Original Article

Effect of Acupressure on Fatigue in Patients with Chronic Obstructive Pulmonary Disease

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Abstract

Aims: The study was conducted to reveal the effect of acupressure on fatigue in patients with Chronic Obstructive Pulmonary Disease.
Methodology: This semi-experimental study was conducted by performing pretest-posttest and repeated measurements using an interventional and a control group at the Pulmonary Diseases Clinic of Erzincan Mengucek Gazi Training and Research Hospital between November 2015 and May 2017. The study sample consisted of a total of 80 patients with Chronic Obstructive Pulmonary Disease, 40 in the interventional group and 40 in the control group. The data were collected using a patient description form consisting of the socio-demographic characteristics of the patients, the Chronic Obstructive Pulmonary Disease and Asthma Fatigue Scale and the Fatigue Severity Scale.
Results: In the intergroup assessment of the interventional and control groups with respect to their mean fatigue scores, the mean fatigue score of the patients in the interventional group that underwent acupressure was found to be lower than that of the control group.
Conclusions: The acupressure procedure was found effective in reducing fatigue in subjects with Chronic Obstructive Pulmonary Disease.

Keywords: Acupressure, Fatigue, Nursing

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a generally progressive, but preventable and treatable disease characterized by airflow limitation caused by the harmful particles and gases in the lungs, which is not fully reversible(Barnes, 2007; Global Initiative for Chronic Obstructive Lung Disease (GOLD), 2017). As a major health problem all over the world, COPD is an increasing cause of morbidity and mortality (Ministry of Health, 2014). According to the GOLD (Global Initiative for Chronic Obstructive Lung Disease) data, COPD is the fourth leading cause (5.1%) of death in the world. Yet, it is believed that COPD will be the third cause of death worldwide by the 2020 (Global Initiative for Chronic Obstructive Lung Disease (GOLD), 2017). And, COPD has been found to be the fourth cause of death in Turkey, according to the cause of death statistics of Turkish Statistical Institute (TSI) in 2013 (Turkey Statistical Institute, 2013). With the emerging physiopathologic changes in COPD, respiratory function changes considerably and patients experience severe limitations in their daily activities. Patients with COPD experience many symptoms such as shortness of breath, chronic sputum production, chronic cough, wheezing, fatigue and insomnia (Kucukusta, 2019). In a study by Wong et al, 95% of the patients with COPD has been found to experience fatigue (Wong et al., 2010). In a study by Dogan, it has been found that all the patients experience very high-level of fatigue (Dogan,2013). In patients with COPD, it is important to identify and reduce the fatigue, and to improve the quality of life by planning daily activities (Wong et al, 2010, Tel Aydin & Taskin Yilmaz, 2019). Diagnosing fatigue in patients with COPD, identifying appropriate interventions and implementing these interventions by nurses will provide significant contributions to the daily lives of these patients (Ovayolu, Ovayolu &Ates, 2008). Complementary and alternative treatment (CAT)

methods are among the nursing interventions applied for fatigue (Khorshid &Yapucu, 2005). One of the CAT methods used in patients with COPD is the acupressure (Isik & Cadirci, 2011). As a CAT method, acupressure can be used to facilitate the energy flow and healing process of the body by removing lactic acid and metabolic wastes that accumulate in the muscles due to excessive work on the muscles and to improve the blood circulation and oxygen transport to the tissues (Cambron, Dexheimer & Swenson, 2007). In a study by Sabouhi et al., the effect of acupressure on fatigue was investigated in patients who had undergone hemodialysis treatment, and acupressure has been found to decrease fatigue significantly as a result of the research (Sabouhi et al., 2013). The results of this study suggest that acupressure may be used in nursing interventions to reduce fatigue and improve quality of life of patients with COPD. And, the purpose of this study is to investigate the effect of acupressure on the level of fatigue of patients with COPD.

Hypotheses: H_0: Acupressure is not effective in reducing the fatigue level of patients with COPD.

H_1: Acupressure is effective in reducing the fatigue level of patients with COPD.

