

A Review Of Psychological And Personality Characteristics On PAP Therapy Adherence Among Sleep Disordered Breathing Patients

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Article Info

Article Notes

Received: February 17, 2018

Accepted: April 05, 2018

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Keywords

Psychological and Personality Characteristic
Sleep Disordered Breathing
Obstructive Sleep Apnea
PAP therapy
Adherence

ABSTRACT

Sleep disordered breathing (SDB) is a common health problem with significant morbidity and mortality. Positive airway pressure (PAP) therapy is the accepted first-line treatment for SDB. Despite the documented efficacy of PAP therapy in the treatment of SDB, patient adherence is problematic. Proposed reasons for this nonadherence include patient-related, therapy/medication-related, and health professional-related factors. Some research studies have been published regarding the relationship between patient psychological or personality characteristics and adherence with PAP therapy. These studies can be divided into two groups. The first group focuses on psychological/personality characteristics of SDB patients. These studies claim that hypochondriasis, depression, memory and some cognitive function impairment are prevalent among SDB patients. Patients with these psychological and personality characteristics report more symptoms and complaints compared to other SDB patients. The second group examines the PAP adherence and psychological/personality characteristics. They report that PAP adherence may negatively correlate with Type D personality, hypochondriasis, claustrophobia, depression, neuroticism, and BIS while may be positively associated with BAS-FS, and intellect imagination.

However, limited data, the significant difference of the methods, techniques, number of cases and results of the studies, and contribution of multiple other factors make it difficult to draw a reliable conclusion. More specific studies with larger sample size on proposed psychological/personality variables would give a more clear understanding of this problem.

Introduction

The upper airway is an anatomical space between the nose and the upper part of trachea. During sleep, any narrowing or blockage in this anatomic passage will cause breathing problems such as arousal, snoring, partial or complete cessation (hypopneas, and apneas) of breathing. These breathing problems are labeled as Sleep Disordered Breathing (SDB). SDB mostly comprises snoring, upper airway resistance syndrome (UARS) and obstructive sleep apnea (OSA).

Snoring prevalence varies among different populations. It is reported that 19-37% of the general population and 50% of middle age men snore¹. UARS refers to increased resistance in the upper airways, and it causes recurrent arousals (Respiratory effort related arousals-RERA) during sleep. Though the prevalence is not known, one study reported that 15.5% of the adult population might have

UARS². Obstructive sleep apnea (OSA) is a common health problem with significant morbidity and mortality. Prevalence rates of OSA in the United States, when defined as an Apnea-Hypopnea Index (AHI) greater than five events per hour as measured by a polysomnogram, are estimated to be approximately 20–30% in males and 10–15% in females^{3,4}.

Positive airway pressure (PAP) therapy is the accepted first-line treatment for SDB⁵.

PAP is a device that pushes air through a hose and mask to the patient's upper airway in order to provide constant positive pressure. PAP devices are generally designed to provide a pressure of 4 to 20 cm water. This pressure prevents the collapse of the upper airway and resolves apneas and hypopneas during sleep. The most commonly used form is continuous positive airway pressure (CPAP), which has a fixed pressure based on titration study. Another form is auto positive airway pressure (APAP), which provides a pressure interval (most of the time 5 to 15 cm). APAP pressure changes in this interval depend on upper airway resistance during sleep. If a patient has mild to moderate OSA and no titration study is available, then APAP may be an empirically preferred method. A third form is BiPAP. If a patient requires higher pressures on CPAP then clinicians may prefer BiPAP to make the patient's expiration more comfortable and improve his/her compliance. In more complicated cases (where both obstructive and central apnea exists) auto servo ventilation (ASV) or other forms (auto BiPAP, VPAP) may be an option.

Treatment adherence is defined as "the extent to which a person's behavior-taking medications, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider"⁶. Historically, PAP adherence was arbitrarily defined and generally accepted as the use of PAP therapy for ≥ 4 h/night on $\geq 70\%$ of nights for at least 30 days or longer duration.

PAP treatment has two important drawbacks for adherence. First, the PAP device is an uncomfortable and cumbersome machine to use. Another drawback is the necessity of long term usage of PAP device. Therefore, despite the documented efficacy of PAP therapy in the treatment of OSA, patient adherence problems remain high⁷. Studies show significant non-adherence with PAP among patients (23–89%)^{8, 9}. These percentages are similar to non-adherence for treatment of other chronic health problems¹⁰.

