

Quality of Life in Patients with Obstructive Sleep Apnea by CPAP Therapy Status: A Comparative Cross-Sectional Study

Quality of Life in Patients with Obstructive Sleep Apnea

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ABSTRACT

Introduction: Obstructive sleep apnea (OSA) is a frequently underdiagnosed condition characterized by symptoms such as excessive daytime sleepiness, fatigue, and reduced quality of life (QoL), while continuous positive airway pressure (CPAP) is the gold standard treatment. This study aimed to examine the impact of CPAP therapy on the quality of life of patients with obstructive sleep apnea.

Methods: A comparative cross-sectional study was conducted at the University Hospital Centre Osijek in 100 patients with moderate to severe OSA, comparing pre-CPAP and post-CPAP (≥ 3 months) groups. Data were collected using a structured questionnaire and the SF-36 health-related quality of life instrument.

Results: Compared with the pre-CPAP group, patients using CPAP therapy for at least three months demonstrated significantly better physical functioning ($P = 0.03$), mental health ($P = 0.02$), vitality

($P = 0.05$), and fewer limitations due to physical ($P = 0.02$) and emotional problems ($P = 0.03$). CPAP users also reported less frequent fatigue ($P = 0.02$), better mood ($P = 0.02$), and greater satisfaction with social functioning ($P = 0.01$). Regular CPAP users demonstrated better physical functioning ($P = 0.05$) and fewer limitations due to physical ($P = 0.02$) and emotional problems ($P = 0.03$) than occasional users. Compared with women, men reported better quality of life both before and after CPAP therapy, including better physical functioning ($P = 0.03$) and better mental health after therapy ($P = 0.04$).

Conclusion: Patients with OSA receiving CPAP therapy reported significantly better quality of life than those not receiving CPAP therapy, particularly in the domains of physical and mental functioning. Regular CPAP use was associated with better quality of life, especially with improved physical functioning and fewer physical and emotional limitations. Compared with men, women reported poorer quality of life both before and after CPAP therapy, with greater physical and emotional limitations.

INTRODUCTION

Sleep disorders encompass a wide range of conditions that must be recognized, diagnosed, and treated in a timely manner due to their significant impact and serious consequences on overall health. The most common sleep-related breathing disorder is obstructive sleep apnea (OSA). OSA represents a serious medical problem affecting approximately 17% of women and 34% of men between the ages of 30 and 70 years [1], and its prevalence is increasing alongside the growing prevalence of obesity [2]. It is characterized by repeated partial or complete obstruction of the upper airway during sleep, leading to episodes of apnea and hypopnea, breathing interruptions lasting longer than 10 seconds, and intermittent hypoxia [1]. OSA significantly impairs quality of life and increases the risk of cardiovascular and metabolic diseases [1, 3, 4], diabetes [5], depression, and reduced life expectancy [3, 4, 6].

Diagnosis is based on the apnea-hypopnea index (AHI), where an AHI ≥ 5 accompanied by symptoms such as snoring, daytime sleepiness, nocturnal awakenings, morning headaches, and cognitive disturbances is sufficient for the diagnosis of OSA [7]. It is estimated that nearly 80% to 90% of patients with OSA remain undiagnosed due to failure to recognize mild cases and low awareness of this condition among the general population and healthcare professionals [8].

Among the most important risk factors for OSA are excessive body weight [2, 9], male sex [9, 10], older age [9], anatomical characteristics of the upper airway, alcohol and sedative use [11], smoking [12], and genetic predisposition [13]. Obesity causes fat accumulation in the airway, increasing the risk of obstruction. In men and individuals older than 40 years, upper airway muscle tone declines, while conditions such as septal deviation and enlarged tonsils additionally contribute to the risk [9, 10]. Narrowing of the upper airway and reduced activity of the pharyngeal dilator muscles lead to obstruction during sleep [9, 10]. Episodes of apnea cause hypoxia and hypercapnia, which activate arousal mechanisms and sleep fragmentation [14]. Night-time symptoms include snoring, choking episodes [15], frequent

urination, and night sweats [16], while daytime symptoms include fatigue, sleepiness [17], morning headaches [18], and cognitive disturbances [19]. Individuals with OSA are often irritable, anxious, prone to depression [20], and have reduced sexual desire [21]. Men experience greater snoring intensity compared with women, whereas women report snoring and apneas less frequently [22]. Women more commonly complain of daytime fatigue, lack of energy, insomnia, morning headaches, and mood disturbances compared with men [23].