Methodology: The quasi-experimental study was carried out using pre- and post-tests with repeated measurements using intervention and control groups in Erzincan Mengucek Gazi Training and Research Hospital Pulmonary Diseases Clinic between November 2015 and May 2017. The study population consisted of patients who were diagnosed with COPD and admitted to the Erzincan Mengucek Gazi Training and Research Hospital Pulmonary Diseases Clinic between August 2016 and January 2017. The study sample consisted of a total of 80 hospitalized patients, of whom 40 were in the intervention group and 40 in the control group, who agreed to participate in the research and met the research inclusion criteria between the dates specified. A post hoc power analysis was conducted to determine the adequacy of the study sample size, and it was determined the study has a 95% confidence interval, 0.99 power with a level of significance of 0.05. Sampling inclusion criteria; Patients with a fatigue score 3 and above according to Fatigue Severity Measurement-Visual Analogue Scale (VAS), who can receive treatment at the hospital for at least 5 days for uninterrupted application, and patients who had no accompanying health problems that may adversely affect daily living activities other than COPD (open wounds, cancer, stomach/intestinal problems, etc.) and patients who do not have any communication problems that would prevent them from participating in the study were included. Patient Information Form, COPD and Asthma Fatigue Scale and Fatigue Severity Scale (VAS) were used for data collection. The study data were collected between August 2016 and January 2017.

Patient Information Form: It consists of 7 items on the gender, age, marital status, occupation, education status, disease duration and smoking history.

COPD and Asthma Fatigue Scale (CAFS): COPD and Asthma Fatigue Scale (CAFS) has been developed by Revicki et al. in 2010 to reveal the effects of COPD and Asthma on fatigue, and its Turkish validity and reliability study has been conducted by Yel in 2012 and the Cronbach's α coefficient of the scale has been found to be 0.96(Revicki et al., 2010;Yel, 2012). In this study, Cronbach's _alpha_ coefficient was 0.97. The 12-item Likert type scale is scored by marking "never", "rarely", "sometimes", "often", and "very often". In the calculation of the scale score, the first 10 items are scored as "Very often = 5 points", "Often = 4 points", "Sometimes = 3 points", "Rarely = 2 points", "Never = 1 point", and 11th and 12th items are scored with "Never = 5 points", "Rarely = 4 points", "Sometimes = 3 points", "Often = 2 points", "Very often = 1 point". The total raw score is obtained by adding all the item scores and the raw scores are converted to the total scale score in the range of 0-100. Only one score is obtained scale related to the fatigue state and there is no scoring for sub-scales. Higher fatigue scores indicate higher fatigue level of the individual.

Measurement of Fatigue Severity - Visual Analogue Scale (VAS): The scale developed by Price et al. has been used in studies to identify fatigue, a subjective symptom such as pain (Price et al., 1983; Pollard et al., 2006; Muz & Tasci, 2015). The scale is a 10-cm ruler that says "I do not feel tired" (0 points) at the one end, and "I feel very tired" (10 points) on the other. The patients were informed that the "0" on the scale means "I do not feel tired", that the increasing numbers indicate increase in severity of fatigue, and that "10" means "I feel very tired", and asked to mark the fatigue they felt at the moment on the scale. The distance between the marked point and the lowest point of the line (0 = I do not feel tired) was measured in centimeters, and the numerical value found is considered the fatigue score of the patients.

The data were collected by the researcher with face-to-face interviews with the patients hospitalized at the Erzincan Mengucek Gazi Training and Research Hospital Pulmonary Diseases Clinic between August 2016 and January 2017. In the study, data were gathered from the intervention group first in order prevent any effect

on the control group induced by the intervention group.

