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Original Research Article

Evaluation of non-invasive ventilation compliance in obstructive sleep apnea syndrome or obesity hypoventilation syndrome patients: an observational study

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ABSTRACT

Background: Recent times have seen the rise in obstructive sleep apnea syndrome/obesity hypoventilation syndrome (OSAS/OHS) patients across the globe. Availability of sleep study centers, questionnaires, and more awareness have made the diagnosis of OSAS/OHS early. But still, the majority of patients suffer from morbidity associated with OSAS/OHS despite the better diagnosis, the most common cause being non-adherence to (CPAP). This needs to be addressed more vigilantly and with utmost importance for successful management of OSAS/OHS.
Methods: This is an observational study, we selected patients by reviewing sleep study records at a tertiary care center (Rohilkhand medical college and hospital) in Bareilly, India. All diagnosed patients with OSAS/OHS (i.e. AHI >5) were telephoned and enquired about symptoms and non-invasive ventilation (NIV) use. They were evaluated using a self-designed questionnaire.
Results: In our study, we had total of 49 OSAS/OHS patients with mean age of 50.6 years and mean BMI of 35.63. Male patients were 37 (75.5%) and at the time of diagnosis AHI (mean) was 60.67 events/hour. In NIV users there were 24 patients (48.97%), 22 patients (91.7%) feel they have been benefitted from CPAP and 2 patients (8.3%) do not feel benefit from CPAP (NIV) use. Among NIV users there was significant drop of AHI (mean) to 8.07. Among NIV users there was a reduction in symptoms like excessive day time sleepiness in 18 patients (81.81%), witnessed apnea in 15 patients (88.23%), snoring in 21 patients (91.30%), blood pressure in 3 patients (21.42%), blood sugar levels in 2 patients (20%), morning headache in 5 patients (83.30%), depressive mood in 2 patients (40%), perceived memory loss in 3 patients (33.3%), sense of choking in 17 patients (94.4%) and weight loss in 19 patients (76%).
Conclusions: CPAP significantly improves symptoms and provides objective as well as subjective benefit to OSAS/OHS patients but still significant proportion of patients hesitate to initiate the therapy. Poor education/awareness regarding OSAS/OHS and non-availability of affordable CPAP remains the leading cause of non-compliance. There is a need for early education, reinforcement and affordable CPAP therapy.

Keywords: OSAS/OHS, NIV, Compliance

INTRODUCTION

There is an increase in OSAS/OHS patients in recent times across the globe, due to rise in number of obese patients in developed as well as developing countries. This has been associated with decreased quality of life and an increased morbidity related to cardiovascular, motor vehicle, and other industry-related accident risks, lower workplace productivity and increased health care expenditure.[1] Validated questionnaires, increased number of sleep study centers, and more awareness among doctors as well as patients have made the diagnosis of

OSAS/OHS early.[2] But still, vast majority of patients suffer from morbidity associated with OSAS/OHS, despite the better diagnostic facilities, the most common cause being noncompliance to NIV, non-adherence to NIV, and lack of education among patients. This needs to be addressed more vigilantly, unless we find the causes of non-compliance/adherence we may not be successful in managing OSAS/OHS efficiently. This is a questionnaire-based study where we try to figure out the causes of non-compliance/adherence. Aims and objectives of the study were to assess the compliance of NIV in OSAS/OHS, to identify various causes of non-adherence/compliance of NIV in diagnosed cases of OSAS/OHS.

METHODS

This is an observational study, we selected patients by reviewing sleep study records at a tertiary care center Rohilkhand medical college and hospital in Bareilly, India. This study was conducted from October 2018-October 2019. Inclusion criteria was that all diagnosed patients of OSAS/OHS with an apnea-hypopnea index (AHI) of >5 were included in the study. Patients who did not wish to be part of the study were excluded. Patients were telephoned and were asked if they were using NIV, if yes then quantify the use (hours per night, nights per week) and evaluated improvement in symptoms using a self-designed questionnaire. Those who initiated the NIV but later abandoned therapy and those who never initiated treatment were enquired about their reasons for non-compliance/adherence. Total of forty-nine diagnosed patients of obstructive sleep apnea syndrome/obesity hypoventilation syndrome were assessed and the data was analyzed.

