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Effect of Positive Airway Pressure Treatment on the Life Quality of Patients with Sleep Apnea Syndrome

Uyku Apne Sendromu Hastalarında Pozitif Hava Yolu Basıncı Tedavisinin Yaşam Kalitesi Üzerine Etkisi

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Abstract
Objectives: Sleep apnea syndrome (OSA) is closely associated with obesity and cardiovascular diseases. OSA disrupts neurocognitive functioning and negatively affects quality of life. Use of a positive airway pressure (PAP) device remains the gold standard treatment for OSA. We used the Short Form-36 (SF-36) instrument to measure quality-of-life changes in PAP-treated patients in Turkey.
Materials and Methods: The present study included 67 (52 male) consecutive OSA patients treated with a PAP device. Each subject underwent overnight full-laboratory polysomnographic examination. The SF-36 scores of patients given a PAP device were measured before they commenced using the device and 6–18 months later.
Results: Appropriate use of PAP devices improved quality of life as evidenced by improvement on all parameters of the SF-36 instrument quality-of-life scale (P<0.05).
Conclusion: We found that PAP therapy significantly improved quality of life. This study is the first in Turkey to use the SF-36 on this subject.
Key words: Sleep Apnea Syndrome, continuous positive airway pressure, quality of life, Short form 36

Öz
Amaç: Uyku apne sendromu obezite ve kardiyovasküler hastalıklar ile yakın ilişkilidir. Uyku apne sendromu, nörokognitif fonksiyonları ve yaşam kalitesini olumsuz etkiler. Uyku apne sendromunun tedavisinde positive airway pressure (PAP) cihazlarının kullanımı halen altın standarttır. Bu çalışmada ülkemizde PAP ile tedavi edilen uyku apne sendromu olgularında kısa form-36 anketi ile yaşam kalitesindeki değişim ölçülmüştür.
Materyal ve Metot: Çalışma PAP cihazı ile tedavi edilen 52'si erkek toplam 67 ardışık uyku apne sendromu hastası ile yapıldı. Bütün olgulara tüm gece uyku laboratuvarında polisomnografi yapıldı. SF-36 skoru PAP cihazı kullanmadan önce ve sonrasındaki 6-18 aylık süre içinde yapıldı.
Bulgular: PAP cihazını uygun şekilde kullanan hastalarda SF-36'nın bütün parametrelerinde düzelme olduğu saptandı (P<0,05).
Sonuç: Bu çalışma PAP tedavisinin yaşam kalitesini olumlu yönde etkilediğini göstermiştir. Çalışmamız ülkemizde SF-36 ile bu konuda yapılan ilk çalışmadır.
Anahtar kelimeler: Uyku apne sendromları, sürekli pozitif havayolu basıncı, yaşam kalitesi, kısa form 36

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Introduction

Sleep apnea syndrome (OSA) features recurrent episodes of apnea, each of which lasts for at least 10 s. Apnea is characterized by complete or partial interruption of breathing. OSA occurs in about 4% of middle-aged males and 2% of middle-aged females.[1] OSA is characterized by oxygen desaturation during the respiratory events, increased sympathetic activity, and peripheral vasoconstriction.[2] OSA is associated with deterioration in neurocognitive functioning and increased incidences of stroke and cardiovascular events.[3]

OSA is characterized by excessive sleepiness and cognitive–behavioral, respiratory, cardiac, metabolic, and/or inflammatory disorders secondary to repeated episodes of upper airway obstruction during sleep.[4] Moreover, OSA is an independent risk factor for cardiovascular mortality and morbidity.[5] Because of such problems, the life quality of OSA patients is impaired.[6–8]

Several tools are available to assess the general and disease-specific quality of life of adults. The Short Form-36 (SF-36) healthcare instrument is a well-known and widely used generic health-related quality-of-life questionnaire. The SF-36 was developed by Ware,[9] and the reliability and validity of the Turkish version of the SF-36 has been confirmed by Koçyiğit et al.[10]

Maintenance of continuous positive airway pressure (CPAP) is the most effective treatment for OSA. In Turkey, CPAP has been shown to improve scores on the Calgary Sleep Apnea Quality-of-Life (SAQL) index.[11] Elsewhere, CPAP has been shown to improve scores on the SF-36.[12] In the present study, we explored the effect of PAP treatment on SF-36 quality-of-life and Epworth Sleepiness Scale (ESS) scores in a Turkish population.