Numerous studies have demonstrated that patients with OSA experience a marked reduction in quality of life (QoL) [24, 25]. QoL is a multidimensional and complex construct, generally understood as encompassing both subjective perceptions and objective conditions related to physical health, material circumstances, social relationships, and emotional well-being [26]. In this context, health-related quality of life specifically reflects how disease and its treatment influence an individual's functional status, level of disability, and everyday activities [26, 27]. Importantly, interventions aimed at improving QoL may contribute not only to better rehabilitation outcomes and overall patient care, but also to the alleviation of disease-related symptoms [27].

CPAP is considered the gold standard treatment for moderate and severe OSA [28]. CPAP keeps the airway open, improves oxygenation, reduces sleep fragmentation, and alleviates symptoms such as daytime sleepiness and cognitive problems [29, 30]. Therapy also has a beneficial effect on mental health [31] and reduces the risk of cardiovascular complications [32, 33]. However, adherence to therapy can be challenging due to discomfort, mucosal dryness, nasal congestion, or psychological discomfort [34]. Education, equipment individualization, and continuous support from healthcare professionals are essential for long-term preservation of patients' quality of life [34–38]. In some cases, physicians may recommend additional treatments, such as the use of humidifiers, mask modifications [39], or even surgical interventions, to maximize the benefits of CPAP therapy [40]. Although CPAP remains the most effective treatment for OSA, it is important to approach treatment with an understanding of each patient's specific needs to ensure optimal therapy use and improvement in patients' quality of life [41–43].

Despite the well-known negative impact of obstructive sleep apnea on health-related quality of life, data on changes following CPAP therapy in the domestic context remain limited. Therefore, this study aimed to compare the quality of life of patients with OSA receiving CPAP therapy and those not receiving CPAP therapy, and to assess differences in quality of life according to sociodemographic characteristics and gender.

METHODS

Study design

This comparative cross-sectional study was conducted at the University Hospital Centre Osijek, Clinic of Neurology, between January and May 2025. Two independent groups of participants were included: patients before initiation of CPAP therapy and patients who had been using CPAP therapy for at least three months. Data were collected from two independent groups representing different stages of CPAP therapy (before initiation and after ≥ 3 months of use). As different participants were recruited at each time point, the samples were independent.

Setting and samples

The study was conducted at the Sleep Disorders Outpatient Clinic, Clinic of Neurology, University Hospital Centre Osijek. The sample included adult patients diagnosed with moderate to severe OSA, defined as an apnea-hypopnea index (AHI) ≥ 15 events per hour. Participants were divided into two groups: (1) patients initiating CPAP therapy and (2) patients attending follow-up visits after at least three months of CPAP use.

Inclusion criteria were: age ≥ 18 years, diagnosis of moderate or severe OSA confirmed by polysomnography or polygraphy (AHI ≥ 15 events/hour), initiation of CPAP therapy (for the first group), use of CPAP therapy for ≥ 3 months (for the second group), ability to understand and independently complete the questionnaire, and provision of written informed consent. Exclusion criteria were: acute medical conditions at the time of data collection, prior surgical treatment for OSA, discontinuation of CPAP therapy, refusal to participate, or incomplete questionnaires.

Measurements/instruments

Data were collected using a structured questionnaire consisting of three parts. The first part included sociodemographic and clinical characteristics: sex, age, place of residence, marital status, level of education, and comorbidities (diabetes, hypertension, obesity, stroke, myocardial infarction, and other). Clinical variables also included duration of OSA diagnosis, CPAP use (regular or occasional), and average daily duration of CPAP use.

Participants who reported difficulties with CPAP use were asked an additional question regarding the reasons for these difficulties, with predefined response options including: discomfort during use (pressure, pain, irritation), sleep disturbances related to mask use, difficulties adapting to the device, technical problems with the device or mask, and lack of support or instructions for use.