Proposed reasons for non-adherence include **patient-related** (failure to understand importance of therapy, and instructions of usage, social isolation, alcohol/medication use, feeling ill or too tired to use it, physical limitations/hearing problem), **therapy/medication-related** (complexity of therapy, adverse reactions, chronic

long term usage, financial problems, lack of efficacy), and **health professional-related** factors (poor relationship with patient, unwillingness of education, lack of knowledge of medications patient is taking)^{8,7,11}.

Overview

Educational and therapeutic interventions and demographic characteristics have been studied in relation to PAP adherence in OSA patients^{12,13}. Beside these factors sleep clinicians have noticed that patient personality traits (i.e., patterns of thinking, feeling, and behaving that are unique among individuals) may affect adherence and usage of PAP therapy. In medical literature, there has been increased investigation regarding the relationship between patient psychological/personality characteristics and adherence with PAP therapy. Published studies show a wide variety of design, subject number, psychological/personality tests and results. These studies may be divided into two main groups. The first group of these studies focuses on more psychological/personality characteristics of SDB patients while others focus on PAP adherence and these characteristics.

Psychological/personality characteristics of SDB patients: Early studies with a small number of OSA patients reported a possible relationship between depressive symptoms and SDB. **Aikens et al.** investigated 178 OSA patients for PAP adherence. The Minnesota Multiphasic Personality Inventory (MMPI) test was used to assess patient's psychological responses¹⁴. The MMPI was administered prior to overnight diagnostic polysomnography. They found that 58% of these patients demonstrated at least one elevation on an MMPI subscale. Thirty-eight percent had two or more elevations on subscales, with several variations of hysteria-depression and hysteria-depression-hypochondriasis configurations evident. The authors also concluded that OSA patients who have core depressive symptoms (as measured by the MMPI scale D) without significant psychological symptoms in other areas tend to have less severe OSA, whereas those with a diverse set of other psychological symptoms overshadowing depressive symptoms (e.g., somatic focus, emotional reactivity, family/marital problems, cognitive problems, etc.) tend to have greater AHI and lower oxygen saturation.

Another study compared OSA patient with only snorers (without OSA). They used the MMPI on 94 patients and found that OSA patients had higher scores on the hypochondriasis and psychopathic deviance scales compared to only snorers¹⁵.

Hayashida et al. studied 230 OSA patients using the MMPI and self-rating depression scale (SDS)¹⁶. They reported that subjective daytime sleepiness in patients with OSA may be influenced by certain personality

characteristics affecting the hypochondriasis score and by age as well as by the severity of respiratory disorder indices. **Pierobon et al.** assessed the psychological and neuropsychological status of 157 obese OSA patients by using a battery of validated tests¹⁷. Their patients reported a higher frequency of extroversion and depressive behaviors. They also found some impairment of memory and cognitive function in these patients. The authors pointed out the necessity of more studies to investigate the eventual dose effect on psychological and neuropsychological variables of OSA and obesity severity and treatment efficacy.

In summary, these studies reported that hypochondriasis, depression, memory and some cognitive function impairment were prevalent among SDB patients. Patients with these psychological and personality characteristics reported more symptoms and complaints compared to other SDB patients.

Psychological/personality characteristics and PAP adherence of SDB patients: There is an increasing focus on the relationship between adherence and psychological/personality characteristics. In an early study, using the Minnesota Multiphasic Personality Inventory (MMPI), it was found that PAP adherence was higher among patients with hypochondriasis and low depression scores. Authors reported that the hypochondriasis and depression scales along with BMI and rating quality and daytime sleepiness significantly contributed to adherence prediction. Their results also showed that lower MMPI depression and hypochondriasis scale scores and subjective ratings indicating better sleep quality and less daytime sleepiness. However, this study was performed on a small group of patients¹⁸. Another study focused on claustrophobia and adherence to CPAP with 153 OSA patients. Authors used an adapted form of Fear and Avoidance Scale measurement to recognize claustrophobic tendencies. They found that claustrophobia negatively influences adherence to CPAP. Poor adherers had significantly higher claustrophobia scores than more adherent participants¹⁹.

