



# Factors Influencing the Use and Nonuse of Continuous Positive Airway Pressure Therapy: A Comparative Case Study

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## KEY WORDS

continuous positive airway pressure therapy  
obstructive sleep apnea  
social comparison  
stigma

The rates of sustained use of continuous positive airway pressure (CPAP) therapy among adults with obstructive sleep apnea (OSA) appear consistently suboptimal, despite the efficacy of this treatment. Using semistructured interviews, this study identified facilitators and barriers toward CPAP therapy after treatment initiation among patients with OSA. A purposive sample of eight patients representing extreme differences in CPAP use was recruited from a multisite sleep disorders clinic at a tertiary health center. Perceived physical, psychological, and social factors were found to influence both CPAP use and nonuse. It was revealed that the way patients feel about themselves influences the ways in which they manage their OSA with or without CPAP. This study underlines the necessity of working with patients and their families to create social environments that are both accepting and supportive of patients with OSA.

Obstructive sleep apnea (OSA) syndrome is a prevalent disorder characterized by the repetitive collapse of the pharynx during sleep, resulting in recurrent awakenings to restore upper-airway patency (Malhotra, Ayas, & Epstein, 2000). OSA is a chronic condition that affects 1 in 5 adults (Young, Peppard, & Gottlieb, 2002). For 1 in 20 adults who have daytime impairment because of OSA (Young et al.), continuous positive airway pressure (CPAP) remains the treatment of choice (Engleman et al., 1999) because of its ability to eliminate pharyngeal collapse as well as its ability to improve the symptoms of OSA (Malhotra et al.; Wild, Engleman, Douglas, & Espie, 2004).

Although CPAP has been demonstrated to be efficacious for treating OSA, rates of initial acceptance and continuous use of CPAP therapy appear consistently suboptimal, with approximately 18% of OSA patients declining CPAP prescriptions, and up to 30% of patients who accept CPAP prescriptions abandoning CPAP by 5 years (Engleman & Wild, 2003). Furthermore, Weaver and colleagues (1997) suggest that consistent and inconsistent CPAP users can be differentiated within 1 week of treatment.

## Background

There is quantitative evidence of the importance of psychological variables in CPAP use. In patients with OSA, hypochondriacal, claustrophobic, and depressive personality traits have been associated with nonadherence to CPAP therapy (Chasens, Pack, Maislin, Dinges, & Weaver, 2005; Wild et al., 2004). Wild, Engleman, Douglas, and Espie (2004) provided further evidence of patient psychological variables

affecting CPAP use at 3 months postinitiation. They determined that 24% of the overall variance in CPAP use could be explained by patient psychological variables such as personal-health value, health locus of control, and self-efficacy. In addition, variables derived from social cognitive theory (i.e., perceived self-efficacy) and the transtheoretical model (i.e., readiness to change, decisional balance) were shown to predict CPAP use at 6 months posttreatment initiation when assessed at 1 week ( $R_2 = 0.232, p = .001$ ) and at 3 months posttreatment ( $R_2 = 0.415, p < .001$ ; Aloia, Arnedt, Stepnowsky, Hecht, & Borrelli, 2005). Although significant, much of the variance still needs to be explained. The unexplained variance may be attributable to variables external to the person. For example, family and other social factors contributing to CPAP use continue to be understudied in this patient population.

Although CPAP therapy may create physical problems, some studies have shown that these problems, such as mask discomfort, do not necessarily prevent CPAP use (Chasens et al., 2005). Engleman and colleagues (2003) suggest that a lack of obesity, age higher than 80 years or lower than 50 years, and female sex are better determinants of CPAP nonuse. However, these quantitative studies have not shown how or why these various factors are associated with CPAP nonuse. This in turn poses a challenge to creating relevant clinical interventions to improve CPAP use.

