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Evaluation of Dyspnea and Fatigue Among the COPD Patients

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1. Introduction

Chronic diseases are diseases of long duration and generally slow progression. Chronic diseases, such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are by far the leading cause of mortality in the world, representing 63% of all deaths (World Health Organization(WHO), 2010a). Rapid improvements in health and longevity are dramatically changing the burden of illness throughout the world. In developed countries changes in lifestyle and improvements in the treatment of major causes of mortality have aged the population and increased the prevalence of chronic diseases. Poor countries that have achieved gains in life expectancy are also experiencing an increase in chronic disease (Davis et al.,1999). According to Centers for Disease Control and Prevention (CDC) more than 1.7 million Americans die of a chronic disease in 2005. Chronic disabling conditions cause major limitations in activity for more than one of every 10 Americans, or 25 million people (CDC, 2005). In Turkey, chronic diseases accounted for 79% of all deaths in 2002(WHO, 2010b). Notification to national reports, 305.467 dies of total 430.459 was related to chronic diseases in Turkey (Turkey Health Ministry National Burden of Illness Report 2004).

Chronic obstructive pulmonary disease (COPD) is one of the important chronic diseases. COPD is characterized by airflow obstruction with related symptoms such as chronic cough, exertion dyspnea, expectoration, and wheeze. (Edelman et al., 1992; Mannino, 2003). COPD is a highly prevalent, usually progressive illness associated with disability and early death (WHO, 2008). COPD is a major cause of chronic morbidity and mortality throughout the world. It is a growing cause of morbidity and mortality worldwide (Mannino, 2003; Mannino & Braman, 2007; Tatlıcioğlu, 2000). According to the World Health Organization, 80 million people worldwide have moderate to severe COPD. More than 3 million people died of COPD in 2005, which is approximately 5% of all deaths worldwide (WHO, 2008). COPD is currently the fifth leading cause of death and disease burden globally (O'Donnell et al., 2008). In the Turkey, COPD is the third leading cause of death. Although there has been significant decrease in other mortality causes; there has been an increase by 163 % in COPD mortality (Turkish Thorasic Society, 2010). COPD will be third leading cause of death globally by 2020(WHO, 2008). COPD is the tenth leading disease burden, expressed in disability-adjusted life-years (DALYs), and causes about 2% of the burden of disease

worldwide. Overall, COPD was estimated to have resulted in more than 26 million DALYs in 2000 (Lopez et al., 2006).

COPD characterised by progressive airflow obstruction which is mainly irreversible. COPD is associated with significant comorbidities and extrapulmonary manifestations (Baghai-Ravary et al., 2009). Living with COPD can be challenging, as the disease dramatically impacts patients' daily life. When disease symptoms especially dyspnea affects the performance of daily activities, the potential exist for important changes to occur in individual's overall quality of life (Meek et al., 2001). COPD is associated with increased risk for anxiety, depression, and other mental health disorders (Dowson et al., 2004; Singer et al., 2001). Psychiatric disorders are at least three times higher in COPD patients compared to the general population (Laurin et al., 2007). As the disease progresses, any kind of physical activity or social interaction may prove difficult. COPD is a significant disease which affects the individual physically, emotionally, and socially and leads to an increase in the social support needs of the patients (Aras & Tel, 2009).

Dyspnea and fatigue are occurred many chronic disease. COPD, congestive heart failure, and fluid build-up in renal failure can cause dyspnea. (Ramasamy et al., 2006). Fatigue is almost a universal complaint in patients with autoimmune deficiency syndrome (AIDS), congestive heart failure, myocardial infarction, and progressive neurologic disorders such as multiple sclerosis, and autoimmune diseases such as rheumatoid arthritis, and dialysis patients receiving either hemodialysis or peritoneal dialysis, and cancer (Appels & Mulder, 1988; Brunier & Graydon, 1996; O'Brain & Pfeifer, 1993; Tel et al., 2011).

Dyspnea and fatigue are the two most common symptoms experienced by patients with COPD (Meek & Lareau, 2003; Oh et al., 2004; Tel, 1998). The most important complaint of patients with COPD is dyspnea. Dyspnea is identified as a perception or observation of abnormal and disturbing sensation of breathing. Dyspnea is the perception and experience of labored, uncomfortable breathing, and may produce secondary physiological, emotional, cognitive, and behavioral responses (American Thoracic Society, 1999).