The second part of the questionnaire assessed the participants' perception of daytime symptoms and psychosocial functioning. This section included questions focused on the subjective experience of emotional status, social relationships, and the perceived impact of the disease on everyday life. Specifically, it included questions regarding the presence of anxiety or depressive feelings related to sleep problems, the level of satisfaction with social life, and the perception of support from family and friends in the context of health-related difficulties. Participants were also asked to identify the aspect of health they considered to be most affected by OSA. Responses were collected through self-assessment, providing insight into the subjective evaluation of psychosocial functioning and everyday difficulties associated with the disease.

Quality of life was assessed using the freely available Short Form Health Survey (SF-36) [44]. The validated Croatian version was applied [45, 46]. The SF-36 consists of 36 items grouped into eight domains: physical functioning (PF), role limitations due to physical health (RP), role limitations due to emotional problems (RE), vitality (energy/fatigue) (VT), mental health (MH), social functioning (SF), bodily pain (BP), and general health perception (GH). Scores for each domain were transformed to a standardized scale ranging from 0 to 100, with higher scores indicating better perceived health status and higher quality of

life. Results are presented as a profile of eight subscales, and values above 50 are interpreted as indicative of preserved or good quality of life [44–46].

The SF-36 questionnaire has been validated and widely used in clinical and population-based studies, enabling comparisons across different groups of participants [47–49]. The SF-36 has demonstrated good internal consistency in previous studies, with Cronbach's alpha coefficients typically exceeding 0.70 across most domains [47–49].

Data collection/procedure

Before completing the questionnaire, participants were informed about the aim and purpose of the study. The questionnaire was administered using a paper-and-pencil format and distributed personally during outpatient visits. Participation in the study lasted approximately 10–15 minutes, including providing study information, obtaining written informed consent, and completing the questionnaire.

Ethical considerations

The study was conducted anonymously, and no personal identifying data were collected, ensuring full confidentiality of participants. All procedures were performed in accordance with the General Data Protection Regulation (GDPR) and the ethical principles outlined in the Declaration of Helsinki. Ethical approval for the study was obtained from the Ethics Committee of the University Hospital Centre Osijek (approval number: R1-96-2/2025) and the Faculty of Dental Medicine and Health Osijek (approval number: 2158/97-97-10-25-05).

Statistical data analysis

Categorical variables were presented as absolute and relative frequencies. Numerical variables were described using the median and interquartile range. Differences between categorical variables were analyzed using the χ^2 test. The normality of distribution for numerical variables was assessed using the Kolmogorov–Smirnov test. Because the data were not normally distributed, comparisons of numerical variables between two independent groups were performed using the Mann–Whitney U test.

For comparisons involving three or more independent groups, the Kruskal–Wallis test was applied. All *P-values* were two-tailed, and the level of statistical significance was set at $\alpha = 0.05$. Statistical analyses were performed using the IBM SPSS Statistics software, version 22.0 (IBM Corp., Armonk, NY, USA).

RESULTS

The study included 100 participants, of whom 84 (84%) were men, and 16 (16%) were women. The median age was 55 years (interquartile range 48–62 years). The pre-CPAP group included 48 (48%) participants, while the post-CPAP group included 52 (52%) participants. The majority of participants lived in urban areas, had completed secondary school education, and were married. Twenty participants were obese, while 20 participants (20%) had no associated comorbidities (Table 1).

Table 1. General characteristics of participants

Characteristic		Number (%) of participants
CPAP device use	Pre-CPAP group	48 (48)
	Post-CPAP group	52 (52)
Sex	Male	84 (84)
	Female	16 (16)
Age	23 – 40	11 (11)
	41 – 50	24 (24)
	51 – 60	39 (39)
	61 – 70	18 (18)
	≥71	8 (8)
Place of residence	City	61 (61)
	Village	39 (39)
Education level	Primary school	12 (12)
	High school	72 (72)
	College or University degree	16 (16)
Marital status	Single	7 (7)
	Married	80 (80)
	Cohabiting	6 (6)
	Divorced	4 (4)
	Widowed	3 (3)

Characteristic	Number (%) of participants
None	20 (20)
Diabetes mellitus	10 (10)
Hypertension	21 (21)
Obesity	20 (20)
Comorbidities Myocardial infarction	2 (2)
Stroke	1 (1)
Other	11 (11)
Combination of multiple comorbidities	15 (15)
Total	100 (100)