The factors that influence both CPAP use and nonuse have been explored in very few qualitative research publications. Dickerson and Kennedy (2006) explored motivation to use CPAP, with assistance

from a support group, among compliant patients. In addition, Dickerson and Akhu-Zaheya (2007) described the experience of patients' trials and tribulations in using CPAP over time. These tribulations of CPAP use have also been explored in patients who have abandoned CPAP therapy (Dickerson & Akhu-Zaheya; Tyrrell, Poulet, Pe Pin, & Veale, 2006). Using the health belief model, Tyrrell, Poulet, Pe Pin, and Veale explored beliefs about both OSA and CPAP treatment and the reasons for CPAP nonuse among nine patients. In this study, health beliefs were seen to influence abandonment. These three qualitative studies, when combined, explore some of the reasons why patients with OSA use or do not use CPAP. Further studies are needed to determine other factors that may influence use or nonuse of CPAP.

Using an inductive approach, this comparative case study adds to the existing literature by uniquely comparing and contrasting the perspectives of OSA patients who use CPAP devices with the perspectives of OSA patients who have abandoned CPAP therapy. The present case study broadens the knowledge of the CPAP experience by elucidating the perceived factors that facilitate CPAP use, as well as elucidating the perceived factors that prevent CPAP use and lead to the abandonment of treatment in patients with OSA.

## Methods

### Sample

A purposive sample of 8 patients was recruited from a multisite sleep disorders clinic at a tertiary health center between July 20, 2006, and September

20, 2006. Healthcare services at these clinics are provided by nurses and physicians who specialize in treating and caring for patients with sleep disturbances. Patients of these clinics receive written materials and one-on-one instruction regarding OSA and treatments. Intensive nursing support is available to all patients experiencing challenges with therapy. All services are covered by the government medical coverage plan. However, patients are financially responsible for their CPAP devices. Inclusion criteria for patients in this study were (1) adult diagnosis with OSA, (2) prescription for CPAP therapy ( $\geq 1$  week), and (3) ability to speak and read English.

In addition, purposive sampling was used to recruit patients who represented extreme differences in CPAP use. The clinical team at the sleep disorders clinic identified users as patients who consistently used CPAP ( $\geq 5$  hours of nightly use in the past 7 days), as well as nonusers—patients who returned to follow up but had used CPAP for  $\leq 1$  hour of nightly use in the past 7 days. Two men and two women were recruited in each group.

**Table 1** outlines the patient profile summary. The summary contains demographic data and indicates the severity of OSA, the extent of CPAP use, the use of prescribed adjunct sedatives/hypnotics, and selected comorbidities known to influence CPAP use.

### Data Collection

A qualitative descriptive design guided the individual interviews about CPAP use in the two groups

**Table 1. Patient Profile Summary**

Group	Users ( <i>n</i> = 4)	Nonusers ( <i>n</i> = 4)
Age (years)	48.8 $\pm$ 9.9	43.3 $\pm$ 5.3
Body mass index (kg/m <sup>2</sup> )	35.2 $\pm$ 8.3	28.8 $\pm$ 11.3
Apnea-hypopnea index <sup>1</sup> (number of apnea-hypopnea events/hours of sleep)	43.0 $\pm$ 40.4	45.2 $\pm$ 14.4
Epworth Sleepiness Scale score <sup>1</sup> (preinitiation of continuous positive airway pressure [CPAP])	11.2 $\pm$ 5.8	8.7 $\pm$ 3.7
Epworth Sleepiness Scale score <sup>1</sup> (postinitiation of CPAP)	3.7 $\pm$ 2.1	7.5 $\pm$ 3.5
Time since CPAP treatment began (weeks)	32.2 $\pm$ 27.6	121.5 $\pm$ 105.5
Average CPAP nightly use in past 7 days (hours)	7.0 $\pm$ 1.2	0.0 $\pm$ 0.0
Use of prescribed adjunct sedatives/hypnotics (number of patients)	0	2
Diagnosis of hypertension (number of patients)	3	0
Diagnosis of diabetes (number of patients)	1	0
Diagnosis of depression (number of patients)	0	1
Married or partnered (number of patients)	4	4

<sup>1</sup>The Epworth Sleepiness scale (ESS) is used as a subjective measure of sleepiness, one manifestation of OSA (Rosenthal & Dolan, 2008). Scores range from 0–24. Higher scores indicate greater somnolence during waking hours. The apnea-hypopnea index is an objective measure of respiratory disturbances.

