The Effects of Sleep Hygiene and Deep Breathing - Cough Exercise Training on The Quality of Sleep and Life in COPD Diagnosed Patients/ *KOAH Tanısı Almış Hastalara Verilen Uyku Hijyeni ve Derin Solunum-Öksürük Egzersizleri Eğitiminin Uyku ve Yaşam Kalitesine Etkisi*

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Öz

Giriş: Kronik hastalıklar, yaşam kalitesini olumsuz etkileyen faktörlerin başında gelmektedir ve bu nedenle kronik hastalık semptomlarının hafifletilmesi ile hastaların yaşam kalitesinin artırılmasına yönelik girişimlerin planlanması gerekmektedir. Amaç: Bu çalışmanın amacı, KOAH tanısı ile yatmakta olan hastalara verilen uyku hijyeni ve derin solunum-öksürük egzersizi eğitiminin hastaların taburculuk sonrasında uyku ve yaşam kalitesine etkisinin belirlenmesidir. Gereç ve Yöntem: Bu çalışma, KOAH tanısı almış hastalarla 25 Şubat-30 Nisan 2018 tarihleri arasında yürütülmüştür. Eğitim verilmeden önce hastalara "Hasta Tanıtım Formu", "Uykuyu Etkileyen Faktörler Formu", "Pittsburgh Uyku Kalitesi Ölçeği (PUKİ)" ile "Yaşam Kalitesi Ölçeği (SF-36)" uygulanmıştır. Verilerin değerlendirilmesinde yüzdelik, aritmetik ortalama, ki-kare ve t-testi kullanıldı. Bulgular: Girişim grubundaki hastaların eğitim öncesi ve eğitim sonrası toplam PUKİ puan ortalaması sırasıyla 14.20 ± 1.45 ve 12.57 ± 0.97; kontrol grubundaki hastaların 15.00 ± 1.89 ve 14.80 ± 1.13 idi. Girişim grubundaki hastaların eğitim öncesi ve eğitim sonrası Yaşam Kalitesi Ölçeği puan ortalaması sırasıyla 43.98 ± 12.72 ve 117.12 ± 15.09; kontrol grubundaki hastaların ise 36.93 ± 5.77 ve 38.13 ± 5.67 idi. Girişim grubunda ön test ve son test toplam PUKİ (z:-4.178, p<0.001) ve yaşam kalitesi (z:-4.782, p<0.001) puan ortalamaları arasında istatistiksel olarak anlamlı farklılık saptanırken, kontrol grubunda istatistiksel olarak anlamlı farklılık saptanmamıştır. Sonuç: Uyku hijyeni ve derin solunum öksürük egzersizi eğitiminin uyku ve yaşam kalitesi üzerinde etkili olduğu saptandı.

Anahtar Kelimeler: Derin solunum egzersizi, Öksürük egzersizi, Uyku hijyeni, Uyku, KOAH.

Abstract

Introduction: Chronic diseases are one of the leading factors that negatively affect quality of life and therefore interventions should be planned to alleviate the symptoms of chronic diseases and improve the quality of life of patients. Aim: The purpose of this study was to determine the effects of sleep hygiene and deep breathing-coughing exercise training on the post-discharge quality of sleep and life in COPD diagnosed patients. Material and Method: The study was conducted with patients diagnosed with COPD between 25 February and 30 April 2018. A Patient Information Form, the Pittsburgh Sleep Quality Scale (PSQI) and the Quality of Life (SF-36) Scale were administered before deep breathing-coughing exercise and sleep hygiene training were given to patients. In assessing the data, percentages, arithmetic

means, chi-square and t-test were used. Results: The mean pre-training and post-training total PDQI scores of the patients in the intervention group were 14.20±1.45 and 12.57±0.97, respectively, and 15.00±1.89 and 14.80±1.13 in the control group. The mean scores of the Quality of Life Scale before and after the intervention group were 43.98±12.72 and 117.12±15.09, respectively; the mean scores of the patients in the control group were 36.93±5.77 and 38.13±5.67, respectively. There was a statistically significant difference between pretest and posttest total PDQI (z:-4.178, p<0.001) and quality of life (z:-4.782, p<0.001) mean scores in the intervention group, whereas there was no statistically significant difference in the control group. Conclusion: Sleep hygiene and deep breathing-coughing exercises training were found to be effective on sleep and quality of life.

