ORIGINAL ARTICLE

THE RELATIONSHIP BETWEEN OBSTRUCTIVE SLEEP APNEA SYNDROME, CHRONIC DISEASES AND QUALITY OF LIFE IN GERIATRIC PATIENTS ATTENDING THE SLEEP UNIT

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Hasan TÜLE
Elçin BALCI

Erciyes University, Department of Public Health, Faculty of Medicine, Kayseri, Türkiye

Abstract

Introduction: The primary aim of our study was to determine the frequency of chronic diseases and quality of life in elderly patients admitted to a sleep unit.

Materials and Method: The study was conducted with participants over 65 years of age who applied to the sleep unit with complaints such as sleep disorders, snoring, suffocation during sleep, somnolence, daytime sleepiness. Data were obtained by using Personal Information Form, Quality of Life Scale and polysomnography reports. Cronbach Alpha reliability analysis, Chi-Square, Independent groups t-test, One-way ANOVA Analysis of Variance, Pearson Correlation Analysis and Linear Regression Analysis were used to evaluate the data.

Results: It was determined that 66.3% of the participants had a diagnosis of chronic disease, most frequently diabetes mellitus, hypertension, asthma, chronic obstructive pulmonary disease and heart diseases. 89% of the participants had obstructive sleep apnea syndrome. Quality of life levels were determined to be at a good level. It was determined that there was a negative correlation between the apnea hypopnea index value of the participants and the sort form-12 total score, and a one-unit increase in apnea hypopnea index values significantly decreased the quality of life of the patients by 0.174 times.

Conclusion: It was determined that most of the participants were diagnosed with chronic diseases and obstructive sleep apnea syndrome and that the quality of life levelswere at a good level, however, the increase in apnea hypopnea index value significantly decreased the quality of life.

Keywords: Sleep Apnea, Obstructive; Chronic Disease; Quality of Life.

Correspondence

Hasan TÜLE
Phone : +905558699828
e-mail : htule66@gmail.com

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INTRODUCTION

Sleep is defined as the process of temporary, partial and periodic loss of the organism's communication with the environment in a reversible manner with stimuli of varying intensity. At the same time, it is the rest period in which the human body rests physically and mentally, cells are renewed, memory functions are controlled, learning is maintained, and preparation for new experiences begins (1). During the sleep cycle, vital systems such as respiratory, circulatory and nervous systems as well as disorders in musculoskeletal systems are repaired. Disruption of the sleep-wake cycle leads to a decrease in sleep quality and this leads to negative effects on human health (2).

Obstructive sleep apnea syndrome (OSAS), characterized by recurrent complete (apnea) or partial (hypopnea) obstruction of the upper airways, is a disease associated with sleep desaturation and recurrent awakenings (arousal) (3). The prevalence of this disease is comparable to other important chronic diseases such as chronic obstructive pulmonary disease (COPD), diabetes mellitus (DM), coronary artery disease (CAD) and asthma. OSAS can occur in any age group and the incidence of the disease in men of all ages is twice that of women (4).

Chronic diseases are defined as long-standing and slowly progressing diseases. Chronic diseases are diseases that require long- term medical care and treatment and cause irreversible changes (5).

The concept of quality of life, which is expressed as the subjective satisfaction and happiness of the individual in his/her life, is defined as how the person sees his/her situation, expectations, standards, goals and experiences in line with his/her own interests (6). OSAS, which has become an important public health problem today, causes individuals to become easily irritable and to experience problems in their relationships with others (7).

Variables such as male gender, obesity, advanced age, smoking and alcohol consumption have an important role in OSAS. Especially respiratory diseases, cardiovascular diseases, DM, metabolic diseases and other systemic diseases may increase the incidence of OSAS, and the presence of diseases may also affect the progression of OSAS. (3)

The aim of this study is to determine the relationship between OSAS, chronic diseases and quality of life.