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of patients with symptomatic OSA. Semistructured interviews took place in a private office in the clinic and lasted approximately 15–60 minutes. The interviews were digitally recorded to ensure transcription rigor. The interview questions are listed in **Table 2**. Field notes were used to document nonverbal behavior and events that occurred during the interview (e.g., interruptions).

## Data Analysis

Qualitative data analysis was performed using CmapTools version 4.07, which is knowledge-modeling computer software developed by the Institute for Human and Machine Cognition in Pensacola, FL. In this thematic analysis, the interview data were first transcribed verbatim and analyzed line by line for instances (phrases) that described factors involved in the extent of each patient's use of CPAP. These factors were assigned thematic codes. To reduce research bias in coding and enhance confirmability of data, transcripts and field notes were analyzed and coded independently by two researchers. Audit trails created by each researcher were compared to ensure the objectivity of the thematic codes and provide triangulation of the findings. One researcher was blinded to the case study groups. For each patient, each code and its corresponding excerpt were entered into a computer-generated table. Coding was performed as data collection and analysis proceeded. This process of coding, known as constant comparison, involved determining commonalities and variations between newly coded data and previously coded data within each group to refine each of the codes and the factors they represent (Polit & Beck, 2004). Ultimately, the use of computer-generated tables containing the codes facilitated the identification of similar codes within and between cases. After all the codes were identified, they were further refined

and clustered into higher order categories (themes) based on an inductive and comparative approach, which sought to specifically compare and contrast qualitative data arising from each case. Following this categorization, the computer-generated table was reorganized to display categories, subcategories, and example phrases extracted from the raw data.

## Findings

Using a comparative approach, this case study identified perceived physical, psychological, and social factors that facilitated and prevented CPAP use. Although the same perceived factors were presented by both cases, the way these factors were perceived were in opposition. The comparison and contrast of perceptions between user and nonuser patients is presented in **Table 3**.

## Discussion and Implications

In this qualitative study, perceived physical, psychological, social, and financial influences have been identified. In particular, the reasons for using CPAP were overwhelmingly provided by users of CPAP, while the reasons for not using were overwhelmingly provided by patients classified as nonusers. Similarly, Dickerson and Kennedy (2006) and Dickerson and Akhu-Zaheya (2007) revealed patients using CPAP who described their decision to use as a "trade off" for which the benefits of using CPAP outweighed the negative aspects. Furthermore, this study revealed two important issues that influenced patients in either using or abandoning CPAP—social comparison and stigma.

## Social Comparison

Although not previously studied in the context of CPAP use, the concept of social comparison—relating the features of one self to those of others—was relevant to the findings of this study. Social

**Table 2. Semistructured Interview Questions**

1. Tell me about your experience using continuous positive airway pressure (CPAP). What has it been like? How often do you use CPAP?
2. What makes/made you continue to use (or not use) CPAP treatment?
3. What influences you the most in using (or not using) CPAP?
4. What is/was your biggest challenge in using CPAP?
5. What do you think might happen to you if you skipped 1 night of CPAP treatment?
6. To what extent do you feel that you are able to continue using CPAP? One year from now? Five years from now?
7. Is there someone who influenced you to use (or not use) CPAP? The following probes will be used as needed: 7a. Who is this person? 7b. How did they influence you?
8. What advice would you give to someone who has just been prescribed CPAP?