Keywords: Deep breathing exercises, Cough exercise, Sleep hygiene, Sleep, COPD.

1. Introduction

With today's rapid technological developments, human lifespan is increasing, but as a result of this, there is also an increase in the appearance of chronic illnesses. Chronic illnesses are at the forefront of factors which have a negative effect on the quality of life, and for this reason, it is necessary to alleviate the symptoms of chronic illness and to plan interventions to increase the quality of life of patients. Diseases of the respiratory system seriously affect daily activities, and they are important illnesses in causing restrictions in life, increasing mortality, and reducing the quality of life (Padilha et al., 2017). Chronic obstructive pulmonary disease (COPD) is one of a number of chronic diseases which are becoming a problem throughout the world (McKay et al., 2012). Costs of care and treatment and mortality and morbidity are high, making COPD an important health problem everywhere (Köktürk et al., 2017; McKay et al., 2012).

COPD is an irreversible, chronic, preventable disease which restricts air flow in the lungs (Yıldırım, 2006; Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2017). It cannot be completely cured; its progress is insidious; it lowers the quality of life, and it can cause disabilities (Hermiz et al., 2002).

In the world as a whole, 64-65 million people are coping with COPD (Luk, et al. 2017; Baker and Fatoye, 2017). According to data from the Turkish Statistics Institute, diseases of the respiratory system were the third largest cause of death in Turkey, COPD is fourth among the causes of death (Özgen Alpaydın et al., 2021). It has been reported that smoking and the aging population will cause an increase in COPD in the next 30 years, and that COPD-related deaths will reach 4.5 million a year, making it the third most important cause of death (GOLD, 2017; Köktürk et al., 2017).

In COPD, the symptom which restricts a person the most and causes the greatest difficulty is fatigue, and in order to reduce feelings of dyspnea and fatigue to a minimum, a person will expend a little effort as possible (Reardon, 2007). The result of this is that a person has difficulty in performing the functions of daily life, and becomes dependent. Sleep and rest reduce fatigue and the effects of the illness, but the commonest problems for COPD patients after shortness of breath and weakness are sleep problems (Reardon, 2007; Öztürk, 2011; Budhiraja et al., 2012; Cho et al., 2017). As COPD progresses, patients' sleep problems increase, and the sleep quality of COPD patients may be disrupted by symptoms such as

expectoration, coughing, dyspnea and hypoxemia, as well as by the side effects of medications being used (Öztürk, 2011; Bülbül, 2013).

In the education given to COPD patients and their families, space must be given to topics such as oxygen treatment, methods of reducing dyspnea, balanced nutrition, the benefits of adequate sleep and the maintenance of physical activity, deep breathing-coughing exercises, the careful use of energy and techniques for easing daily activities, making use of free time, coping techniques and indications to health institutions (Erdinç et al., 2010). It has been reported that pulmonary rehabilitation (PR) given to COPD patients, improved the quality of life but not improve sleep quality between observation and control groups (McDonnel, et al., 2014).

This study was conducted on in-patients diagnosed with COPD at a government hospital in the west of Turkey with the aim of determining the effects of education on sleep hygiene and deep breathing and coughing exercises after discharge from hospital on their quality of sleep and life.

2.   Material and Methods

2.1. Type of Study

The research was conducted as a semi-experimental group study with pre-test and post-test.

2.2. Place and Time of Study
The population of the research was patients admitted to the Chest Clinic of the hospital with a diagnosis of COPD between the dates of 25 February and 30 April 2018.

2.3. Population and Sample
The sample consisted of 60 patients, 30 in the intervention group and 30 in the control group, who fitted the inclusion criteria and who accepted to participate in the study. The COPD patients were classified by the clinic physicians on the basis of FEV_1/FVC level and post bronchodilator results.

Criteria for inclusion in the study were as follows: 1) age ≥18 years, 2) a diagnosis of COPD (Stage I, Stage II and Stage III), 3) no communication problems, 4) ability to perform the breathing exercises in a suitable manner (evaluated by checklist), and 5) providing written informed consent to participate in the study. Exclusion criteria were 1) not consenting to participate in the study, 2) inability to perform the breathing exercises in a suitable way, 3) having communication problems, and 4) having an active infection (GOLD, 2017).