Another accompanying important symptom of dyspnea is fatigue in COPD. Fatigue is an unpleasant subjective symptom that prevents individuals from performing his functions and using his normal capacity, affects whole body and changes from a slight exhaustion to unbearable fatigue (Swain, 2000). Fatigue is poorly understood and believed to have a significant subjective component strongly associated with dyspnea, although the nature of the relationship remains unclear. Fatigue has been defined as "the multidimensional sensation of tiredness that the individual experiences when perceiving the reduced capacity to function normally" and it often varies with respect to daily pattern, triggers or contributing factors, and responsiveness to interventions (Kapella et al., 2006). In contrast with a prevalence rate of 18.3%–25% in the general population (Lewko et al., 2009; Pawlikowska et al., 1994) fatigue is "almost always" experienced by 43%–58% of persons with COPD (Kinsman et al., 1983; Walke et al., 2007).

Fatigue was reported by patients with COPD as the second most important symptom of COPD, after dyspnea (Blinderman et al., 2009; Janson-Bjerklie et al., 1986; Walke et al., 2007). Peters et al. (2010) found that fifty percent of patients with COPD had abnormal fatigue. Guyatt et al. (1987) report that fatigue ranks second to dyspnea as a symptom contributor to decreased quality of life in COPD patients.

Dyspnea and fatigue are a subjective experiences that can only be measured from the patient's perceptions, because every person have different thresholds for noticing, reporting, and rating the severity of these symptoms (Victorson et al., 2009). In several studies were found out that there is a significant correlation between dyspnea, fatigue and physical activity and that fatigue levels increase when dyspnea intensifies and physical activity levels reduce (Breslin et al., 1998; Theander & Unosson, 2004; Woo, 2000a). Individuals with COPD undergo a high amount of activity restriction and dependency due to dyspnea or fatigue or both symptoms (Akbal, 2003; Woo, 2000b; Yildirim, 2006). McCarley (2003) explored that there was a moderate correlation between dyspnea and fatigue experienced by the patients with COPD. Reishtein (2005) reported that there was a moderately negative correlation between dyspnea, fatigue and functional capacity among COPD patients. It is reported that there is a complicated correlation in COPD between fatigue and other disease-related symptoms such as dyspnea, anxiety, depressed emotions and sleep quality (Kapella et al. 2006). Breslin et al. (1998) suggested that physical dimensions of fatigue correlated with an increase in the severity of pulmonary impairment and reduction in exercise tolerance.

1.1 Assessment of dyspnea and fatigue

Because dyspnea and fatigue are subjective symptoms, they are assessed through the use of standardized symptom reports or questionnaires (Guyatt et al., 1993; Victorson et al., 2009). Implementation of many interventions to patients with COPD, measurement and evaluation of dyspnea and fatigue is very important part of this patients care. The two purposes of measuring dyspnea are to differentiate between patients who have less dyspnea and those who have more dyspnea (discriminate), and to determine whether dyspnea has changed over time and/or as a result of treatment (evaluate) (Mahler, 2006). For the most part, questionnaires used to measure dyspnea as an outcome of pulmonary rehabilitation are evaluative instruments and each of this instruments measure different aspect of dyspnea (Meek & Lareau, 2003; Meek, 2004).

The Medical Research Council Scale (MRC); The MRC categorizes the individual based on whether dyspnea is associated with specific tasks and situations (ATS, 1999; Meek, 2004). Patients are assigned to one of five grades, based on their difficulty with mobility, from Grade 1, "never troubled by breathlessness except on strenuous activity," to Grade 5, "too breathless to leave the house or breathless after undressing." The MRC does not uniquely measure dyspnea, since the level of dyspnea is evaluated related to activities. The MRC, is easy to administer and is useful for general screening and categorizing of patients (ATS, 1999; Mahler, 2006).