Statistical analysis

The data were entered on a Microsoft excel spreadsheet for statistical analysis. Qualitative data was present in frequency and percentage and quantitative data was presented in mean and standard deviation.

RESULTS

In our study, we had total of 49 OSAS/OHS patients with mean age of 50.6 years and mean BMI of 35.63. Out of 49 patients, 37 were males (75.5%) and 12 were females (24.5%). At the time of diagnosis AHI (mean) was 60.67 events/hour. In NIV users there were 24 patients (48.97%), 22 patients (91.7%) feel they have been benefitted from CPAP and 2 patients (8.3%) do not feel benefit from CPAP (NIV) use. Among NIV users there was significant drop of AHI (mean) to 8.07 (Table 1).

Among NIV users there was a reduction in symptoms like excessive day time sleepiness (DTS) in 18 patients (81.81%), witnessed apnea (WA) in 15 patients (88.23%), snoring in 21 patients (91.30%), blood pressure in 3 patients (21.42%), blood sugar levels in 2 patients (20%), morning headache in 5 patients (83.30%), depressive mood in 2 patients (40%), perceived memory loss in 3 patients (33.3%), sense of choking in 17 patients (94.4%) and weight loss in 19 patients (76%) (Figure 1).

Table 1: Demographics and NIV compliance.

Variables	Findings
Mean age of OSA patients	50.6 years
Number of males with OSA	69.8%, n=37
Mean initial AHI	60.67 events/hour
Mean AHI on NIV therapy	8.07 events/hour
Compliance	48%, n=24
Non compliance	52%, n=25

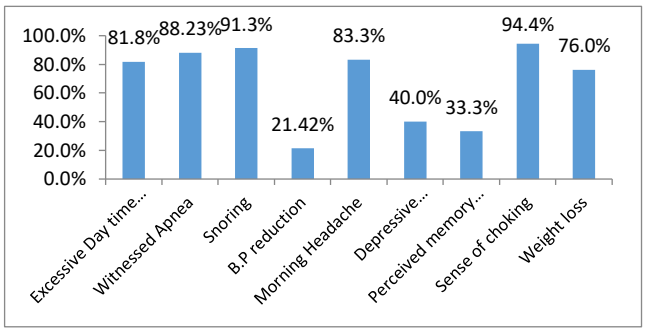

Figure 1: Reduction in symptoms (in percentage) after NIV use.

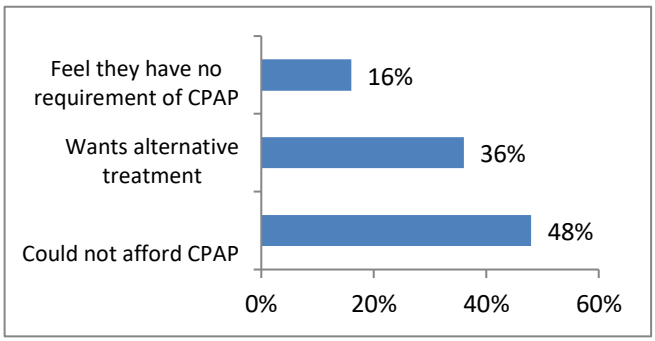

Figure 2: Reasons for non-compliance of NIV.

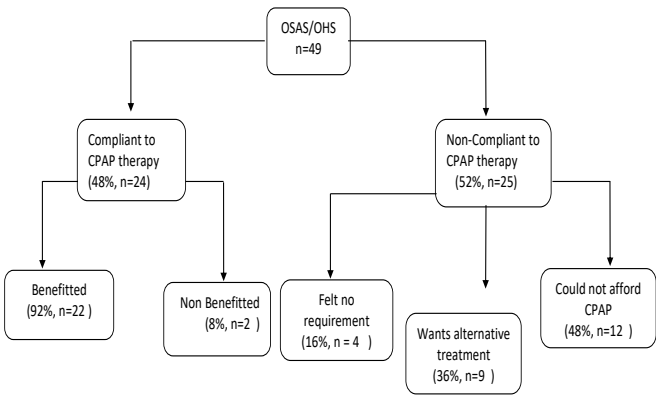

Figure 3: Compliance and non-compliance among OSAS/OHS patients.