**Table 3. Factors Influencing the Use and Nonuse of CPAP Therapy**

Categories	Factors Influencing Use	Factors Influencing Nonuse
<b>Physical</b>	<p>Perceived physical benefits when using CPAP</p> <ul style="list-style-type: none"> <li>• More energy, weight loss, and improved fitness</li> <li>• Reduction in comorbidities such as gastroesophageal reflux disease, hypertension, and diabetes</li> </ul>	<p>Perceived physical benefits when not using CPAP</p> <ul style="list-style-type: none"> <li>• More energy and weight loss</li> </ul>
	<p>Perceived physical detriment when not using CPAP</p> <ul style="list-style-type: none"> <li>• Daytime symptoms: headaches, tiredness, and exhaustion</li> <li>• Nighttime symptoms: disrupted sleep</li> </ul>	<p>Perceived physical detriment when using CPAP</p> <ul style="list-style-type: none"> <li>• Physical discomfort (e.g., aerophagia)</li> </ul>
<b>Psychological</b>	<p>Perceived ability to manage CPAP</p> <ul style="list-style-type: none"> <li>• "...there aren't really any difficulties with the machine. It's really too easy."</li> <li>• "It gets to the point where you know where to position [the mask]... I was able to fix it pretty easily."</li> </ul>	<p>Perceived inability to manage CPAP</p> <ul style="list-style-type: none"> <li>• "I can't. I can't manage it. It's just, I've always been a light sleeper and it just, it's extraordinarily intrusive."</li> </ul>
	<p>Perceived psychological benefits when using CPAP</p> <ul style="list-style-type: none"> <li>• "I think it's nice to be able to go to places and not have to worry about falling asleep."</li> <li>• "I certainly see a lot of things in a different way now."</li> </ul>	<p>Perceived psychological benefits when not using CPAP</p> <ul style="list-style-type: none"> <li>• "It's so frustrating. I can't sleep with it on and I end up taking it off so that I can get a good night's sleep."</li> </ul>
	<p>Perceived psychological detriment when not using CPAP (e.g., guilty feelings)</p> <ul style="list-style-type: none"> <li>• "The snoring or the sounds that I make when I'm asleep are, are incredible... incredibly loud...and then of course, there's when I stop breathing. So that's...probably really nerve wracking for my wife...needless to say, when she's around, I always put it on."</li> <li>• "I remember waking up a couple times where I woke up and it's like I didn't put my mask on and...you have this feeling of guilt."</li> </ul>	<p>Perceived psychological detriment when using CPAP (e.g., disturbed self-image)</p> <ul style="list-style-type: none"> <li>• "You feel like a monster... You don't like to see yourself with this contraption on your face...I have to make sure that all the lights are off, that I'm in bed probably asleep before my husband comes to bed...It makes me very, very uncomfortable."</li> <li>• "I wish that they could come up with something else that's not so...devastating...You know, like something smaller...I think if they definitely had a smaller...a smaller gadget, I probably would wear it and not even think twice."</li> </ul>
	<p>Beliefs about OSA</p> <ul style="list-style-type: none"> <li>• OSA is responsible for decreased energy and weight gain, sleepiness, tiredness, decreased sleep, shortness of breath, and increased risk of death.</li> <li>• OSA is a debilitating, serious, progressive illness</li> </ul>	<p>Beliefs about OSA</p> <ul style="list-style-type: none"> <li>• Minimization of illness by patient: Nonusers also perceived their illness as less serious than others, which served to justify nonuse of CPAP.</li> </ul>
<b>Social</b>	<p>Demands of work/school</p> <ul style="list-style-type: none"> <li>• CPAP makes it possible to work by eliminating fatigue.</li> <li>• "Trust me; I was definitely embarrassed...you know, sitting there in front of [my students] and not being able to stay awake 15, 20 minutes."</li> </ul>	<p>Demands of work/school</p> <ul style="list-style-type: none"> <li>• Poor sleep quality, caused by CPAP, prevents productivity at work</li> </ul>
	<p>Avoiding stigma of illness</p> <ul style="list-style-type: none"> <li>• "I want to stay alert and see the whole show and appreciate it like everybody else."</li> <li>• "You don't want to be known as...the person that couldn't stay awake or the person that couldn't remember... 'Remember when this happened?' or 'Remember when that happened?' And it's like, 'Uh, no. I was asleep.' [Laughs]...So it kind of gets, gets to you after awhile."</li> <li>• "I also suffered a lot...A joke is a joke. Like I can laugh at myself as well as anybody can, but I think that when you're always the target of the same jokes...like after awhile you start to feel like there's something wrong with you."</li> </ul>	<p>Avoiding stigma of using CPAP</p> <ul style="list-style-type: none"> <li>• "A lot of people don't realize that sleep apnea is a serious thing. So...you know, like you would be sitting in a group and then they'll...they'll make fun of you: 'Oh! She has to wear a mask.' or '...You should see the thing that she has to wear and...' ....So then, you have to make like a joke of yourself... You know, it hurts. It hurts deep down."</li> </ul>
	<p>Presence of supportive relationships</p> <ul style="list-style-type: none"> <li>• "The family is behind me a hundred percent...my daughter (age 5 years) sees the machine and she calls it daddy's sleep machine...at first I was worried that she'd find it scary or something, but she doesn't, you know. I guess kids are just so incredibly optimistic."</li> <li>• "... Romance is when you're alive and you can be with your partner..."</li> </ul>	<p>Lack of supportive relationships</p> <ul style="list-style-type: none"> <li>• "My wife is a bit skeptic[al], because she's been and seen all of the efforts that I made and I don't succeed...It's not easy to counter the effect of your wife saying, '[CPAP] is not going to work for you!' all the time! [Laughs]...I keep saying to her, 'You know, please, help me out here! Don't discourage me!'"</li> <li>• "...lot of the times people will tell you, 'Well, if you weren't so heavy, you wouldn't have [OSA].'"</li> <li>• "I think the biggest mistake that I did make was tell people that I had sleep apnea...I regret telling people that I had it... nobody cares at all."</li> </ul>