The Oxygen Cost Diagram (OCD); This scale was developed in an effort to match a range of tasks with the occurrence of dyspnea (ATS, 1999). The OCD is a 100-mm vertical visual analog scale with 13 activities listed at various points along the line corresponding to increasing oxygen requirements for their completion, ranging from sleeping (at the bottom) to brisk walking uphill (at the top) (McGavin et al., 1978).

The Baseline Dyspnea Index(BDI); BDI is a rater evaluation of dyspnea associated with activities (Mahler et al., 1984). The rating includes the magnitude of the task and the effort required to perform the task. Each category is rated on a 0 to 4 grade and summated for a total score. The BDI also has a transitional score, the transitional dyspnea index (TDI), that measures the change in dyspnea associated with activities following an intervention. (Foglio

et al., 1999; Meek & Lareau, 2003). The most widely used multidimensional instruments include the Baseline (BDI) and Transition (TDI) Dyspnea Indices, which consider three components (functional impairment, magnitude of task, and magnitude of effort) (ATS, 1999; Mahler et al., 1984).

The University Of San Diego Shortness Of Breath Questionnaire (SOBQ); The University of San Diego Shortness Of Breath Questionnaire (SOBQ) is a 24-item measure that assesses self-reported shortness of breath while performing a variety of activities of daily living (Eakin et al., 1998). Patients are asked to rate their dyspnea associated with the 21 different activity, from 0 = "not at all" to 5 = "maximally or unable to do because of breathlessness." Three additional questions about limitations due to shortness of breath, fear of harm from overexertion, and fear of shortness of breath are included for a total of 24 items. [Eakin et al 1998; Ries et al., 1995).

The Borg Scale; The Borg scale a category-ratio scale, is commonly used to evaluate the effects of exercise on dyspnea. The original and modified scales have ratio properties ranging from 0 = nothing at all to 10 = very, very severe, with descriptors from 0 to 10. The Borg scale has been used in pulmonary rehabilitation programs to evaluate dyspnea before, during, and after progressive exercise (Foglio et al., 1999).

The Visual Analog Scale (VAS); The VAS is usually a 100 mm line anchored at either end with descriptors, such as "none" to "very severe." When used to measure dyspnea, these anchors are qualified to read "no shortness of breath" to "maximum shortness of breath," or some similar variation (Gift, 1989). The VAS can be used to quantify a number of aspects of symptoms besides the sensation of dyspnea, such as effort and distress with dyspnea. The visual analogic scales and the Borg scale are the simplest tools available; both are completed by the patient, and allow a follow-up of the impact of treatment on dyspnea (Janssens et al., 2000).

The Chronic Respiratory Questionnaire (CRQ); The Chronic Respiratory Questionnaire (CRQ), a 20-item, disease-specific, quality-of-life questionnaire (ATS, 1999; Guyatt et al., 1987), has been used extensively in pulmonary rehabilitation settings. The CRQ consists of four domains (dyspnea, fatigue, emotional function, and mastery), rated on a seven-point scale. The dyspnea component of the CRQ asks patients to identify five activities of importance to them. These same activities are rated with 1 = most dyspnea and 7 = least dyspnea, before and after a pulmonary rehabilitation program. (Meek, 2004). The CRQ has a fatigue subscale consisting of five items, scored on a 7-point scale. The CRQ fatigue domain is reliable, valid with the same clinically important differences as the other components. To determine the outcomes of pulmonary rehabilitation, it is safe to say that the CRQ is the most widely used and tested instrument that measures both dyspnea and fatigue (Meek & Lareau, 2003).

The Pulmonary Functional Status Scale (PFSS); The Pulmonary Functional Status Scale (PFSS) is a 53-item, self-administered questionnaire measuring physical, mental, and social function. The dyspnea subscale evaluates dyspnea related to activities, as well as dyspnea independent of activities (Weaver et al., 1998).