2.4. Data collection tools
Data were collected using a Patient Information Form, the Pittsburgh Sleep Quality Index (PSQI), and the Quality of Life Scale (SF-36).

2.4.1. Patient Information Form: The Patient Information Form was prepared by the researcher and consisted of 18 questions on such sociodemographic topics as the patients' educational level, height, weight, body mass index (BMI), marital status, profession, age and gender, as well as their illness, treatment and sleep problems (Akıncı and Olgun, 2008; Doğan and Ovayolu, 2016).

2.4.2. Pittsburgh Sleep Quality Index (PSQI): Pittsburgh Sleep Quality Index (PSQI) was developed by Buysse et al. (1989) to evaluate sleep quality. The PSQI, a 19-item tool and the total score includes seven components: sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, sleeping medication use and daytime dysfunction. Components are weighted equally on a 0–3 scale, yielding a global score ranging from 0–21, with higher scores indicating worse sleep quality. This validity and reliability of this scale for Turkey was assessed by Ağargün et al. (1996), and its Cronbach's alpha reliability was determined as 0.804.

Cronbach alpha analysis was performed to determine the reliability of the PSQI in this study, and the reliability coefficient was found to be 0.913. As this coefficient was greater than 0.70, the condition of reliability was fulfilled (Büyüköztürk, 2011; Ağargün et al., 1996).

2.4.3. The SF-36 Quality-of-Life Instrument: The Quality of Life Scale was developed by Sullivan et al. (1995). Turkish validity and reliability were performed by Koçyiğit et al. (1999). A higher score on the scale indicates a person's higher quality of life both overall and on the subdimensions. Cronbach alpha analysis was performed to determine the validity of the Scale in this study, and a reliability coefficient of 0.965 was found. As this coefficient was greater than 0.70, the condition of reliability was fulfilled (Büyüköztürk, 2011; Ware, 1992).

2.5. Data Collection

A Patient Information Form, the Pittsburgh Sleep Quality Scale (PSQI) and the Quality of Life Scale (SF-36) were administered before deep breathing-coughing exercise and sleep hygiene training were given to patients (Figure-1). Patients in the intervention group were given education on sleep hygiene and breathing-coughing exercises by face-to-face/one to one interview once time in the patient's room. This took approximately 20-30 minutes. In addition, the education content was prepared in brochure form and given to the patients one day before they were discharged. The same form and scales were reapplied one month after the discharge. In the control group, the same forms were applied without any training at the same time. The brochures were given to the patients in the control group after data collection had been completed.

Figure-1: Educational Content

 -Sleep

- Factors of affecting sleep

- Factors of continuing insomnia

- Treatment of sleep disorders

- Sleep hygiene

- Deep breathing-cough exercise

-Benefits of deep breathing-cough exercise

2.6. Ethical Considerations

The research was approved by the University health sciences ethics committee (Approval No.204784486-050.04.04) and conformed to the principles outlined in the Helsinki Declaration. Written permission was obtained from the institutions where the study was to be carried out, and verbal and written informed consent was obtained from the patients for the study. Patients were informed about the purpose and procedures of the study, the voluntary

nature of participation, and the option to withdraw at any time. The research project was not funded by national grants or other external sources.

2.7. Statistical Analysis

Analysis of the study data was performed using the Statistical Package for the Social Sciences (SPSS) 25.0; numerical and percentage distributions, arithmetic means, chi-square test, Mann-Whitney U test and Wilcoxon Signed Rank test were used in the evaluation of the data.

Whether the scale scores included in the analyzes showed normal distribution or not was checked by performing the Shapiro-Wilk test separately in the groups. As a result of the analysis, it was determined that the data did not show normal distribution and nonparametric test methods were used. Data were evaluated with a significance level of $p < 0.05$ and a confidence interval of 95%.

Results

Table1 shows the distribution of the patients in the experimental and control groups by their sociodemographic characteristics and habits. It was found that the mean age of patients in the experimental group was 64.56±11.37 years, 70% were male, 50% were of normal weight, 70% were married, 93.33% were educated to primary school level, 70% lived in the provincial capital, 20% smoked, 56.67% were at Stage II, they had had COPD for an average of 15.17±7.63 years, 93.33% had previously been admitted to hospital in connection with COPD, 53.33% used a nebulizer device, and 36.68% did not have another chronic illness.