A diagnosis of OSA for more than 3 years was reported by 26 (50%) participants, while 3 (6%) participants had been diagnosed with OSA for less than 6 months. Regular CPAP use was reported by 44 (85%) participants, while 8 (15%) used the device occasionally. Of the total 52 participants using CPAP, 22 (42%) used it for 4–6 hours daily, while 24 (46%) participants used CPAP for more than 6 hours per day. Among the 20 participants who experienced difficulties while using the CPAP device, 9 (45%) reported discomfort during use as the main reason. Significant symptom improvement after initiation of CPAP therapy was reported by 31 (60%) participants, partial improvement by 17 (33%), while 2 (4%) participants reported no improvement and 2 (4%) were unsure (Table 2).

Table 2. CPAP use and treatment-related characteristics (N = 52)

Characteristic	Number (%) of participants	
How long have you had a diagnosis of obstructive sleep apnea?	Less than 6 months	3 (6)
	6 months – 1 year	7 (14)
	1 – 3 years	16 (30)
	More than 3 years	26 (50)
Do you use the CPAP device regularly?	Yes, regularly	44 (85)
	Yes, occasionally	8 (15)
If you use it, how many hours per day do you use it on average?	Less than 2 hours	1 (2)
	2 – 4 hours	5 (10)
	4 – 6 hours	22 (42)
	More than 6 hours	24 (46)
Difficulties during use (n = 20)	Discomfort during use	9 (45)
	Problems sleeping with the mask	7 (35)
	Difficulty adapting to the device	1 (5)
	Technical problems with the device	3 (15)
Have you noticed symptom improvement after starting CPAP therapy?	Yes, significant improvement	31 (60)
	Yes, partial improvement	17 (33)
	No, no improvement	2 (4)
	Not sure	2 (4)

Compared with the pre-CPAP group, significantly more participants in the post-CPAP group rated their current physical condition as excellent, whereas participants in the pre-CPAP group more frequently rated their physical condition as poor ($P = 0.02$). Compared with the pre-CPAP group, significantly more participants reported frequent daytime fatigue, whereas participants in the post-CPAP group reported fatigue considerably less often ($P = 0.02$). Significantly more participants in the post-CPAP group reported no

difficulties with physical activity due to sleep problems, whereas participants in the pre-CPAP group more often reported occasional difficulties ($P = 0.01$). Compared with the pre-CPAP group, participants in the post-CPAP group more frequently reported feeling motivated and in a good mood during the day ($P = 0.02$). Participants in the post-CPAP group were also more likely to report satisfaction with their social life, whereas participants in the pre-CPAP group were more often dissatisfied ($P = 0.01$) (Table 3).

Table 3. Self-assessment of symptoms and daily functioning by CPAP therapy status

Question	Answer	Number (%) of participants		P-value*
		Pre-CPAP group	Post-CPAP group	
How would you rate your current physical condition?	Excellent	0 (0)	7 (14)	0.02
	Very good	8 (17)	8 (15)	
	Good	24 (50)	29 (59)	
	poor	16 (33)	7 (14)	
	Very poor	0 (0)	1 (2)	
How often do you feel tired during the day?	Never	0 (0)	3 (6)	0.02
	Rarely	6 (12)	14 (27)	
	Occasionally	20 (42)	25 (48)	
	Often	20 (42)	10 (19)	
	Always	2 (4)	0 (0)	
Do you have difficulties with physical activity due to sleep problems?	Never	6 (12)	14 (27)	0.01
	Rarely	11 (23)	19 (36)	
	Occasionally	25 (53)	18 (35)	
	Often	6 (12)	1 (2)	
Do you feel cheerful and motivated during the day?	Always	1 (2)	4 (8)	0.02
	Mostly	20 (42)	31 (60)	
	Occasionally	17 (35)	15 (29)	
	Rarely	10 (21)	2 (4)	
Do you have problems with concentration and memory?	Never	7 (15)	8 (15)	0.85
	Rarely	13 (27)	18 (35)	
	Occasionally	23 (48)	21 (40)	
	Often	5 (10)	5 (10)	
Do you feel anxiety or depression due to sleep problems?	Never	11 (23)	15 (29)	0.38
	Rarely	14 (29)	18 (35)	
	Occasionally	15 (31)	15 (29)	
	Often	8 (17)	3 (6)	
	Always	0 (0)	1 (2)	
How satisfied are you with your social life?	Completely satisfied	18 (37)	16 (30)	0.01
	Mostly satisfied	16 (33)	30 (58)	
	Undecided	5 (10)	5 (10)	
	Mostly dissatisfied	9 (19)	1 (2)	
Do you feel supported by your family and friends regarding your health problems?	Always	26 (54)	37 (71)	0.20
	Mostly	18 (37)	12 (23)	
	Occasionally	4 (8)	2 (4)	
	Rarely	0 (0)	1 (2)	
Which aspect of your health do you consider to be most affected by obstructive sleep apnea?	Physical health	32 (67)	36 (69)	0.74
	Mental health	11 (23)	8 (15)	
	Social relationships	3 (6)	5 (10)	
	Other	2 (4)	3 (6)	
Total		48 (100)	52 (100)	