The Pulmonary Functional Status And Dyspnea Questionnaire (PFSDQ); The Pulmonary Functional Status And Dyspnea Questionnaire (PFSDQ) is a 164-item, self-administered questionnaire that evaluates dyspnea and activity levels. The pulmonary functional status

and dyspnea questionnaire-modified version (PFSDQ-M), measure dyspnea, fatigue, and activity levels (Lareau et al.,1994). PFSDQ-M has been used to measure fatigue in COPD patients (Meek et al. 2001). The PFSDQ-M comprises three domains: influence of dyspnea on ADLs, influence of fatigue on ADLs and change experienced by the patient in ADLs. The patient reports to what degree dyspnea and fatigue affect 10 specific ADL items, assigning a score from 0 to 10 for each activity as follows: 0 (no interference); 1-3 (mild); 4-6 (moderate); 7-9 (severe); and 10 (extremely severe). Higher values on the scale indicate greater ADL limitation. The five general questions in the dyspnea and fatigue domains are informative and qualitative, and the answers are not calculated in the questionnaire score (Lareau et al.,1998).

The St George's Respiratory Questionnaire (SGRQ); The Saint George Respiratory Questionnaire (SGRQ) is the best-known and most frequently used disease-specific health related quality of life (HRQL) questionnaire for respiratory diseases (ATS,1999; Jones et al.,1992). The SGRQ is a standardized, self-administered questionnaire for measuring impaired health and perceived HRQL in airways disease. It contains 50 items, divided into three domains: Symptoms, Activity and Impacts. A score is calculated for each domain and a total score, including all items, is also calculated. Each item has an empirically derived weight. Low scores indicate a better HRQL(Jones et al.,1992; Ståhl et al. 2005).

Multidimensional Fatigue Inventory (MFI); The MFI consists of 5 subscales: general fatigue; physical fatigue; reduced activity; reduced motivation; and mental fatigue. Each subscale has 4 items with a 5-point Likert scale (1 -no, that is not true, 5 - Yes, that is true), thus the total score for each subscale ranges from 4 to 20. The overall score of fatigue is calculated by adding all subscales, so that the overall score ranges from 20 to 100. A higher score implies more severe fatigue (Breslin et al., 1998; Lewko et al 2009; Meek & Lareau, 2003; Oh et al., 2004).

The Profile Of Mood States (POMS); POMS is a broader measure that has been used in investigations of individuals with COPD (Janson-Bjerklie et al., 1986; Woo,2000b). The POMS is a 30-item questionnaire composed of 6 subscales (tension/anxiety, depression/dejection, anger/hostility, vigor/activity, confusion/bewilderment, and fatigue/inertia); the POMS-F subscale consists of 7 items. Subjects are asked to indicate the degree or intensity of feelings in the past few days on a 5-point Likert scale (0 = not at all to 4 = extremely). The POMS-F presents another possible way to measure fatigue in the COPD population (Meek, 2004).

The Multidimensional Assessment Of Fatigue (MAF); MAF (16 items) was originally designed for arthritis patients (Belza, 1993;Tack, 1990), It has been used in cancer patients (Meek et al., 2001) and with chronic pulmonary disease (Belza et al., 2001). The MAF surveys four dimensions: severity, measured by items 1 and 2; distress, item 3; degree of interference in activities of daily living, items 4 through 14; and, finally, timing (frequency of occurrence and changeability), items 15 and 16 (Belza, 1993; Tack, 1990).

1.2 COPD and pulmonary rehabilitation

Dyspnea and fatigue are closely related symptoms in chronic lung disease that are consistently encountered in the clinical setting. Pulmonary rehabilitation is an essential, basic component of an integrated approach to managing chronic lung disease (Nield, 2003).

When disease' symptoms affect the patient's performance of daily activities, the potential exists for overall quality of life to be decreased. If these symptoms continue to limit daily activities and the intensity of the symptom increases, patients to become deconditioned. This results in an interrelationship of symptoms affecting activities, and vice versa, often referred to as the "dyspnea spiral" or cycle of deconditioning. Pulmonary rehabilitation is one of the few interventions believed to break this cycle of progressive symptoms limiting activities (ATS,1999). Most patients are referred for pulmonary rehabilitation in order to improve the symptom of dyspnea. Nevertheless, patients with high fatigue derive significant benefit from pulmonary rehabilitation. Research of Baltzan et al. (2011) has shown that high levels of fatigue are common in patients entering pulmonary rehabilitation. Fatigued patients benefit from pulmonary rehabilitation, with improved exercise performance as well as improved health status. Lacasse et al. (2006) concluded that rehabilitation relieves dyspnea and fatigue, improves emotional function and enhances patients' sense of control over their condition. The primary measurable benefits of pulmonary rehabilitation to date have been a decrease in symptoms, and an increase in exercise endurance. A pulmonary rehabilitation program is to assess and treat activity limitations associated with symptoms of COPD including dyspnea in order to maximize patients' ability to participate in activities of daily living, leisure, and vocational pursuits (Migliore, 2004). Dyspnea and fatigue are important symptoms associated with COPD that improve with pulmonary rehabilitation (Meek &Lareau, 2003).

