of life in such patients with proper OSA management. In spite of the advantages of BQ in the general population, utilization of the BQ as a screening tool for OSA should be considered with caution in the sleep clinic populations.

5. Conclusion

On evaluation of BMI from berlin questionnaire revealed that the obstructive Sleep apnea is more prevalent among the overweight and obese patients. The Study showed that the gender revealed a significant difference between the two groups with higher mean values in males when compared to females and on comparison with age revealed no significant difference between the two groups with higher mean values in individuals with more than 50 years to individuals with age less than or equal to 50 years.

6. Conflict of Interest

The authors declare that there are no conflicts of interest in this paper.

7. Source of Funding

None.

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