Note: * χ^2 test

Compared with the pre-CPAP group, participants in the post-CPAP group reported significantly better physical functioning ($P = 0.03$), fewer limitations due to physical problems ($P = 0.02$) and emotional problems ($P = 0.03$), greater vitality ($P = 0.05$), and better mental health ($P = 0.02$) (Table 4).

Table 4. Quality of life about CPAP device use (N = 100)

SF-36 domains	Median (IQR)		P-value*
	Pre-CPAP group (n = 48)	Post-CPAP group (n = 52)	
Physical functioning (PF)	55 (30 – 83)	67,5 (50 – 95)	0,03
Role-physical (RP)	37,5 (0 – 75)	75 (6,25 – 100)	0,02
Role-emotional (RE)	66,7 (0 – 100)	100 (41 – 100)	0,03
Vitality/ energy (VT)	52,5 (40 – 70)	60 (45 – 75)	0,05
Mental health (MH)	54 (41 – 68)	66 (52 – 84)	0,02
Social functioning (SF)	62,5 (50 – 87)	62,5 (50 – 87)	0,66
Bodily pain (BP)	65 (45 – 90)	77,5 (45 – 97)	0,19
General health (GH)	55 (40 – 65)	55 (50 – 70)	0,46

Note: *Mann-Whitney U test

Participants who regularly used the CPAP device had significantly better physical functioning than participants who used the CPAP device occasionally ($P = 0.05$). Participants who regularly used the CPAP device also had fewer limitations due to physical problems ($P = 0.02$) and emotional problems ($P = 0.03$) than participants who used the CPAP device occasionally (Table 5).

Table 5. Quality of life according to the frequency of CPAP device use (N = 52)

SF-36 domains	Median (IQR)		P-value*
	Regular users (n = 44)	Irregular users (n = 8)	
Physical functioning (PF)	72,5 (50 – 95)	50 (25 – 60)	0,05
Role-physical (RP)	75 (25 – 100)	12,5 (0 – 62,5)	0,02
Role-emotional (RE)	100 (33 – 100)	83 (0 – 100)	0,03
Vitality/ energy (VT)	60 (50 – 75)	57,5 (15 – 73)	0,49
Mental health (MH)	68 (52 – 8)	74 (44 – 84)	0,83
Social functioning (SF)	75 (50 – 87)	68,75 (40 – 100)	0,86
Bodily pain (BP)	77,5 (46 – 100)	82,5 (19 – 100)	0,83
General health (GH)	60 (51 – 70)	60 (45 – 85)	0,73

Note: *Mann-Whitney U test

In the pre-CPAP group, men had significantly better physical functioning than women ($P = 0.03$) and reported significantly less bodily pain ($P = 0.05$). Women in the pre-CPAP group had significantly greater limitations due to physical problems ($P = 0.03$) and emotional problems ($P = 0.02$) than men. Among men, those in the post-CPAP group reported significantly better mental health than those in the pre-CPAP group ($P = 0.04$). Women in the post-CPAP group had significantly poorer physical functioning ($P = 0.01$), significantly greater limitations due to physical problems ($P = 0.02$) and emotional problems ($P = 0.02$), and reported significantly greater bodily pain ($P = 0.02$) than men in the post-CPAP group (Table 6).