Fatigue and dyspnea are important symptoms requiring evaluation and management in patients with COPD. Nurses perform crucial responsibilities for supporting coping-skills against dyspnea and fatigue complaints of COPD patients. Investigating the correlation between dyspnea and fatigue will contribute to coping behaviors against dyspnea and fatigue and the quality of life of the patients. Because of the high prevalence of this symptom and the severity of suffering that can be associated with it, clinicians need to become familiar with available methods for the alleviation of dyspnea.

2. Aim

The present research was conducted in order to investigate dyspnea, fatigue-experience and the correlation between dyspnea and fatigue.

3. Material and methods

The research was consisted of COPD patients who were ambulatory examined and checked at the pulmonary clinics of a state hospital between February and June 2009. The sample of the research was made up by 300 patients with COPD who accepted to participate. Participants were selected according to the following criteria; had been diagnosed of COPD, aged 18 years or older, understand, and communicate in Turkish, did not have any communicational and psychiatric problems. Written approvals from the hospital and oral consents from the patients were obtained. The data of the research were collected using face to face interview technique, personal information form, Medical Research Council Dyspnea Scale (MRC) and Brief Fatigue Inventory (BFI).

Data were entered into SPSS software (v. 14.0; SPSS Inc.,Chicago, IL) and recoded as required according to the questionnaires' scoring instructions. The data analysis was

performed through percentage distribution, ANOVA, t test and Pearson's Correlation Analysis and $p \leq 0.05$ was accepted as statistically significant.

3.1. Personal information form

Personal information form includes sociodemographic characteristics such as age, gender, marital status, educational level and disease characteristics such as disease length, disease severity, health condition, repeated hospitalization. COPD severity was defined by The GOLD criteria classify COPD into four stages (ATS, 1991; GOLD, 2006).

3.2 The Medical Research Council (MRC) dyspnea scale

Dyspnea perception during daily activities was measured using the MRC dyspnea scale. Modified MRC chronic dyspnea self-administered questionnaire consisting of five questions about perceived breathlessness. Grade 1, "never troubled by breathlessness except on strenuous activity," to Grade 5, "too breathless to leave the house or breathless after undressing (Bestall et al., 1999; Stenton, 2008).

3.3 The Brief Fatigue Inventory (BFI)

The BFI was used to assess the severity of fatigue and the amount of interference with function caused by fatigue in this study. The BFI has 9 items that were designed to provide a measure of fatigue. Three items in the BFI ask patients to rate their fatigue during the past 24 hours at its "worst," "usual" or "average," and "now," with "0" being "no fatigue," and "10" being "fatigue as bad as you can imagine." Additional items assess how much fatigue has interfered with different aspects of the patient's life during the past 24 hours. The interference items included in the present study were mood, daily activity, walking ability, eating, relations with other people and enjoyment of life. Each interference item is scored on an eleven point rating scale from "0" (does not interfere) to "10" (completely interferes). A mean BFI score is calculated as the mean of the intensity and interference items (Çınar & Olgun, 2010).

4. Results

It was found out that mean age of the patients was 66.03 years (SD= 11.33), 50.7 % was male, 58.7% belonged to ≥ 65 age group, 72.0% was married, 49.7% was illiterate, 46.3 % was housewives, 27.9% was retired, 74.3% had a moderate income level. It was explored that 30.7% of the patients had the disease for ≥ 12 years (disease length ≥ 12 years), 38.6% moderate COPD, 77.3% was repeatedly hospitalized and 89.3% said to use their medications regularly and 47.0% identified their health condition as bad.