Type D personality is defined as the joint tendency toward negative affectivity and social inhibition. It has been associated with poor adherence to medication in myocardial infarction patients. In one study, Type D personality was examined among OSA patients. Researchers recruited 247 OSA patients. They used Type D scale 14 (DS 14) and the side effect of CPAP inventory (SECI) questionnaire. They reported that 30% of the patients have type D personality. These patients reported more severe and frequent broad range side effects. Their objective adherence was significantly lower²⁰.

Moran and colleagues studied 63 patients with OSA. They used BIS/BAS, Mini IPIP, and WAYS tests. They found elevated behavioral inhibition system (BIS) scores

and neuroticism were associated with PAP therapy nonadherence. The authors suggested that the BIS scale may be a useful tool for predicting nonadherence²¹.

Stepnowsky *et al.* reported that active ways of using coping skills with new and difficult situations correlate with CPAP adherence. However, they had a small number of patients and used different questionnaires (Ways of Coping Questionnaire, Center for Epidemiologic Studies Depression Scale (CES-D), Profile of Moods States (POMS), bipolar disorder (BD)). Depression was not correlated, but the coping strategies variable was strongly correlated with adherence²².

In an interesting study, So SJ *et al.* studied 88 patients with UARS and 365 patients with OSA. Eysenck Personality Questionnaire (EPQ) was used. Patients with UARS scored lower on EPQ-E (extroversion/introversion) and EPQ-L (lie) than those with OSA. UARS patients also showed higher scores on EPQ-P (psychoticism) and EPQ-N (neuroticism) than OSA patients. They concluded that patients with UARS have worse subjective sleep quality than OSA patients in spite of their better PSG findings. UARS patients tend to have more neurotic and sensitive personalities than patients with OSA, which may be a cause of the clinical features of UARS²³.

In a different study, Dieltjens *et al.* investigated patient's personality and adherence to a mandibular advancement device (MAD) in 113 OSA patients. They found 45% of type D patients discontinued MAD treatment, whereas only 15 % of non-type D patients reported treatment discontinuation. The odds ratio for treatment discontinuation was 6.03 for type D personality, adjusted for age, gender, MAD type (monobloc or duobloc), and a decrease in apnea severity. In continuing MAD users, no significant difference in perceived side effects was reported between the personality types²⁴.

We also conducted a study on 321 OSA patients by using Behavioral Inhibition and Behavioral Activation Systems Scales (**BIS/BAS**), The Mini-International Personality Item Pool (**Mini-IPIP**) and Positive and Negative Affect Scales (**PANAS**). Interestingly we found BAS-Fun seeking (BAS-FS) was the strongest predictor for patient adherence with PAP therapy²⁵. Also, there were significant relationships between the personality facets of intellect/imagination (Mini-IPIP) and negative affect (PANAS) when considering PAP adherence only from the perspective of usage time. We assumed that BAS-FS is related to PAP adherence because using PAP involves action, moving toward a goal, and incorporating new behaviors that may provide the reward of feeling better. We also found that imagination was positively related to adherence to a certain extent. Imagination is a factor that shows openness to experience and is sometimes called intellect/imagination. Individuals who have a high degree of the imagination factor are

typically more insightful and open to new experiences. Possibly, the intellect/imagination trait is related to the BAS-FS trait. In our study, patient depression was prevalent (28%). However, we did not find any relationship between depressive mood and adherence. Previous studies have reported a relationship between depression and adherence. Some studies did not support^{22, 26} the findings as in our study. One possible explanation is that depression might have a minimal effect on adherence due to the passive nature of CPAP use. Yet another explanation could be that the ameliorative effect of CPAP use on mood²⁷ might encourage some depressed OSA patients to use their CPAP more. Also, most of the patients were on anti-depressive treatment in our study. The relationship between OSA and depression is complex and multifaceted²⁷. Further research is needed to fully appreciate how depressed mood and OSA are linked. In our study, we did not look at Type D personality specifically. But we found one of the components of Type D personality (negative affect) was significant for poor adherence.

Conclusion

Published studies reveal that PAP adherence may be negatively correlated with Type D personality, hypochondriasis, claustrophobia, depression, neuroticism, and BIS. In turn, adherence may be positively associated with BAS-FS, and intellect imagination. However, data are limited and reported studies show marked difference in terms of methods, techniques, number of the cases and results. Additionally, multiple other factors contributing to adherence make it difficult to reliably examine personality traits that relate to adherence. More specific studies with larger sample size on proposed psychological/personality variables would give a more clear understanding of this problem.

Conflict Of Interest

We have no conflict of interest. This is not a funded study

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