Applications Performed on the Intervention Group: Patient Information Form and COPD and asthma fatigue scale were applied in the first follow-up (before starting acupressure) of the patients in the intervention group. Then, in line with the acupuncture application procedures, a total of 5 sessions of acupressure application were applied on the Lu 1, Lu 7, St36, Li 4 spots manually for 5 days a week (from Monday to Friday). These spots were identified using the individual's own finger measurements. Each session was applied to the patients at the same time on the designated days. A session consisted of proper positioning of the patient, heating technique (effleurage) and acupressure application. In order to determine the effectiveness of the sessions, VAS scale for fatigue was applied to the patients 10 minutes after each session (In the 1st, 2nd, 3rd, 4th and 5th follow-ups). In the 5th follow-up of the patients, the COPD and asthma fatigue scales were reapplied.

Applications Performed on the Control Group: The control group did not undergo any interventions other than clinical treatment during the study. In the first follow-up, Patient Information Form, COPD and Asthma Fatigue Scale and VAS Fatigue Scale were applied to the individuals in the control group. VAS fatigue scale was applied in the 2nd, 3rd and 4th follow-ups of patients in the control group. In the 5th follow-up, COPD and Asthma Fatigue Scale and VAS fatigue scale were reapplied.

Data Analysis: The data obtained from the study were analyzed by the SPSS 20 (Statistical Package for the Social Sciences) statistics program. In the analysis of individual characteristics, descriptive tests (percentile, arithmetic mean, standard deviation, min-max) were used, and Mann Whitney U test, Willcoxon and Friedman tests were used to determine the intervention efficiency between the intervention and control groups.

Ethical Principles of the Study: Before starting the study, written consent was obtained from the Erzincan Mengucek Gazi Training and Research Hospital, and an approval was obtained from the Erzurum Ataturk University, Faculty of Health Sciences Ethics Committee.

Results

Table 1 shows the comparison results of the control variables of the patients in the intervention and control groups. Of the patients in the intervention group, 57.5% was male, and 52.5% of the patients in the control group was female. It was determined that 50% of the patients in the intervention and control groups was not illiterate and that the majority of the patients was married (82.5% of intervention, 67.5% of control). It was determined that 47.5% of the patients in the intervention group was retired, and 50% of the patients in the control group was housewives. It was determined that 45% of the patients in the intervention group quit smoking and 50% of the patients in the control group had never smoked before. The mean age of patients in the intervention group was 70.35±8.10, mean disease duration was 9.73±7.09 (years), and the mean age of patients in the control group was 67.48±8.98 and their mean disease duration was 10.50±8.30 (years). Considering the control variables of the patients included in the study, it was determined that there was no statistically significant difference between the groups and two groups were found to be similar in terms of demographic characteristics ($p>0.05$).

Table 2 shows the mean pre- and post-test COPD and Asthma Fatigue Scale scores of patients in the intervention and control groups. The mean pre-test COPD and Asthma Fatigue Scale scores of the intervention and control groups were 74.71±9.53 and 74.58±10.67, respectively. The difference between the pre-test COPD and Asthma Fatigue score averages of the intervention and control groups was not statistically significant ($p>0.05$). The post-test COPD and Asthma Fatigue scores of patients in the intervention and control groups were 39.12±10.85 and 69.04±12.70, respectively. The difference between the post-test COPD and Asthma Fatigue score averages of the intervention and control groups was statistically significant ($p<0.05$).Table 3 shows the intra-group comparison of the pre- and post-test COPD and Asthma Fatigue Scale score averages of the intervention and the control groups. The differences between the intra-group pre- and post-test COPD and Asthma Fatigue Scale scores were statistically significant both in the intervention and the control groups ($p<0.05$).

Table 4 shows the inter-group comparison of VAS fatigue score averages of the patients in the intervention and control groups. The mean VAS fatigue scores of the patients after the first session (VAS 1) were 7.93±0.90 and 8.71±01.36 in the intervention and control groups, respectively, and the scores after the fifth session (VAS 5) were 3.18±1.19 in the intervention group and 7.49 ± 1.47 in the control group. A statistically significant difference was found between the intervention group and the control group in terms of all VAS measurements ($p<0.05$). In all VAS measurements, the mean score of the patients in the intervention group was found to be lower than the patients in the control group.