## Key Practice Points

1. Although continuous positive airway pressure (CPAP) therapy has been demonstrated as efficacious for treating obstructive sleep apnea (OSA), rates of initial acceptance and continuous use of CPAP therapy appear consistently suboptimal.
2. Social comparison and stigma are two important issues that influence whether patients use or abandon CPAP.
3. When teaching patients about OSA and CPAP, extending the invitation to those who are most significant to the patient could minimize stigma, clarify misconceptions, and therefore, create desirable social environments; these individuals may better understand the patient experience and find ways of supporting the patient in adapting to lifelong CPAP treatment.

comparison is theorized as a means for individuals to reduce uncertainty and validate their attitudes (Buunk & Mussweiler, 2001). Comparison is also theorized to be directional (Buunk & Mussweiler). Patients in this study engaged in both upward and downward comparison. *Downward comparison* is comparison with others who are thought to be worse off and has been theorized as a method for self-enhancement (Buunk & Mussweiler). In this study, one nonuser patient differentiated himself from others with OSA. He reported that there were a lot of other individuals who were in worse shape than himself in terms of sleep apnea, and was influenced to not use CPAP. *Upward comparison* is the comparison with others who have slightly better performance and has been theorized as a motivator of certain behaviors (Buunk & Mussweiler). One patient described a desire to be more like his peers who did not have OSA. He stated, "I want to stay alert and see the whole show and appreciate it like everybody else." The desire to participate in social activities was described as a driving force to use CPAP. Patients in this study compared themselves with their peers with respect to the severity of their OSA and their ability to perform during the day.

### Stigma

Patients in this study were also the subjects of comparison by their peers. In many cases, patients were the recipients of negative comparisons and were stigmatized by their peers. Ridicule from others was experienced by patients in this study; one patient who had abandoned CPAP expressed hurt over being made fun of while using CPAP in the past. Another patient was ridiculed for his inability to stay awake before starting CPAP treatment; he reported

being the target of jokes. Both of these individuals lamented having to make fun of themselves to fit in better with their peers.

This study has shown that the way patients feel about themselves is important to how they manage their OSA. The patients of this study were aware of how others perceived them in their social environment. Rejection seemed to drive patients to act in ways that would lead to acceptance from their peer group. In some cases, it meant the abandonment of CPAP, and in other cases it meant the adoption of CPAP. The stigma some patients face for using CPAP is an issue that cannot be ignored in the clinical setting, and clinicians must work with their patients to create and seek social environments that are receptive and supportive of both chronic illness and CPAP therapy. When teaching patients about OSA and CPAP, extending an invitation to people closest to the patient can help create a desirable social environment and minimize stigma; clarifying misconceptions regarding OSA will enable those who are closest to the patient to understand their experience and find ways to support them as they in adapt to lifelong CPAP treatment.