MATERIALS AND METHOD

Prior to commencing the study, approval was obtained from the Kayseri City Education and Research Hospital Clinical Research Ethics Committee with decision number 555 dated May 18, 2022. Individuals who agreed to participate in the study were informed about the data collection tools and their consent was obtained.

The study was conducted with 363 patients over the age of 65 between January 2022 and August 2023. The sample size was determined using the G*Power program (version 3.1.9.4), with an effect size of d=0.3, a type error of 0.05, N2/N1=1, and α=0.05, based on previous studies. The minimum sample size was 322 patients. Patients who did not have communication problems or psychiatric issues and who agreed to participate in the study were selected using simple random sampling. According to the calculation using G*Power (version 3.1.9.4), the power of the test was found to be P=1.0000000 (100.0%). The data were transferred to a computer and analyzed using SPSS (version 23.0). Using Chi-square analysis and descriptive statistics tests on the data obtained from the Sociodemographic Information Form, the frequency, distribution, mean, standard deviation, and maximum and minimum values of the disease frequency and disease diagnosis characteristics of the patients participating in the study were calculated. The normality of the distribution of the data obtained from the scale was determined using the Kolmogorov-Smirnov test. The mean score, standard deviation, median, range, maximum, and minimum values of the scale and its components were determined from the obtained data. The

internal consistency coefficient of the scale and its components was calculated using Cronbach's alpha coefficient through reliability analysis. To compare the differences between means in independent groups, the Independent Samples t-test was used for two groups with normally distributed data, and ANOVA (Analysis of Variance) was used for more than two groups. In groups where a significant difference was found in the ANOVA, the difference between groups was examined using Tukey and Tamhane's T2 tests. The homogeneity of the groups was determined using the Levene Test. Pearson Correlation Coefficient analysis was applied to variables with a normal distribution to determine the relationship between dependent and independent variables. Linear regression analysis was used to determine whether the AHI level (severity of OSAS) of patients has an effect on their quality of life. A significance level of $p<0.05$ was accepted for the evaluation of the data.

RESULTS

Table 1. shows the distribution of the patients who participated in the study according to the frequency of chronic diseases and disease diagnoses.

It was found that 66.3% of the patients who participated in the study had a diagnosis of chronic disease. HT in 43.0% (n=156), DM in 31.4% (n=114), asthma in 22.5% (n=82), COPD in 5.6% (n=20), stroke in 0.2% (n=1), MI in 0.8% (n=3), CHF in 11.6% (n=42), heart rhythm disorder in 1.4% (n=5), 4.5% had thyroid diseases (n=17), 6.0% had osteoporosis (n=22), 0.5% had cancer (n=2) and 12.0% had depression (n=44). It was found that the most common diagnoses were HT and DM, and the least common diagnoses were stroke and cancer (Table 1).

Table 2. shows the distribution of OSAS status and OSAS level according to AHI values of the patients participating in the study.

When the OSAS level was analyzed according to the AHI of the patients participating in the study,

Table 1. Distribution of Patients According to Frequency of Chronic Diseases and Disease Diagnoses (n=363)

Disease Characteristics	Number	%
Diagnosis of chronic disease		
There is	241	66.3
None	122	33.7
DM		
There is	114	31.4
None	249	68.6
Hypertension (HT)		
There is	156	43.0
None	207	57.0
Asthma		
There is	82	22.5
None	281	77.5
COPD		
There is	20	5.6
None	343	94.4
Stroke		
There is	1	0.2
None	362	99.8
Myocardial Infarction (MI)		
There is	3	0.8
None	360	99.2
Chronic Heart Failure (CHF)		
There is	42	11.6
None	321	88.4
Heart Rhythm Disorder		
There is	5	1.4
None	358	98.6
Thyroid Diseases		
There is	17	4.5
None	346	95.5
Osteoporosis		
There is	22	6.0
None	341	94.0
Cancer		
There is	2	0.5
None	361	99.5
Depression		
There is	44	12.0
None	319	88.0
Total	363	100.0

Table 2. Distribution of Obstructive Sleep Apnea Syndrome Level According to Apnea-Hypopnea Index Values of Patients (n=363)