Table 1. Comparison of Control Variables of the Intervention and Control Groups

		Intervention Group		Control Group		Significance
		n	%	n	%	
Gender	Female	17	42.5	21	52.5	x^2=0.802
	Male	23	57.5	19	47.5	p=0.370
Education status	Illiterate	20	50.0	20	50.0	x^2=1.444 p=0.695
	Primary school	19	47.5	17	42.5	
	Secondary school	1	2.5	2	5.0	
	High School	-	-	1	2.5	
Marital status	Married	33	82.5	27	67.5	x^2=2.400
	Single	7	17.5	13	32.5	p=0.121
Occupation	Housewife	17	42.5	20	50.0	x^2=1.034 p=0.793
	Worker	2	5.0	1	2.5	
	Retired	19	47.5	16	40.0	
	Self-Employed	2	5.0	3	7.5	
Smoking status	Non-smoker	17	42.5	20	50.0	x^2=0.516 p=0.773
	Quit smoking	18	45.0	15	37.5	
	Smoking	5	12.5	5	12.5	
		Intervention Group		**Control Group**		
		X±SD		**X±SD**		
Average Age		70.35±8.10		67.48±8.98		t=1.503 p=0.137
Disease duration (Years)		9.7±7.09		10.50±8.30		U=777.500 p=0.828

Table 2. Inter-Group Comparison of Pre-test and Post-test COPD and Asthma Fatigue Scale Score Averages of the Patients in the Intervention and Control Groups

	n	Min.	Max.	X±SD	Significance
Pre-test					
Intervention Group	40	50	83.33	74.71±9.53	U=780.000
Control Group	40	50	83.33	74.58±10.67	p=0.832
Post-test					
Intervention Group	40	16.67	66.67	39.12±10.85	U=65.000
Control Group	40	50.00	83.33	69.04±12.70	p=0.000

Table 3. Intra-Group Comparison of the Pre- and Post-Test COPD and Asthma Fatigue Scale Score Averages of the Intervention and the Control Groups

Group	n	Pre-test X±SD	Post-test X±SD	Significance*
Intervention	40	74.71±9.53	39.12±10.85	Z=-5.336 p=**0.000**
Control	40	74.58±10.67	69.04±12.70	Z=-3.367 p=0.001

* Wilcoxon test

Table 4. Inter-Group Comparison of VAS Fatigue Score Averages of the Patients in the Intervention and Control Groups According to the Sessions

		n	Min.	Max.	X±SD	Significance
VAS1	Intervention Group	40	5.0	9.0	7.93±0.90	U= 488.000 p=**0.002**
	Control Group	40	5.6	10.0	8.71±01.36	
VAS2	Intervention Group	40	3.5	8.0	6.75±0.89	U= 252.000 p=**0.000**
	Control Group	40	5.6	10.0	8.43±1.35	
VAS3	Intervention Group	40	2.0	8.0	5.62±1.37	U= 178.500 p=**0.000**
	Control Group	40	4.9	10.0	8.11±1.44	
VAS4	Intervention Group	40	1.5	6.5	4.31±1.10	U= 43.500 p=**0.000**
	Control Group	40	4.9	10.0	7.83±1.29	
VAS5	Intervention Group	40	1.0	5.0	3.18±1.19	U= 21.000 p=**0.000**
	Control Group	40	4.0	10.0	7.49±1.47	

Discussion

In the study, pre-test fatigue scores of patients in the intervention and control groups were compared, and pre-test fatigue levels of the patients in both groups were found to be high, with no statistically difference between the groups ($p>0.05$, Table 2). Decreased tissue oxygenation in patients with COPD also causes fatigue, limiting the activity of daily living in individuals. (Paddison, Effing, Quinn & Frith, 2013). Many previous studies have shown that patients with COPD experience fatigue (Wong, Goodridge, Marciniuk & Rennie, 2010; Cicek & Akbayrak,2007; Mollaoglu, Kars Fertelli & Ozkan Tuncay,2011; Polat, 2013; Andersson et al., 2015).