Table 1 demonstrates dyspnea severity and fatigue-experience of the patients. All of the patients said to have dyspnea and the analysis made using MRC dyspnea scale revealed that 73.3% of the patients had severe dyspnea. 99.3% of the patient told to experience fatigue. It was explored that 49.0% of the patients had always fatigue experience.

Their total fatigue score' mean was 60.36 ± 20.57 , mean score of activities of affected by fatigue was 40.22 ± 14.37 , and MRC dyspnea mean score was 3.59 ± 1.31 .

Characteristics	n (%)
Dyspnea Complaint	
Mild	12(4.0)
Moderate	68(22.7)
Severe	220(73.3)
Fatigue Complaint	
Yes	298(99.3)
No	2(0.7)
Frequency Of Fatigue Experience	
Sometimes	60(20.0)
Often	93(31.0)
Always	147(49.0)

Table 1. Dyspnea severity and fatigue experience of the patients

It was concluded in our research that there was a positive correlation between dyspnea and fatigue ($r=0.636$, $p<0.01$) and as dyspnea scores increased so did mean fatigue scores. Also, there was a significant negative correlation between the measured FEV₁ values of the patients and dyspnea scores ($r=-.341$ $p<0.01$) and fatigue scores ($r=-.260$ $p<0.01$).

Table 2 demonstrates mean scores of dyspnea, fatigue levels and levels of the daily activities affected by fatigue according to some socio demographic and disease characteristics.

It was explored that there was not any statistically significant difference between fatigue levels, levels of the daily activities affected by fatigue and dyspnea scores in terms of age and sex($p>0.05$). It was found out that there was statistically significant difference between fatigue level and levels of the daily activities affected by fatigue and disease length (year) ($p<0.05$).

It was found out that there was statistically significant difference between fatigue level and levels of the daily activities affected by fatigue and dyspnea according disease severity, the number of repeated hospitalization, patients’ perception about their health condition and frequency of fatigue-experience. High fatigue score and score of the daily activities affected by fatigue were presented by those who had the disease for ≥ 12 years. High fatigue score and score of the daily activities affected by fatigue and dyspnea score were presented by who fourth stage of COPD, who were repeatedly, had hospitalized for ≥ 4 times a year and who identified their own health condition as very bad and frequency of fatigue as always.

5. Discussion

Chronic obstructive pulmonay disease is characterised by significant physical and psychosocial challanges. Dyspnea and fatigue are the two most common symptoms experienced by patients with COPD (Blinderman et al., 2009; Gift & Shepard, 1999; Kinsman et al., 1983). Dyspnea is predominantly related to a reduction in vital capacity of lungs. Dyspnea is the most commonly experienced complaint of the COPD patients (Rabe et al., 2006; Tel & Akdemir, 1998; Wong et al., 2010). Fatigue may be affected by dyspnea and is frequently told by the patients (Janson-Bjerklie et al., 1986; Reishtein 2005). Wong et al.(2010) found that fatigue was experienced by almost all participants with COPD. Çınar and Olgun (2010) were reported that 97% of patients with COPD experienced high levels of fatigue. The