Table 1. Distribution of the Patients in Terms of Some Variables

Variable		Intervention (n=30)		Control (n=30)		p*
		N	%	n	%	
Gender	Male	21	70.00	20	66.67	0.781
	Female	9	30.00	10	33.33	
Age group	59 and younger	10	33.33	5	16.66	0.188
	60-69 year	12	40.00	11	36.67	
	70 and older	8	26.67	14	46.67	
Mean of age		64,56±11,37		68,56±12,59		
Body mass index	Underweight (Below 18.5)	4	13.33	1	3.33	0.529
	Normal (18.5 – 24.9)	15	50.00	16	53.33	
	Obese (25.0 – 29.9)	11	36.67	13	43.34	
Marital Status	Married	21	70.00	23	76.67	0.559
	Single	9	30.00	7	23.33	
Educational status	Primary school	28	93.33	29	96.67	0.554
	High school	2	6.67	1	3.33	
Living area	Province	21	70.00	16	53.33	0.310
	District	4	13.33	4	13.33	
	Village	5	16.67	10	33.33	
Smoking use status	Yes	6	20.00	4	13.33	0.488
	No	24	80.00	26	86.67	
Having previous sleeping problems	Yes	30	100.00	28	93.33	0.150
COPD Stages	I. Stage	1	3.33	0	0.00	0.595
	II. Stage	17	56.67	17	56.67	
	III. Stage	12	40.00	13	43.33	
COPD duration (year)		15.17±7.63		15.87±6.33		0.700

Previous hospitalization due to COPD	Yes	28	93.33	29	96.67	0.554
	No	2	6.67	1	3.33	
Device used	Nebulizer	16	53.33	24	80.00	0.133
	Oxygen Tube- Bipap Device	8	26.67	3	10.00	
	Not use	6	20,00	3	10,00	
Type of another chronic disease	Diabetes	7	23.33	3	10.00	0.460
	Hypertension	4	13.33	9	30.00	
	Coronary artery disease	6	20.00	7	23.33	
	Cancer and chronic renal failure	2	6.66	1	3.33	
	None	11	36.68	10	33.34	

*Chi-squared test was applied with a significance level of $p < 0.05$ and a confidence interval of 95%.

In the control group, it was found that the mean age of patients was 68.56±12.59 years, 66.67% were male, 53.33% were of normal weight, 76.67% were married, 96.67% were educated to primary school level, 53.33% lived in the provincial capital, 13.33% smoked, 56.67% were at Stage II, they had had COPD for an average of 15.87±6.33 years, 96.67% had previously been admitted to hospital in connection with COPD, 80.0% used a nebulizer device, and 33.34% did not have another chronic illness. It was found that no patients in either group drank alcohol. It was established that according to the above characteristics there was no statistical difference between the experimental and control groups, and that the groups showed homogeneous distribution ($p > 0.05$).

Table 2. **The mean ranks, medians and IQRs of PSQI before and after the training in experimental and control groups**

Pittsburgh Sleep Quality Index components	Group	Before the training (n=30)			U / p*	After the training (n=30)			U / p*
		Mean Rank	Median	IQR		Mean Rank	Median	IQR	
Subjective sleep quality	Intervention	27.57	2.00	0.00	362.00 0.130	15.50	1.00	0.00	0.00 <0.001
	Control	33.43	2.00	1.00		45.50	2.00	0.00	
Sleep latency	Intervention	28.50	1.00	1.00	390.00 0.301	23.23	1.00	0.00	232.00 <0.001
	Control	32.50	1.50	1.00		37.77	1.00	1.00	
Sleep duration	Intervention	28.75	5.00	0.00	397.50 0.372	45.27	8.00	0.00	7.00 <0.001
	Control	32.25	5.00	0.00		15.73	5.00	1.00	
Habitual sleep efficiency	Intervention	30.75	2.00	2.00	442.50 0.906	19.45	0.00	0.00	118.50 <0.001
	Control	30.25	2.00	2.00		41.55	2.00	2.00	
Sleep disturbances	Intervention	30.67	2.00	1.00	445.00 0.933	19.37	1.00	0.00	116.00 <0.001
	Control	30.33	2.00	1.00		41.63	2.00	1.00	
Use of sleeping medication	Intervention	27.80	0.00	0.00	369.00 0.129	35.75	0.50	1.00	292.50 0.004
	Control	33.20	0.00	1.00		25.25	0.00	0.00	
Daytime dysfunction	Intervention	29.50	2.00	0.00	420.00 0.616	16.95	1.00	0.00	43.50 <0.001
	Control	31.50	2.00	2.00		44.05	2.00	0.00	
Total score	Intervention	25.82	14.00	2.00	309.50 0.054	17.40	13.00	1.00	57.00 <0.001
	Control	35.18	15.00	2.00		43.60	15.00	1.00	

* Mann-Whitney U test was applied with a significance level of $p < 0.05$ and a confidence interval of 95%.