Materials and Methods

This study was performed prospectively between January 2013 and June 2014. We recruited 67 adult (>18 years) OSA patients treated with PAP devices. The original sample of 182 patients was advised to use PAP instruments during the duration of the study. Of these, 44 (24.17%) did not use the device for various reasons. Of the remaining 142 patients, 75 were excluded because they did not wish to participate in the study. Before using the device, the 67 included patients completed the SF-36 questionnaire and face-to-face interviews. The study was approved by Adana Numune Training and Research Hospital's ethics committee. Also, the English in this document has been checked by at least two professional editors, both native speakers of English. For a certificate, please see: http://www.textcheck.com/certificate/c62Fg4.

All subjects underwent an endoscopic ear, nose, and throat (ENT) examination by a specialist before a PAP device was supplied. PAP titration was performed for patients who had no obstacle evident on ENT examination, did not have central sleep apnea syndrome, and did not have severe chronic obstructive pulmonary disease. PAP devices were also given to patients with the above conditions. Priority was given to the use of a nasal mask during titration, but we tested an oronasal mask if patient compliance was a problem. The sleep laboratory had several types of masks (both nasal and oronasal) available, and the mask preferred by each subject was selected. If a subject could not tolerate the automatic positive airway pressure (aPAP) delivered by the PAP device

during titration, a bi-level positive airway pressure (BPAP) device was provided if patient distress persisted. Subjects with sleep apnea syndrome were scheduled for 1- and 6-month check-ups. We recorded ESS and SF-36 scores before any PAP device was given to the subjects. On the ESS scale, a score >10 was considered to indicate increased daytime sleepiness.[13]

Table 1. Demographic characteristics of the participants and knowledge on their PAP devices.

Age	49.39±10.19
Gender	
male	n=51(76.12%)
female	n=16(23.88%)
Smoking status(%)	
nonsmoker	n=41(61.19%)
smoker	n=21(31.34%)
exsmoker	n=5(7.46%)
Education(%)	
illiterate	n=2(2.98%)
Primary school	n=31(46.26%)
High school	n=22(32.83%)
University and upper	n=12(17.91%)
Alcohol consumption(%)	
Yes	n=9(13.43%)
No	n=58(86.57%)
BMI	34.79±5.92
Comorbidities (%)	n=22(32.83%)
AHI	61.24±26.17
ODI	60.99±26.3
Time of PAP use (month)	9.30±4.74
Type of PAP (%)	
CPAP	n=42(62.68%)
aPAP	n=4(5.97%)
BPAP	n=20(29.85%)
BPAP-ST	n=1(1.49%)
Type of mask (%)	
Nasal	n=32(47.76%)
Oronasal	n=35(52.24%)
Humidifier(%)	
Yes	n=16(23.88%)
No	n=51(76.12%)

BMI=Body mass index, **AHI**= Apnea hypopnea index, **ODI**= Oxygen desaturation index, **PAP**= Positive airway pressure, **CPAP**= continuous PAP, **aPAP**= Automatic PAP, **BPAP**=Bilevel PAP, **BPAP-ST**= BPAP Spontaneous Timed

The SF-36 quality-of-life scale was developed in 1992 and contains 36 items including pain, general health, vitality, social functioning, emotional strength, mental health,

physical strength, and physical functioning.[9] The SF-36 was completed twice, before and after PAP therapy.

All participants underwent E-series polysomnography (PSG) (Compumedics, Melbourne, Victoria, Australia). PSG modalities included electroencephalography (EEG), electro-oculography (EOG), submental electromyography, oxygen saturation measurement using a finger-probe oximeter, assessment of respiratory movements by chest and abdominal belts, airflow evaluation, electrocardiography (ECG), and measurement of leg movements by placement of anterolateral electrodes on both tibiae. Sleep stages and respiratory parameters were scored using the standard criteria of the American Academy of Sleep Medicine (AASM).[14] Based on those guidelines, a respiratory event was scored as an apnea if the peak signal excursion dropped by ≥90% of baseline, the duration of that drop was ≥10 s, and the amplitude reduction during ≥90% of the event met the recommended criteria for apnea. A respiratory event was scored as a hypopnea if the airflow fell to ≤30% of the baseline level (measured in the nose) for ≥10 s, if it was associated with <4% oxygen desaturation, and if such features persisted for >90% of the duration of the event. The apnea/hypopnea index (AHI) was calculated as the total number of obstructive apneas + hypopneas/hour of sleep time. Sleep stage scoring was performed using PSG Profusion 3 software in 30-s epochs, and the data were certified by a registered PSG technologist (these are the recommended AASM criteria.[14]

All analyses were performed using SPSS software version 18.0 (SPSS for Windows 18.0, Chicago, IL, USA). We used independent-samples t-test to compare the means of various subgroups.

