

Family History of Successful CPAP Treatment is Associated with Improved CPAP Compliance

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Abstract

Background: Non-compliance with continuous positive airway pressure (CPAP) is a significant problem in the treatment of obstructive sleep apnea (OSA). When compliance is defined as an average CPAP use >4 hours/night, 46%-83% of patients are non-compliant. Poor compliance leaves undertreated patients at increased risk for cardiovascular and neurocognitive sequelae of OSA. Factors known to affect CPAP compliance include disease severity, perceived symptomatic benefit, and intensive and early support through the sleep clinic.

Objectives: The objective of this study was to assess the effect of a family history of successful CPAP treatment on CPAP compliance.

Methods: An anonymous survey of 410 adult patients attending CPAP follow-up clinic at a tertiary medical center was conducted between March 2010 and February 2011. Patterns of CPAP use were assessed. Compliance was defined as an average CPAP use >4 hours/night. Subjects were also surveyed regarding the presence of first degree relatives with a diagnosis of OSA, their use of CPAP, whether they described their CPAP as "helpful" and whether or not they "liked" using their CPAP.

Results: Thirty-eight percent of the patients surveyed (n=157) had a family member who also had a diagnosis of OSA and used CPAP. Of those with a family history of CPAP use, 92% of compliant patients had a family member who described their CPAP as "helpful" vs. 71% of non-compliant patients (p=0.002). Logistic regression analysis to predict compliance vs. non-compliance, controlling for age, gender, ethnicity, and a diagnosis of co-morbid hypertension or diabetes showed that having a family member who found CPAP "helpful" was associated with an odds ratio for compliance of 4.70 (95% CI 1.99-11.07, p value <0.001). In addition, 72% of compliant vs. 60% of non-compliant patients had a family history of CPAP use with a family member who "liked" their CPAP (p=0.3).

Conclusion: CPAP non-compliance is a complex multifactorial clinical problem. This study shows that familial social support, in the form of modeling CPAP use and self-described helpfulness of CPAP therapy, is associated with CPAP compliance.

Keywords: CPAP treatment; CPAP compliance; Memory; Neurocognitive

Introduction

Obstructive sleep apnea is characterized by recurrent episodes of partial or complete upper airway obstruction. The prevalence of OSA in the general adult population varies between 2 and 4%. During episodes of upper airway obstruction, a subsequent increase in sympathetic nerve activity and transient decrease in oxygen saturation are believed to be account for an increase in cardiovascular risk. This includes an increased risk of hypertension, cerebrovascular accident and myocardial infarction. OSA is also associated with neurocognitive symptoms such as excessive daytime sleepiness, poor concentration and memory impairment [1].

Continuous positive airway pressure (CPAP) is the most effective treatment for OSA. CPAP establishes a pneumatic splint and prevents collapse of the upper airway associated with muscular relaxation during sleep. The effectiveness of CPAP therapy is dependent on its frequency and duration of use. CPAP compliance is frequently defined

as use of the device for greater than 4 hours per night. Using this definition, 46%-83% of patients are non-compliant. Patients with adequate CPAP compliance are observed to have improvement in disease specific quality of life measures, including daytime sleepiness, as well as a decrease in new-onset hypertension and cardiovascular events. Factors known to affect CPAP compliance include disease severity, perceived symptomatic benefit, associated co-morbidities and early support through the sleep clinic. However, compliance is likely effected by additional factors as well. Identification of compliance predictors could help in the planning of early interventions to improve CPAP use. CPAP compliance depends to a great extent not only on the subject (severity of disease, symptomatology, etc.), but also on education and professional medical support with therapy and additional factors in the home environment. This includes the influence of marital status and other close personal relationships/support structure outside of the hospital setting [2,3].