In addition, CPAP support groups have been shown to provide practical information on how to incorporate CPAP into a healthy lifestyle and persevere with the treatment (Dickerson & Kennedy, 2006). It is anticipated that informal and formal CPAP support groups or dyads will benefit patients who would like to use CPAP. In this study, the absence of supportive relationships has been identified by nonusers as a factor toward not using CPAP. To counter this particular factor, clinicians have the unique ability to find supportive peers among the patient population. Such groups or dyads put in place by clinicians may help patients find acceptance, validate attitudes, or reduce uncertainty. The researchers also anticipated that the use of positive patient examples when communicating with patients, in addition to or in place of support dyads/groups, would be effective in motivating the use of CPAP.

### Limitations

In this unique study, the purposive sampling of CPAP users and CPAP nonusers ensured a wide range of experiences in using or abandoning CPAP. However, OSA patients who could not purchase CPAP machines because of financial reasons were not included in this study. These patients may be living a very different reality from those who can choose to use or not use the therapy and should be studied to see what strategies they use to cope with their situation. In addition, the importance

of the patient's social context (as revealed by this study) begs further research that would compare patients of various familial and social structures (e.g., single or partnered, parent or nonparent). In this study, all participants had spouses or partners. In addition, theoretical saturation did not occur among the modest sample of eight patients within the 8 weeks of the study. The expansion of sample size and study duration was prevented by limited resources. However, despite this limitation in sampling, redundancy was achieved on most of the factors that facilitate CPAP use, as well as the factors that prevent CPAP use. Future studies could extend the sample and validate the findings of this study.

### Future Directions

Patients of these sleep disorder clinics receive written materials and one-on-one instruction regarding OSA and treatments. Intensive nursing support is available to all patients experiencing challenges with therapy. Although the same physical, psychological, and social factors were presented by both users and nonusers, these factors were perceived differently by each group. For example, perceived physical benefits such as improved energy and weight loss were cited by both CPAP users and nonusers as reasons to continue the pattern of use or nonuse of CPAP, respectively. Despite having received standardized teaching at the sleep disorders clinic about OSA and CPAP, the users believed that these benefits were the result of CPAP use, while CPAP nonusers believed that these same physical benefits were the result of CPAP abandonment. The reasons for the differences in perception would be ideal for further research. Further research is needed to determine the optimal interventions to address the determinants of CPAP use and nonuse as identified.

### Conclusion

This comparative case study uniquely compared and contrasted OSA patients who use CPAP devices as prescribed with OSA patients who do not. The perceived physical, psychological, and social influences toward using and not using CPAP revealed in this study can inform clinical practice by facilitating the recognition of contextual factors that affect patient behavior. This knowledge is crucial for rehabilitation nursing because many patients are not able to sustain CPAP use and work toward rehabilitation. By listening to their patients and actively assessing for the presence of the factors identified in this study, clinicians can begin tailoring interventions to remove the specific barriers toward use and capitalize upon each of their patient's identified determinants toward use. Ultimately, clinicians can

restore patient health by creating conditions under which patients can successfully adapt to CPAP therapy for OSA.

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## Errata

The article "Culturally Competent Care Complements Interaction with People with Disabilities," published in the May/June issue of *Rehabilitation Nursing*, has the following corrections:

- References

Kotch, M. J. (2003). *The many faces of diversity: Providing culturally competent care to individuals with disabilities*. Vallejo, CA: Kaiser Foundation Rehabilitation Center.

Kaiser Foundation Rehabilitation Center, Kaiser Permanente National Diversity Council, and Kaiser Permanente National Diversity Department. (2004). *A provider's handbook on culturally competent care*. Oakland, CA: Kaiser Permanente Press.

- Throughout the manuscript, references to the author Koch should have been Kotch (2003).

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