OSAS Level	Number	%
Mild Snoring-No OSA (AHI<5)	40	11.0
Mild OSAS (5≤AHI<15)	32	8.9
Moderate OSAS (15≤AHI<30)	96	26.4
Severe OSAS (AHI≥30)	195	53.7
Total	363	100.0

it was found that 53.7% had severe OSAS (AHI≥30), 26.4% had moderate OSAS (15≤AHI<30), 8.9% had mild OSAS (5≤AHI<15) and 11.0% had mild snoring (no OSAS) (AHI<5) (Table 2).

Table 3 shows the comparison of Quality of Life Scale, Physical Component Summary (PCS-12) and Mental Component Summary (MCS-12) scores according to the frequency of chronic diseases and disease diagnoses.

When Table 3 was analyzed, it was found that SF-12 total score, PCS-12 total score and MCS-12 total score of the patients differed significantly

Table 3. Comparison of Quality of Life Scale, Physical Component Summary and Mental Component Summary Scores of Patients According to Frequency of Chronic Disease and Disease Diagnosis

Chronic Disease Prevalence and Disease Diagnosis	n	Quality of Life Scale and its Components		
		SF-12 Total	PCS-12 Total	MCS-12 Total
		$\bar{x}$ ± SD	$\bar{x}$ ± SD	$\bar{x}$ ± SD
Diagnosis of chronic disease				
There is	241	65.38 ± 21.82	67.89 ± 18.98	65.38 ± 21.82
None	122	84.29 ± 15.52	84.32 ± 11.67	84.29 ± 15.52
Test value		t= -11.882	t= -10.987	t= -11.733
Significance level		p=0.000*	p=0.000*	p=0.000*
DM				
There is	114	62.33 ± 20.42	61.18 ± 22.96	63.49 ± 19.53
None	249	77.28 ± 17.08	76.59 ± 19.49	77.97 ± 16.22
Test value		t= -7.854	t= -7.173	t= -7.969
Significance level		p=0.000*	p=0.000*	p=0.000*
HT				
There is	156	64.87 ± 20.28	63.54 ± 22.31	66.19 ± 19.68
None	207	78.40 ± 16.61	77.93 ± 19.30	78.87 ± 15.64
Test value		t= -7.845	t= -7.437	t= -7.650
Significance level		p=0.000*	p=0.000*	p=0.000*
Asthma				
There is	82	61.93 ± 19.70	59.91 ± 22.02	63.96 ± 19.59
None	281	75.68 ± 18.27	75.19 ± 20.55	76.17 ± 17.34
Test value		t= -6.790	t= -6.723	t= -6.277
Significance level		p=0.000*	p=0.000*	p=0.000*
COPD				
There is	20	49.93 ± 21.97	46.29 ± 24.74	53.58 ± 21.07
None	343	73.92 ± 18.47	73.25 ± 20.71	74.60 ± 17.75
Test value		t= -5.559	t= -6.497	t= -5.078
Significance level		p=0.000*	p=0.000*	p=0.000*
Stroke				
There is	1	33.75 ± 0.00.	33.33 ± 0.00.	34.16 ± 0.00.
None	362	72.67 ±19.39	71.83 ± 21.78	73.50 ± 18.50
Test value		t= -2.005	t= 1.766	t= -2.124
Significance level		p=0.046*	p=0.078	p=0.034*

Table 3. Continued...