Methods

An anonymous survey of 410 adult patients attending CPAP follow-up clinics at the University of Michigan was conducted between March 2010 and February 2011. Patterns of CPAP use were assessed. Compliance was defined as an average CPAP use >4 hours/night. Demographic factors including age, gender, ethnicity and a diagnosis of co-morbid hypertension and diabetes were recorded. Subjects were also surveyed regarding the presence of first degree relatives with a diagnosis of OSA, their use of CPAP, whether they described their CPAP as “helpful” and whether or not they “liked” using their CPAP.

Logistic regression analysis was utilized to predict compliance *vs.* non-compliance for patients with a family member also diagnosed with OSA and using CPAP, controlling for age, gender, ethnicity, diagnosed hypertension and diagnosed diabetes. Age was treated as a categorical variable using the following categories: 18-20, 21-40, 41-60, 61-80 and >81 years of age. A *p* value <0.05 was considered to be significant [4-9].

Results

The majority of patients were male, Caucasian and of middle age. Less than fifty percent had a diagnosis of co-morbid hypertension or diabetes. Thirty-eight percent of the patients surveyed (*n*=157) had a family member who also used CPAP.

Of those with a family history of CPAP use, 92% of compliant patients had a family member who described their CPAP as “helpful” *vs.* 71% of non-compliant patients (*p*=0.002).

Regression analysis to predict compliance *vs.* non-compliance, controlling for age, gender, ethnicity, diagnosed hypertension and diagnosed diabetes showed that having a family member who found CPAP “helpful” was associated with an odds ratio for compliance of 4.70 (95% CI 1.99-11.07, *p* value <0.001). In addition, 72% of compliant *vs.* 60% of noncompliant patients had a family history of CPAP use with a family member who “liked” their CPAP (*p*=0.3) [10].

Discussion

The current study provides insight into additional social factors that may have an effect on CPAP compliance. Previous studies which explored predictors of long-term CPAP compliance showed that perceived symptomatic benefit and intensive and early support through the sleep clinic played an important role. Other studies have shown that disease severity, age, gender and associated co-morbidities, such as hypertension, are also associated with adherence to CPAP therapy. This study is the first to examine the role of familial experience with CPAP treatment as a potential factor influencing CPAP use in other affected family members. Social influences, especially those of close relatives, have been previously shown to play a significant role in health behaviors of other family members ranging from dietary habits to smoking to seat belt use. Over ninety percent of patients in this study with a family member also diagnosed with OSA who described their CPAP as “helpful” were CPAP compliant. This compliance rate was significantly higher than those with a family member who did not describe their CPAP use as particularly “helpful” [11-13].

CPAP compliance is critical to improving the quality of life and cardiovascular outcomes of patients diagnosed with OSA. However, many potential predictors of adherence to this therapy remain

unevaluated. Personalized therapeutic decision-making tools may be helpful in the management of sleep apnea and improvement in rates of CPAP compliance. Interestingly, our study suggests that one of the predictors of adequate CPAP compliance is a family history of successful use.

During the past decade, there has been an increasing focus on personalized medicine. One of the goals of personalized medicine is to identify specific factors among individuals with a particular disease to more precisely target therapy and improve treatment outcomes. Patients with OSA have different clinical presentations as well as different social support structures. By identifying these patient variables, providers may be better able to develop a personalized treatment program for each patient including early and frequent intervention for those at highest risk of poor compliance with therapy. Patients with a negative family experience with CPAP use may benefit from early intervention and support [14-16].

There are certain limitations of the current study. First, this study evaluated primarily male, Caucasian and middle aged subjects. Second, this study only surveyed CPAP compliance in patients who were using or still attempting to use CPAP. Therefore, the results of this study may not be generalizable to patients of other demographic backgrounds or who were diagnosed with OSA but no longer using CPAP. Finally, this study did not account for all potential confounding factors that may ultimately influence CPAP compliance, including disease severity [17,18].

Conclusion

CPAP non-compliance is a complex multifactorial clinical problem. This study shows that familial social support, in the form of modeling CPAP use and self-described helpfulness of CPAP therapy, is associated with CPAP compliance.

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