The total median for PSQI before and after the training in intervention group were found as 14 and 13, respectively. Before and after the training in control group were found as 15 and 15, respectively, too. And the mean of sub-scale scores is shown in Table 3.

It was found that there was no statistically significant difference between the PSQI scores of the intervention and the control groups before education (p>0.05), but that there was a statistically significant difference between mean PSQI scores after education (p<0.05).

The total median for SF-36 before and after the training in intervention group were found as 41.38 and 113.46, respectively. Before and after the training in control group were found as 48.44 and 38.08, respectively, too. And the mean of sub-scale scores is shown in table 3.

It was found that there was no statistically significant difference between the quality of life scores of the intervention and the control groups before education (p>0.05), but that there was a statistically significant difference between mean quality of life scores after education, except for the subdimension of social functionality (p<0.05).

Table 3. The mean ranks, medians and IQRs of SF-36 before and after the training in experimental and control groups

SF-36 Scales components	Group	Before the training (n=30)			U / p*	After the training (n=30)			U / p*
		Mean Rank	Median	IQR		Mean Rank	Median	IQR	
Bodily pain	Intervention	28.80	20.00	32.50	399.00 0.444	40.00	37.50	0.00	165.00 <0.001
	Control	32.20	15.00	17.50		21.00	20.00	7.50	
Physical functioning	Intervention	30.57	10.00	0.00	448.00 0.975	45.50	55.00	0.00	0.00 <0.001
	Control	30.43	10.00	10.00		15.50	5.00	5.00	
Social functioning	Intervention	27.30	25.00	12.50	354.00 0.141	29.28	25.00	37.50	413.50 0.569
	Control	33.70	32.50	0.00		31.72	37.50	12.50	
Physical roles limitation	Intervention	28.02	0.00	0.00	375.50 0.156	45.50	100.00	0.00	0.00 <0.001
	Control	32.98	0.00	5.00		15.50	0.00	0.00	
General health perceptions	Intervention	28.58	25.00	8.34	392.50 0.385	44.68	33.33	12.50	24.50 <0.001
	Control	32.42	25.00	5.00		16.32	18.75	4.16	
Mental health	Intervention	29.77	40.00	8.00	428.00 0.739	37.30	52.00	8.00	246.00 0.002
	Control	31.23	40.00	4.00		23.70	42.00	16.00	
Emotional roles limitation	Intervention	30.55	0.00	0.00	448.50 0.966	45.50	100.00	0.00	0.00 <0.001
	Control	30.45	0.00	0.00		15.50	0.00	0.00	
Vitality	Intervention	32.08	27.50	25.00	402.50 0.479	43.95	50.00	10.00	45.50 <0.001
	Control	28.92	25.00	15.00		17.05	20.00	15.00	
Total Physical health	Intervention	25.90	14.17	6.25	312.00 0.041	45.50	56.46	3.12	0.00 <0.001
	Control	35.10	15.00	10.00		15.50	10.63	3.33	
Total Mental health	Intervention	29.72	26.69	10.25	426.50 0.728	45.43	57.75	11.13	2.00 <0.001
	Control	31.28	27.01	7.87		15.57	26.32	6.37	
Total SF-36 Score	Intervention	31.33	41.38	13.59	425.00 0.711	45.50	113.46	10.00	0.00 <0.001
	Control	29.67	48.44	32.66		15.50	38.08	7.38	

* Mann-Whitney U test was applied with a significance level of p<0.05 and a confidence interval of 95%.

Table 4 shows the Wilcoxon Signed Rank Test findings regarding PSQI and quality of life scores. As seen in the table, the sleep quality of 23 out of 30 participants improved in the transition from the pretest to the posttest in the intervention group (negative ranks=23). Again in the intervention group, the quality of life score of all 30 participants increased in the

transition from the pretest to the posttest (positive ranks=30). A statistically significant difference was found between the mean total PSQI and quality of life scores of the intervention group before and after education (p<0.05), but in the control group, no statistically significant difference was found between the mean total PSQI and quality of life scores before and after education (p>0.05).