Chronic Disease Prevalence and Disease Diagnosis	n	Quality of Life Scale and its Components		
		SF-12 Total	PCS-12 Total	MCS-12 Total
		$\bar{x}$ ± SD	$\bar{x}$ ± SD	$\bar{x}$ ± SD
MI				
There is	3	50.83 ± 28.34	48.95 ± 33.05	50.83 ± 28.34
None	360	72.77 ± 19.30	71.94 ± 21.66	72.77 ± 19.30
Test value		t= -2.255	t= -2.105	t= -2.250
Significance level		p=0.025*	p=0.036*	p=0.025*
CHF				
There is	42	55.86± 19.14	54.48 ± 21.62	57.24 ± 18.44
None	321	74.77± 18.42	74.01 ± 20.84	75.54 ± 17.53
Test value		t= -7.191	t= --6.564	t= -7.298
Significance level		p=0.000*	p=0.000*	p=0.000*
Heart Rhythm Disorder				
There is	5	67.85± 16.53	63.09 ± 16.39	72.61 ± 17.35
None	358	72.66± 19.50	71.88 ± 21.88	73.43 ± 18.60
Test value		t= -0.648	t= -1.057	t= -0.116
Significance level		p=0.517	p=0.291	p=0.908
Thyroid Diseases				
There is	17	57.25± 22.78	55.49 ± 25.56	59.01 ± 21.59
None	346	73.32± 19.00	72.52 ± 21.36	74.11 ± 18.16
Test value		t= -3.838	t= -3.621	t= -3.776
Significance level		p=0.000*	p=0.000*	p=0.000*
Osteoporosis				
There is	22	54.02± 17.42	51.72 ± 18.81	56.32 ± 18.11
None	341	73.77± 18.98	73.03 ± 21.39	74.51 ± 18.07
Test value		t= -5.456	t= -5.234	t= -5.254
Significance level		p=0.000*	p=0.000*	p=0.000*
Cancer				
There is	2	51.04± 18.56	52.08 ± 20.62	50.00 ± 16.49
None	361	72.68± 19.42	71.83 ± 21.81	73.52 ± 18.53
Test value		t= -1.572	t= -1.278	t= -1.792
Significance level		p=0.117	p=0.202	p=0.074
Depression				
There is	44	60.36± 21.53	59.12 ± 24.98	61.60 ± 19.97
None	319	74.25± 18.56	73.47 ± 20.81	75.03 ± 17.80
Test value		t= -4.681	t= -4.182	t= -5.309
Significance level		p=0.000*	p=0.000*	p=0.000*

$\bar{X}$: Mean, SD: Standard Deviation, F: ANOVA Analysis of Variance value, t: Independent groups t test value,*p<0.05, **Tamhane's T2 Test.

Table 4. Comparison of Disease Frequency of Patients According to Obstructive Sleep Apnea Syndrome Level

Variables	OSAS Level								
	OSAS None		Mild OSAS		Moderate OSAS		Severe OSAS		Test value and p
	n	%	n	%	N	%	n	%	
Diagnosis of chronic disease									
There is	16	6.5	21	8.7	62	25.9	142	58.9	χ^2=21.792
None	24	19.6	11	9.2	34	27.6	53	43.6	p=0.000*
DM									
There is	2	2.0	6	5.3	31	27.0	75	65.8	χ^2=25.610
None	38	15.1	26	10.5	65	26.2	120	48.2	p=0.000*
HT									
There is	6	3.8	11	7.2	38	24.0	101	64.9	χ^2=27.254
None	33	16.3	21	10.1	59	28.3	94	45.3	p=0.000*
Asthma									
There is	6	7.3	7	8.3	20	24.8	49	59.6	χ^2=2.803
None	34	12	25	9.1	77	26.9	145	52.0	p=0.423
COPD									
There is	1	7.4	2	11.1	3	14.8	14	66.7	χ^2=2.843
None	38	11.2	30	8.8	93	27.1	182	53.0	p=0.417
Stroke									
There is	-	0.0	-	0.0	-	0.0	1	100.0	χ^2=0.863
None	40	11.0	32	8.9	96	26.5	194	53.6	p=0.938
MI									
There is	-	0.0	1	33.3	-	0.0	2	66.7	χ^2=3.027
None	40	11	32	8.8	96	26.7	192	53.5	p=0.387
CHF									
There is	1	1.8	3	7.1	14	33.9	24	57.1	χ^2=6.552
None	39	12.1	29	9.1	81	25.4	172	53.4	p=0.088
Heart Rhythm Disorder									
There is	-	0.0	1	20.0	3	60.0	1	20.0	χ^2=4.378
None	40	11.1	32	8.8	93	26	193	54.1	p=0.223
Thyroid Diseases									
There is	-	0.0	1	5.8	5	29.4	11	64.7	χ^2=3.916
None	40	11.5	31	9.1	91	26.4	184	53.0	p=0.271
Osteoporosis									
There is	-	0.0	2	6.9	7	31.0	13	62.1	χ^2=4.161
None	40	11.6	30	9.0	89	26.2	182	53.2	p=0.245
Cancer									
There is	1	50.0	-	0.0	-	0.0	1	50.0	χ^2=3.511
None	40	10.8	32	8.9	95	26.6	194	53.7	p=0.319
Depression									
There is	5	10.3	3	6.9	12	27.6	24	55.2	χ^2=0.373
None	34	11.0	30	9.2	84	26.3	171	53.5	p=0.946