Characteristics	Mean Scores		
	Fatigue X ± SD	Activities affected by fatigue X ± SD	Dyspnea X ± SD
Age			
≤ 44	51.93±22.22	35.60±13.17	2.73±1.48
45-64	58.30±22.15	38.60±15.68	3.38±1.34
65+	62.35±19.18	41.61±13.49	3.79±1.23
F, p	2.66 >0.05	2.30 >0.05	6.89 >0.05
Gender			
Female	61.72±20.00	41.00±14.17	3.64±1.29
Male	59.03±21.09	39.46±14.58	3.54±1.33
t, p	0.156 >0.05	0.001 >0.05	0.828 >0.05
Disease Length			
1-3 Years	53.05±22.81	35.23±16.20	3.29±1.36
4-7 Years	59.57±19.61	40.61±13.44	3.46±1.35
8-11Years	62.77±17.46	42.00±12.01	3.90±1.28
12+ Years	66.51±18.57	43.77±13.21	3.76±1.20
F, p	7.358 <0.05	6.187 <0.05	3.493 >0.05
Disease Severity			
Stage I(Mild)	52.58±21.65	54.46±15.28	2.96±1.28
Stage II Moderate)	56.30±21.25	37.64±14.75	3.26±1.27
StageIII(Severe)	67.21±17.22	44.97±12.19	4.14±1.13
Stage IV(Very severe)	69.78±15.60	46.43±10.43	4.34±1.11
F, p	10.615 <0.05	10.413 <0.05	17.928 <0.05
Repeated Hospitalization			
No	52.29±23.52	34.57±16.26	3.11±1.37
Once	55.76±19.89	36.63±14.05	3.22±1.24
Twice	61.31±21.28	40.96±14.60	3.82±1.23
Three times	67.77±15.82	45.40±11.03	3.97±1.15
Four times and more	71.42±11.41	48.40±7.92	4.22±1.17
F, p	9.695 <0.01	10.631 <0.01	8.931 <0.01
Health Condition			
Good	47.00±23.35	32.96±16.48	3.04±1.33
Normal	58.39±21.27	38.19±15.02	3.45±1.29
Bad	62.02±18.90	40.91±13.49	3.63±1.31
Very Bad	76.60±9.50	50.25±6.52	4.86±0.52
F, p	8.986 <0.01	5.953 <0.01	8.054 <0.01
Frequency Of Fatigue Experience			
Sometimes	46.50±23.90	31.58±16.61	2.93±1.36
Often	57.31±17.58	37.45±12.25	3.16±1.20
Always	67.95±17.27	45.49±12.39	4.13±1.13
F, p	29.305 <0.01	26.231 <0.01	2.864 <0.01

Table 2. Mean scores of dyspnea, fatigue levels and levels of the daily activities affected by fatigue accoding to some characteristics

rates of the patients who experienced dyspnea and fatigue were higher in our study too; which concurred with literature.

Reishtein (2005) found out that means scores for dyspnea and fatigue were moderately high in patients with COPD. In this study, it was found that the mean scores of fatigue and dyspnea of the participant patients were high.

It was explored that there was not any statistically significant difference between fatigue levels, levels of the daily activities affected by fatigue and dyspnea scores in terms of age and sex. Kapella et al. (2006) reported that fatigue complaint was significantly correlated with age. Skumlien et al. (2006) reported that 82% of the women and 70% of the men had dyspnea complaint and there was not any difference among the sex in terms of dyspnea number and dyspnea scores. Gift and Shepard (1999) reported that men and women did not differ in their level of fatigue. Oh et al. (2004) and Kapella et al. (2006), reported that there were small differences between women and men; however, these difference were not statistically significant. It was observed in our research that although the dyspnea scores and fatigue scores of the women were higher than those of men, it was statistically insignificant.

High fatigue score and score of the daily activities affected by fatigue were presented by those who had the disease for ≥ 12 years. High fatigue score and score of the daily activities affected by fatigue and dyspnea score were presented by who fourth stage of COPD, who were repeatedly, had hospitalized for ≥ 4 times a year and who identified their own health condition as very bad and frequency of fatigue as always. Several studies show that fatigue is a common symptom in COPD and it has been associated with reduced health status and dyspnea (Breslin et al., 1998; Guyatt et al., 1987). We were found out that dyspnea and fatigue scores were higher in patients which health status is very bad. This result was statically significant. Hospitalization rates in the patients with COPD are high, and increase with age. Baghai-Ravary et al (2009) suggested that increased fatigue was related to dyspnea, exacerbation frequency, health status and time spent outdoors. In this study, we found that the hospitalization rates in the patients with COPD were high and these patients' dyspnea and fatigue scores were also high.

Baghai-Ravary et al.(2009) and Wong et al.(2010) explored that they did not find a correlation between severity of COPD and fatigue. Breslin et al.(1998) reported that physical dimensions of fatigue correlated with an increase in the severity of pulmonary impairment and reduction in exercise tolerance. In this study we found that fatigue score was higher in patients with very severe COPD. These data show a relationship between fatigue and pulmonary function in COPD.