Although the difference between the intra-group fatigue score averages in the intervention and control groups was statistically significant, the decrease in the mean score of the group of the intervention group, which received acupressure application, was higher than the control group ($p<0.05$, Table 3). This result confirms the "**Acupressure is effective in reducing the fatigue level of COPD patients**" hypothesis of the study. The decrease in the average fatigue score of patients in the control group was believed to be related to the treatment they received. Since there was a decrease in fatigue mean scores in both groups, an advanced

analysis was carried out to determine the effect of the acupressure in reducing fatigue alone, and it was found that the effect size of the other factors and acupressure applied in the intervention group was 3.485, and the effect size of the other factors in reducing fatigue in the control group was 0.472. The acupressure applied to the intervention group had much more effect in reducing fatigue.

There are no therapies to treat central fatigue in chronic illnesses. Therefore, among the non-pharmacological approaches, acupressure may have a potential use in these patients (Kilic & Ozcelik,2014). In their study on non-pharmacological nursing interventions used in patients suffering from fatigue, Patterson et al. found that acupressure is used as a nursing intervention in the management of fatigue (Patterson, Wan& Sidani, 2013). The acupressure spots are rich in many somatic receptors. These receptors are stimulated by acupressure and impulses are transmitted to the central nervous system. These stimuli, sent to the central nervous system, cause the increase of neurotransmitters such as serotonin, thus acupressure application becomes effective in reducing fatigue (Eglence Cirpan, 2015).

Since the literature review revealed no study on the effect of acupressure on fatigue level in patients with COPD, the results of the study were discussed with the results of studies investigating the effect of acupressure on fatigue level in different groups of patients.

Studies conducted to determine the effect of acupressure on fatigue level in different patient groups revealed that acupressure application reduced fatigue levels of individuals (Harris, Jeter&Chan,2005; Bastani, Sobhani & Emamzadeh Ghasemi, 2015; Chen Lan et al.,2015; Molassiotis, Sylt &Diggins,2007; Eglence, Karatas&Tasci,2013; Tiwari et al.,2016). In a systematic study by Song et al., investigating the effect of acupressure on symptom management, acupressure was reported to have a positive effect on fatigue levels of patients. The results of this research are similar with the results of previous studies (Song et al.,2015) .

Reducing symptoms such as fatigue, dyspnea and cough in patients with COPD, increasing exercise tolerance and decreasing restrictions increases their quality of life. Increasing the quality of life of the individual is one of the main objectives of treatment of chronic diseases (Karakoc Kumsar&Taskin Yilmaz,2014). Maa et al. found that acupressure application increased the quality of life of patients (Maa et al., 2003).

When the VAS fatigue score averages were compared between the groups of the patients in the intervention and control groups, it was found that the difference in score averages between the two groups was statistically significant and the decrease in the fatigue score average of the intervention group was higher than the control group ($p<=0.05$, Table 4). After each session, there was a reduction in mean fatigue VAS scores. This result shows that acupressure is effective in reducing fatigue in patients with COPD. It is believed that the reason for the decrease in the average fatigue scores of the patients in the acupressure group may depend on the systemic effects of acupressure as well as the treatment they receive, the distraction they experienced and support given to them. The reason for the reduction in the average fatigue score of patients in the control group may be due to the treatment they received and communication with other patients. It has also been found in previous studies that the symptoms improve with increasing number of acupressure sessions (Ceyhan, 2012; Genc &Tan,2014).

Conclusion

The results of study conducted to determine the effect of acupressure on the fatigue level of patients with COPD are as follows:

Acupressure applied manually to St 36, Li 4, Lu 1, and Lu 7 spots was effective in reducing fatigue in patients with COPD,

The fatigue levels of the patients were found to reduce significantly as the number of sessions applied increases.

Recommendations

As one of the non-pharmacological methods, wider acupressure application may be recommended in conjunction with pharmacological methods in reducing the level of fatigue in patients with COPD. It may also be advisable to conduct studies in a larger sample size with frequent follow-up intervals to support the research results.

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