χ^2: Chi-Square Test value, *p<0.05

according to the presence of a diagnosis of chronic disease, and the SF-12, PCS-12 and MCS-12 scores of patients with a diagnosis of chronic disease were significantly lower than those of patients without a diagnosis of chronic disease ($p<0.05$) (Table 3).

In the study, SF-12 total score, PCS-12 total score and MCS-12 total score differed significantly according to the presence of DM, HT, asthma, COPD, stroke, MI, CHF, thyroid diseases, osteoporosis and depression; SF-12, PCS-12 and MCS-12 scores of patients with a diagnosis of

DM, HT, asthma, COPD, stroke, MI, CHF, thyroid diseases, osteoporosis and depression were significantly lower than those of patients without a diagnosis of DM, HT, asthma, COPD, stroke, MI, CHF, thyroid diseases, osteoporosis and depression ($p<0.05$) (Table 3).

In the study, it was determined that the SF-12, PCS-12 scores of patients without a diagnosis of heart rhythm disorder and cancer were higher than those of patients with a diagnosis of heart rhythm disorder and cancer, but the scores of quality of life and its components did not differ significantly according to the diagnosis of heart rhythm disorder and cancer ($p>0.05$) (Table 3).

Table 4 shows the comparison of the disease frequencies of the patients according to the level of OSAS.

When Table 4 was analyzed, it was found that 8.7% of the patients with chronic diagnosis had mild OSAS, 25.9% had moderate OSAS and 58.9% had severe OSAS. Among the patients with severe OSAS, 65.8% had DM, 64.9% had HT, 59.6% had asthma, 66.7% had COPD, 66.7% had MI, 57.1% had CHF, 20.0% had cardiac arrhythmia, 64.8% had thyroid diseases, 62.1% had osteoporosis, 50.0% had cancer and 55.2% had depression. In the study, it was determined that there was a significant relationship between the diagnosis of chronic disease status, DM diagnosis and HT disease diagnosis and OSAS level ($p<0.05$); however, there was no significant relationship between asthma, COPD, stroke, MI, CHF, thyroid diseases, osteoporosis and depression and OSAS level ($p>0.05$) (Table 4)

DISCUSSION

In our study, 66.3% of the patients had a diagnosis of chronic disease. HT was diagnosed in 43.0%, DM in 31.4%, asthma in 22.5%, COPD in 5.6%, CHF in 11.6%, cardiac arrhythmia in1.4%, thyroid diseases in 4.5%, osteoporosis in 6.0%, cancer in 0.4% and depression in 12.0%. It was found that HT and DM were the most common diagnoses and stroke and cancer were the least common diagnoses in the patients who participated in the study. In similar studies conducted on patients who applied to sleep units in our country, it was reported that 27.0%-45.0% of the patients had HT, 11.4%-37.8% had DM, 8.8%-17.2% had CHF, and 4.1%-9.9% had asthma/COPD. Furthermore, in studies conducted in patients with OSAS, it was found that 41.0-51.7% had HT, 21.3-24.3% had DM, 2.0-5.2% had CHF, and 19.7% had COPD (1, 8). Insimilar studies conducted in various countries, it was found that 22.6-47.0% of the patients had HT, 9.3-26.9% had DM, 16.7-22.7% had COPD, and 8.6% had CVD, and the results were compatible with our study and the studies conducted in our country (9, 10). In addition, mild OSAS was found in 8.7%, moderate OSAS in 25.9% and severe OSAS in 58.9% of patients with a diagnosis of chronic disease in our study. In other words, it was observed that as the level of OSAS increased, chronic diseases and depression level increased.