Table 6. Comparison of quality of life between men and women in the pre-CPAP and post-CPAP groups

SF-36 domains	Median (IQR)				P-value*			
	1. Males before	2. Females before	3. Males after	4. Females after	1 vs 2	1 vs 3	2 vs 4	3 vs 4
Physical functioning (PF)	65 (42.5 – 85)	20 (10 -65)	75 (55 – 95)	25 (17.5 –60)	0.03	0.07	0.58	0.01
Role–physical (RP)	50 (0 – 100)	25 (0 – 75)	75 (25 –100)	25 (0 – 75)	0.03	0.05	0.83	0.02
Role–emotional (RE)	100 (16.7 –100)	33 (0-66.7)	100 (66-100)	66.7 (0 – 83.3)	0.02	0.57	0.03	0.02
Vitality/ energy (VT)	60 (42.5 – 70)	45 (40 -50)	60 (45 – 75)	45 (35 –57.5)	0.11	0.24	>0.99	0.07
Mental health (MH)	56 (44 – 74)	48 (24-60)	68 (52 – 88)	52 (42 – 60)	0.15	0.04	0.74	0.06
Social functioning (SF)	62.5 (50 – 87.5)	62.5 (50-87.5)	62.5 (50 –87.5)	50 (31-87.5)	0.89	0.53	0.51	0.29
Bodily pain (BP)	67.5 (45 – 95)	40 (22.5-90)	77.5 (55 –100)	45 (17.5-66)	0.05	0.27	>0.99	0.02
General health (GH)	55 (40 – 67.5)	55 (40 – 60)	55 (50 – 70)	60 (42.5 –70)	0.52	0.66	0.58	>0.99

*Mann-Whitney U test. Comparisons: 1 vs 2 = males vs females (pre-CPAP); 1 vs 3 = males (pre-CPAP) vs males (post-CPAP); 2 vs 4 = females (pre-CPAP) vs females (post-CPAP); 3 vs 4 = males vs females (post-CPAP).

DISCUSSION

The results of this study indicate that patients with OSA who used CPAP therapy for three or more months reported significantly better quality of life than patients assessed before CPAP initiation. Compared with the pre-CPAP group, participants in the post-CPAP group reported reduced fatigue, better mood, better perceived general health, and better social functioning. Participants who regularly adhered to therapy and men had significantly better results in the domains of physical functioning and limitations due to physical and emotional difficulties compared with those who used therapy irregularly and women. Studies conducted worldwide confirm that untreated OSA is associated with lower scores in most domains of quality of life, particularly vitality, physical and mental health, and social functioning [36, 50]. Snoring and night-time restlessness affect the sleep of partners [51], while chronic fatigue and reduced mental clarity make daily activities and social interactions more difficult [52].

The results of this study showed that participants in the post-CPAP group reported better quality of life across multiple domains than those in the pre-CPAP group, which is consistent with recent findings in the literature [36, 53]. In this study, the SF-36 questionnaire showed significant improvements in the areas of physical functioning, limitations due to physical and emotional difficulties, vitality, and mental health. This pattern suggests that CPAP therapy may affect not only respiratory parameters but also has a broader impact on daily functioning and subjective perception of health. Similar results were described in a study conducted in Lithuania [53], where after 3 months of CPAP treatment, improvements were observed in the areas of energy, emotional limitations, and general health status measured by the SF-36 questionnaire, as well as a reduction in daytime sleepiness [53].

Compared with the pre-CPAP group, participants in the post-CPAP group rated their physical condition better, experienced daytime fatigue less frequently, and had fewer difficulties with physical activity related to sleep disorders. An increase in motivation and improved mood was also observed, suggesting a beneficial association with therapy on emotion-

al functioning. These findings are consistent with a study conducted in Croatia in 2024 [36], which emphasized that CPAP therapy significantly reduces daytime fatigue and improves overall quality of life, while subjective perception of improvement plays a key role in patient adherence to therapy. Studies indicate significant improvement in overall quality of life with regular CPAP use, especially in the domains of daytime sleepiness and cognitive functioning [54].