24 patients (51.1%) were non-compliant to CPAP therapy. 4 patients (16%) felt no requirement of CPAP therapy, 9 patients (36%) wanted alternative therapy and 12 patients (48%) could not afford CPAP (Figure 2).

DISCUSSION

In our study, we had a total of 49 OSAS/OHS patients with mean age of 50.6 years, out of 49 patients, 37 were males (75.5%) and 12 were females (24.5%) with a mean BMI of 35.63 kg/m^2 and mean AHI was 60.67 events/hour. Similarly, Sawyer et al in a study observed 55% males and 45% females with mean BMI 38.3 kg/m^2; SD 9.3) and severe OSAS/OHS (AHI 36.8; SD 19.7).[3] Increasing BMI is one the commonest risk factor for developing OSAS/OHS. Increasing age is directly proportional to prevalence of sleep apnea as seen in various epidemiological studies, also in a study published by American Thoracic society showed obstructive sleep apnea (AHI ≥10 events/hour) was present in 3.2% in age group 20-44 years, 11.3% in age group 45-64 years, and 18.1% in age group 61-100 years. This increasing prevalence with age is believed to be due to increasing fatty deposits in the parapharyngeal area and lengthening of the soft palate as well as the changes in the body structures surrounding the pharynx.[4] Various other epidemiological studies have shown that the prevalence of obstructive sleep apnea in higher among men.[5,6]

In our study, symptom reduction after NIV use was noted, reduction in sense of choking was seen in 94.4% patients, snoring was seen in 91.3% patients, witnessed apnea episodes seen in 88.23% patients, excessive daytime sleepiness was seen in 81.8% patients, similar symptoms reduction was seen by Robert et al in a study.[7] In our study compliance of NIV in OSAS/OHS patients was 48 and 52% were non-compliant. The compliance to NIV (CPAP/BiPAP) is a challenge and it grossly determines the outcome of a patient with OSAS/OHS. Nicolini et al in a study concluded that the adherence to noninvasive ventilation is influenced by several factors like age, outcome expectations, leakages, etc.[8] Some common side effects directly affecting the patient's adherence to treatment were discomfort in wearing the mask and nasopharyngeal symptoms like rhinorrhea and increased congestion and all of these were related to decreased humidity of inspired gas.

In Pickwick study, Piper et al and Howard et al in two different studies concluded that treatment with NIV led to a larger degree of improvement in some respiratory functional outcomes as compared to CPAP. Also, only NIV had a satisfactory effect on the cardiac structure and function as seen on echocardiography.[9-11]

Howard et al. noticed a delay of CPAP treatment efficacy to improve daytime hypercapnia as compared to NIV suggesting that efficacy of CPAP is slightly lower. Although Hoffstein et al in a study saw no significant difference between CPAP and NIV in long-term outcome in terms of hospital stay and the incident of cardiovascular events and survival was also the same for both treatments and had no significant differences in compliance, dropouts and side-effects.[12]

Most patients experienced improved sleep and more energy after CPAP treatment. Fewer patients had a fall in frequency of headache and Elkhouli et al also found improvement in the clinical parameters including sleep as better predictors of long-term compliance and satisfaction with CPAP.[13,14]

CONCLUSION

CPAP significantly improves symptoms and provides objective as well as subjective benefit to OSAS/OHS patients but still significant proportion of patients hesitate to initiate the therapy. Poor education/awareness regarding OSAS/OHS and non-availability of affordable CPAP remains the leading cause of non-compliance. There is a need for early education, reinforcement and affordable CPAP therapy.

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