Results

We included 67 subjects, 51 of whom were male. Of these, five (7.46%) had moderate OSA and one (1.49%) mild OSA. The demographic characteristics of the patients and the devices they were given are shown in Table 1. The most common comorbid diseases were; hypertension (HT; 18 patients, 26.87%), chronic heart disease (15, 22.39%), and diabetes mellitus (12, 17.91%).

Prior to treatment, the median ESS score was 12 (min:0 max:24), and it fell to 0 (min:0 max:13) after treatment (P<0.001). All parameters of the SF-36 improved after treatment (Table 2).

Discussion

Our study showed that PAP devices improved both the quality-of-life and ESS scores of sleep apnea patients. This is the first study in Turkey to evaluate the effect of PAP therapy using the SF-36.

Patients with moderate and severe OSA should be treated, as OSA is both an independent risk factor for a variety of diseases and negatively affects quality of life.[6] CPAP is the gold standard treatment for OSA.[15] If OSA and impaired neurocognitive functioning remain untreated, the incidence of stroke and cardiovascular events increases.[3, 6] Like other sleep-related respiratory disorders, OSA is also known to impair quality of life.[16]

CPAP therapy is most often used to treat OSA. Those who do not use CPAP therapy are at higher risk of mortality than those who do.[17] However, the compliance rates of

patients using CPAP devices vary. Fidan et al. reported a compliance rate of 52.9%, and one review suggested that compliance rates were 46–85%.[15,18]

The choice of mask influences compliance.[19] Andrade et al. concluded that oronasal masks compromise treatment adherence and effectiveness in OSA patients.[19] Koyuncu et al. showed that, when OSA patients were educated about their disease and the CPAP device, positive effects were evident on the SF-36.[20]

The use of a humidifier in conjunction with a CPAP device may increase compliance.[21] We did not routinely recommend a humidifier to our subjects, but a humidifier may be useful for those who complain of throat dryness during follow up. Only 23.88% of our subjects used a humidifier.

Table 2. Comparison before and after using the PAP device and SF- 36 scores

	Before CPAP	**After CPAP**	**t**	**p**
Bodily Pain	61(12-100)	84(36-100)	-3.797	0.027*
General Health	32(5-70)	77(47-97)	-14.432	0.030*
Vitality	50 (15-90)	70(35-100)	-5.504	0.049*
Social Functioning	75(12.5-100)	100(37.5-100)	-6.297	0.039*
Role, Emotional	33.33(0-100)	66.66(0-100)	-7.905	0.038*
Mental health	68(12-92)	80(32-100)	-4.015	0.035*
Role, Physical	25(0-75)	100(50-100)	-17.993	0.018*
Physical Functioning	60(5-100)	80(30-100)	-4.136	0.020*

CPAP= Continuous positive airway pressure. Values are given as median(min-max)
* significant values (<0,05)

Yurtlu et al. showed that CPAP therapy improved scores on the Calgary sleep apnea quality-of-life index and the ESS.[11] In a randomised controlled study, Siccoli et al. showed that CPAP therapy improved all SF-36 parameters except pain, physical strength, and physical functioning.[12] In the present study, the mean oxygen desaturation index was 42/h, and all patients underwent only CPAP therapy. Similarly, in such patients, Antic et al. showed that physical and emotional parameters improved.[22]

We found significant improvements in all SF-36 items. After 1 month of PAP therapy, patients were recalled and titrated again if any problem was evident. Ultimately, treatment with a PAP device significantly improved SF36 scores.

Our hospital is located outside of the nearest city and serves the surrounding provinces. Therefore, despite the fact that we gave PAP devices to numerous patients (including those who refused to participate in the study), the number of patients from other regions was limited.

In conclusion, this is the first study in Turkey to evaluate whether a PAP device improved the SF-36-measured quality of life. We found that PAP therapy significantly

improved quality of life. During follow-up, subjects were allowed to change their masks. We believe that quality of life improves more when preferences for other devices, such as aPAP and BPAP, are respected and when repeated titration of PAP is performed.

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