Previous studies have noted significant relationships between dyspnea and fatigue (Baghai-Ravary et al., 2009; Janson-Bjerklie et al., 1986; Kinsman et al., 1983; Peters et al., 2010, Reishtein, 2005; Theander et al., 2009). As in earlier studies, we found correlations between fatigue and dyspnea. It was concluded in our research that there was a positive correlation between dyspnea and fatigue ($r=0.636$, $p<0.01$) and as dyspnea scores increased so did mean fatigue scores. This result is consistent with previous research reports. Also, there was a significant negative correlation between the measured FEV₁ values of the patients and dyspnea scores ($r=-.341$ $p<0.01$) and fatigue scores ($r=-.260$ $p<0.01$). McCarley (2003) discovered that there was moderately significant correlation between dyspnea and fatigue

experienced COPD patients whereas Kapella et al. (2006) reported that there was significant correlation between dyspnea and fatigue scores among the COPD patients. Reishtein (2005) reported that there was moderately negative correlation between dyspnea and fatigue and functional lung capacity among the COPD patients. Baghai-Ravary et al.(2009) found that fatigue was related to change in FEV₁. Breslin et al.(1998) found that there was a significant negative correlation between general and physical fatigue and predicted FEV₁ values and that physical aspect of fatigue was associated with the severity of pulmonary deterioration. In the light of these findings, patients undergo dyspnea and fatigue more as lung capacity decreases.

6. Conclusion

According to the results of the present research which was conducted in order to investigate dyspnea, fatigue-experience and the correlation between dyspnea and fatigue; all of the patients experienced dyspnea and almost all of them had fatigue. Mean scores of fatigue and dyspnea of the women were higher than those of men. Dyspnea severity and fatigue was more intensified among those who belonged to ≥ 65 age group, who had the disease for ≥ 12 years, who had fourth stage of COPD, who were repeatedly hospitalized and fatigue scores increased as dyspnea severity increased and there was significant negative correlation between FEV₁ values and dyspnea and fatigue scores. As a result, it was recommended that nurses who care COPD patients should assess dyspnea and fatigue-situations and the complaint severity of the patients using scales; should plan and practice the appropriate nursing interventions considering the linear correlation between dyspnea and fatigue; should perform personal care plans for those COPD patients who belonged to ≥ 65 age group, who had longer disease length, who had advanced stage of COPD, who were repeatedly hospitalized due to the fact that the rates of severe dyspnea and fatigue were higher. Dyspnea and fatigue should be evaluated in usual care with a questionnaire that corrects for them in order to tailor treatment to patients' need. Dyspnea and fatigue is an important symptom requiring evaluation and management in patients with COPD.

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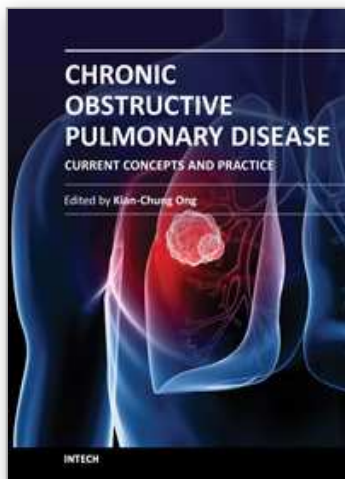
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A decade or so ago, many clinicians were described as having an unnecessarily 'nihilistic' view of COPD. This has certainly changed over the years... This open access book on COPD provides a platform for scientists and clinicians from around the world to present their knowledge of the disease and up-to-date scientific findings, and avails the reader to a multitude of topics: from recent discoveries in the basic sciences to state-of-the-art interventions on COPD. Management of patients with COPD challenges the whole gamut of Respiratory Medicine - necessarily pushing frontiers in pulmonary function (and exercise) testing, radiologic imaging, pharmaceuticals, chest physiotherapy, intensive care with respiratory therapy, bronchology and thoracic surgery. In addition, multi-disciplinary inputs from other specialty fields such as cardiology, neuro-psychiatry, geriatric medicine and palliative care are often necessary for the comprehensive management of COPD. The recent progress and a multi-disciplinary approach in dealing with COPD certainly bode well for the future. Nonetheless, the final goal and ultimate outcome is in improving the health status and survival of patients with COPD.

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