Table 4. The Mean Ranks of Total PSQI and SF-36 Before and After The Training in Experimental and Control Groups

Group	Scores	Ranks	n	Mean Rank	Z	p*
Exp. Group	PSQI Score (Post-Test) - PSQI Score (Pre-Test)	Negative Ranks	23[a]	14.67	-4.178	<0.001
		Positive Ranks	3[b]	4.50		
		Ties	4[c]			
	SF-36 Score (Post-Test) - SF-36 Score (Pre-Test)	Negative Ranks	0[d]	0.00	-4.782	<0.001
		Positive Ranks	30[e]	15.50		
		Ties	0[f]			
Cont. Group	PSQI Score (Post-Test) - PSQI Score (Pre-Test)	Negative Ranks	14[a]	13.61	-0.768	0.442
		Positive Ranks	11[b]	12.23		
		Ties	5[c]			
	SF-36 Score (Post-Test) - SF-36 Score (Pre-Test)	Negative Ranks	17[d]	16.65	-1.039	0.299
		Positive Ranks	13[e]	14.00		
		Ties	0[f]			

* Wilcoxon Signed Rank test was applied with a significance level of p<0.05 and a confidence interval of 95%.

a. PSQI Score (Post-Test) < PSQI Score (Pre-Test)
b. PSQI Score (Post-Test) > PSQI Score (Pre-Test)
c. PSQI Score (Post-Test) = PSQI Score (Pre-Test)

d. SF-36 Score (Post-Test) < SF-36 Score (Pre-Test)
e. SF-36 Score (Post-Test) > SF-36 Score (Pre-Test)
f. SF-36 Score (Post-Test) = SF-36 Score (Pre-Test)

3. Discussion

Difficulties experienced by COPD patients because of sleep disturbances including sleep apnea syndromes and nocturnal hyperventilation reduce the total duration and effectiveness of sleep, and this has a negative effect on sleep quality (Jen et al., 2016; Sevilla Berrios & Gay, 2016).

Nearly all of the patients who took part in our study had previously experienced sleep problems either at home or in the hospital. In the results of studies conducted on patients diagnosed with COPD by Esen (2008) and Scharf et al. (2011), it was reported that patients often experienced sleep problems. Mean PSQI scores of patients diagnosed with COPD were found to be 10.82±3.69 by Esen (2008) and 11.0±5.4 by Scharf et al. (2011). In another study, the total mean PSQI scores of COPD patients was reported as 8.44 ± 3.49, and it was reported that the sleep quality of 87.1% of the patients was poor (Vicdan, 2018). In the results of a study

conducted on COPD patients by Zohal et al. (2014), it was found that the mean PSQI scores in patients with and without sleep apnea were 8.1 ± 1.7 and 6.2 ± 2.3 respectively (Zohal et al., 2014). In the present study, it was found that the median PSQI scores before education were 14.00 for the intervention group and 15.00 for the control group. According to this, the sleep quality of patients in our study was worse than that of patients in other studies. The reason for this may be that the sample was smaller.

The first basic conclusion reached in our study was that education in sleep hygiene and deep breathing-coughing exercises significantly improved sleep quality in patients diagnosed with COPD. The most important finding which showed this was the statistically significant difference between the median scores obtained before and after education. When measured one month after education in sleep hygiene and deep breathing-coughing exercises, the PSQI scores of patients in the intervention group were found to have fallen significantly from 14.00 to 13.00, i.e. an 7.14% improvement, and their sleep quality had increased. However, although the median pre-test and post-test PSQI scores of patients in the control group has not changed (from 15.00 to 15.00), this difference was not statistically significant. This finding clearly showed the effect of the education given. Examining similar studies from this aspect, it was seen that PSQI scores fell from 11.78 to 6.57 in a study by Yıldız (2012) on patients in coronary intensive care, and in a study with women in the postmenopausal period by Duman (2016), the PSQI score fell from 14.03 to 7.09, an improvement of 19.46% (Yıldız, 2012). In a study by Demiralp et al. (2010) examining the effect of relaxation exercises on the sleep quality of breast cancer patients receiving chemotherapy, the PSQI score fell from 6.16 to 4.63, and there was an improvement of 24.8% (Demiralp et al., 2010) In comparison to this, the patients in our study had worse sleep scores than in any of these studies, and there was an 7.14% improvement. It can be said that education in sleep hygiene and deep breathing-coughing exercises was less effective in improving the sleep quality of COPD patients than for those with other diseases, because it is a chronic disease characterized by restriction of air flow in the lungs.