In our study, OSAS was detected in 89.0% of the patients according to the AHI value; 53.7% of them had severe OSAS, 26.4% had moderate OSAS, and 8.9% had mild OSAS. In some studies, conducted in patients presenting to sleep units, the frequency of OSAS was reported to be 74.4% and 75.9% (8). In studies conducted in patients who applied to sleep units in different countries, OSAS level was reported to be between 62.0% and 88.0% (10). In studies conducted both in our country and abroad,

it was found that the level of OSAS was high in patients applying to sleep units. When these results are considered, it can be said that the results of our study and other studies are similar.

It was determined that the quality of life scores of the participants decreased significantly as the age range increased. There are many studies examining the relationship between the age factor and quality of life and therefore, it shows that there is a close relationship between these two concepts (11). Health problems, role losses, losses of family members, decrease in cognitive functions and similar conditions that develop with age affect the quality of life of the individual (12). We observe similar results to our research results in the studies conducted.

In our study, 58.9% of patients with a chronic diagnosis had severe OSAS and a significant relationship was found between the diagnosis of chronic disease and OSAS level. Among thepatients with severe OSAS, 65.8% had DM, 64.9% had HT, 59.6% had asthma, 66.7% had COPD, 75.0% had MI, 57.1% had CHF, 28.6% had cardiac arrhythmia, 68.2% had thyroid diseases, 62.1% had osteoporosis, 50.0% had cancer and 55.2% had depression. In our study, a significant relationship was found between the diagnosis of DM and HT disease and OSAS level, whereas no significant relationship was found between asthma, COPD, stroke, MI, CHF, thyroid diseases, osteoporosis and depression and OSAS level. In our study, the incidence of OSAS was found to be significantly higher in patients with HT and DM. In some studies, conducted abroad, depression was found in 14.0-14.8% of OSAS patients and the results were consistent with our study (12.0%). In a study conducted in China, hepatopathy was found in 44.6% of patients (9,10). Depression, hypochondriasis and conversion reactions are observed in OSAS. A significant proportion of OSAS patients experience social adaptation problems, family problems, decreased school or work performance, and their quality of life decreases significantly (7). Untreated OSAS leads to an increase in HT, coronary and cerebrovascular diseases, poorer neurocognitive performance, mental problems and all these lead to a decrease in the quality of life of patients (13).

In our study, it was determined that there was a significant relationship between the AHI variable and the quality of life level of the patients. The AHI values of the patients at the end of polysomnography(PSG) show that 10.3% of the patients' quality of life level is significantly affected. It was determined that the AHI values of the patients at the end of PSG significantly decreased the quality of life by 0.174 times. The results of some studies in the literature indicate that quality of life is related with AHI values and the determinants of OSAS severity (14). In a study conducted by Lopes et al. (2008) on 1892 patients to evaluate the quality of life in severe OSAS, it was reported that the quality of life decreased depending on the severity of the disease and the quality of life decreased significantly with increasing OSAS severity. In the same study, it was determined that quality of life parameters including social functionality and emotional role difficulty regressed in patients with an AHI value greater than 30 (15). In Hanazay's (2014) study evaluating the level of quality of life, frequency of depressive symptoms and the effect of PAP treatment in patients with OSAS, it was reported that a positive correlation was found between the increase in AHI value and deterioration in quality of life level (13). These resultscan be said to be important in terms of showing the presence of correlation between quality of life and OSAS severity.

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