In this study, participants who regularly used the CPAP device had significantly better results in the domains of physical functioning and limitations due to physical and emotional difficulties compared with those who used therapy irregularly. Lo Bue et al. reported improvements in mental health and psychological well-being among CPAP users who adhered to therapy, but emphasized that side effects such as mask discomfort, claustrophobia, nasal dryness, and skin irritation still affect therapy adherence [55]. In the present study, among participants who reported difficulties with CPAP use, the most common issues were discomfort during use (45%) and problems sleeping with the mask (35%), followed by technical problems (15%) and difficulties adapting to the device (5%). These findings are consistent with previous literature, which highlights mask-related discomfort, sleep disturbances, and technical issues as the most frequently reported side effects of CPAP therapy [56]. Such adverse effects may negatively impact adherence and consequently reduce the overall effectiveness of treatment [56]. A literature review by López-López et al. emphasized that education, technical support, and multidimensional approaches (particularly the role of nurses) significantly increase long-term CPAP adherence [57]. Continuous support from healthcare professionals, including motivational interventions [37], regular check-ups, and progress monitoring, may help resolve problems associated with CPAP device use and ensure better adherence to therapy [38]. Regular adherence to CPAP therapy is associated with better quality of life across multiple domains; however, actual effectiveness in clinical practice depends on proper education, technical adjustment of the device, psychological support, and an individualized approach to increase successful adherence to therapy [37, 38, 57].

The results of this study indicate that men reported better physical functioning, fewer physical and emotional limitations, and less pain than women. These

findings are consistent with international studies showing that women experience a greater decline in quality of life compared with men with similar AHI levels [58, 59]. Furthermore, women with OSA have reduced work productivity and higher rates of sick leave and divorce compared with women without OSA, while such an association has not been found among men [58, 59]. Compared with men, women from both groups had poorer quality of life, with greater physical and emotional limitations and more pronounced pain in this study. The results are consistent with previous studies showing that women with OSA have poorer quality of life and greater physical and emotional difficulties compared with men, while CPAP therapy improves outcomes in both genders, although gender differences may persist after treatment [60, 61]. Women also more frequently report anxiety, fatigue, and limitations in daily activities [62].

Limitations

This study has several limitations. The relatively small sample size and single-center design limit the generalizability of the findings. The cross-sectional design does not allow firm causal conclusions, and the use of self-assessment measures may be subject to participant bias. The sample was predominantly male (84%), which reflects the epidemiology of OSA but may limit the interpretation of gender-based differences. Additionally, the cross-sectional design does not allow evaluation of temporal changes in CPAP adherence or the long-term effects of therapy. Longitudinal studies are needed to better assess these outcomes.

Recommendations for Future Research

Future studies should include larger, multicentre samples, as well as longitudinal studies following the same patients over time to better understand the long-term effects of CPAP therapy and adherence. It is also recommended to include additional factors such as psychosocial and socioeconomic variables, health literacy, and barriers within the healthcare system. Furthermore, experimental or quasi-experimental studies should evaluate targeted interventions aimed at improving CPAP adherence, thereby providing higher-level evidence on their effectiveness.

Implications for Clinical Practice and Education

The results of this study emphasize the importance of timely diagnosis and continuous use of CPAP therapy in patients with OSA to improve the physical and psychological aspects of quality of life. In clinical practice, particular emphasis should be placed on educating patients about proper device use and the importance of regular adherence to therapy, since regular CPAP use was associated with better outcomes. The findings also indicate the need for an individualized treatment approach, taking into account gender differences and the specific needs of patients. In the context of healthcare education, programs should be developed to strengthen healthcare professionals' competencies in supporting patients with OSA, including recognizing barriers to adherence and providing psychosocial support.

CONCLUSIONS

The results of the study show that patients with OSA who had been using CPAP therapy for at least three months reported significantly better quality of life than those in the pre-CPAP group, particularly in the domains of physical and psychological functioning, vitality, and limitations due to physical and emotional problems. Compared with the pre-CPAP group, participants in the post-CPAP group also reported less fatigue, better mood, better perceived general health, and better social functioning. Regular adherence to therapy was associated with better quality-of-life outcomes, while men reported better physical functioning and fewer physical and emotional limitations than women. These findings highlight the importance of regular adherence to CPAP therapy and support an individualized approach to optimizing quality of life in patients with OSA.

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The authors declares no conflict of interest.

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