Another finding which shows that the sleep quality of the patients diagnosed with COPD improved significantly was that after education was given, the total PSQI scores of the intervention group were significantly better than those of the control group. There was no difference between the pre-test scores of the groups, but a statistically significant difference was found between their post-test scores. Soler et al. (2013) reported that pulmonary rehabilitation improved the sleep quality of COPD patients. Thus the results of our study are similar to those of Soler et al. Also, similar studies were conducted on coronary patients in intensive care (Yıldız, 2012) and on women in the postmenopausal period (Duman, 2016). It was found in these studies that sleep hygiene education significantly improved the sleep quality of patients. In another study, it was reported that more than half (58.2%) of individuals who adhered to the rules of sleep hygiene had an average sleep latency of 13.0±9.7, average PSQI scores of 3.0±1.0, and an average total sleep duration of 7.5±0.91 hours, while those who slept badly had a sleep onset latency of 38±26.6, average PSQI scores of 10.2±2.3, and an average total sleep duration of 5.7±1.4 (Gellis & Lichstein, 2009). It is reported that in Alzheimer's patients experiencing difficulty in sleeping, behavioral techniques such as a daily walk and in particular sleep hygiene education reduced complaints relating to sleep (McCurry et al., 2005). It was reported in another study that relaxation exercises improved the perception of sleep quality in breast cancer patients (Demiralp, Oflaz and Komurcu, 2010). In a study examining the sleep quality of sportsmen, it was reported that sleep hygiene education

increased sleep quality (Caia et al., 2018). The results of the present study support these findings.

With regard to quality of life, it was found that the average total quality of life score of COPD patients included in our study was 41.38 in the intervention group and 48.44 in the control group. Similar to our study, when the SF-36 scale was used to determine quality of life, mean quality of life scores in patients diagnosed with COPD were reported as 33.91±11.95 by Esen (2008). Also, among studies conducted using the St. George Respiration Quality of Life Scale with patients diagnosed with COPD, Scharf et al. (2011) found a mean quality of life score of 57.0 ± 21.3, and Zohal (2014) found a mean total quality of life score in patients with and without sleep apnea of 60.6 ± 10.4 and 40.2 ± 11.8 respectively (Scharf et al., 2011; Zohal et al., 2014).

It was found in our study that education in sleep hygiene and deep breathing-coughing exercise in patients diagnosed with COPD raised median quality of life scores from 113.46 to 38.08, resulting in a statistically significant difference. In the control group however, although the median quality of life score rose from 48.44 pre-test to 38.08 post-test. This result shows clearly the positive effect of the education given on the quality of life. Pre-test scores showed no difference between the groups, but a statistically significant difference was found between post-test scores, except for social functionality. Özmen et al. (2018) state that pulmonary rehabilitation leads to an enhance in exercise capacity and advanced quality of life with chronic respiratory diseases patients (Özmen et al., 2018). It was concluded in a study by Folch-Ayora et al. (2018) that an education program (meaning of COPD, risk factors, signs and symptoms, use of inhalation devices, importance of quitting smoking, engaging in regular exercise, nutrition, oxygen therapy and ventilation, etc.) given to COPD patients had the effect of raising the quality of life (Folch-Ayora et al., 2018). Our study results are similar to the literature.

4. Conclusion and Suggestions

Sleep hygiene and deep breathing-coughing exercises training were found to improve sleep and quality of life in COPD diagnosed patients.

It is recommended that in order to increase the quality of sleep and life in patients diagnosed with COPD, education on sleep hygiene and deep breathing-coughing exercise should be given, the practice of providing the necessary in-service training to nurses with regard to education on sleep hygiene and deep breathing-coughing exercise should be made more widespread in clinics, a dyspnea scale should be used, randomized controlled and qualitative studies should be conducted on the subject, and also that similar studies should be repeated in different clinics and with different disease groups.

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Declarations