Research Article

Evaluation of Physical Activity, Kinesiophobia, Daily Life Activities and Quality of Life in Individuals with Chronic Obstructive Pulmonary Disease in Different Phenotypes

Alp Özel[1], Eylem Tütün Yümin[1], Tuncer Tuğ[2], Suat Konuk[2*]

[1]School of Physical Therapy and Rehabilitation, Bolu Abant Izzet Baysal University, Turkey
[2]Department of Chest Diseases, Bolu Abant Izzet Baysal University, Turkey

*Corresponding Author: Suat Konuk, Department of Chest Diseases, Bolu Abant Izzet Baysal University, Bolu 14030, Turkey, E-mail: suatkonukk@windowslive.com

Abstract

Objectives: This study was planned to evaluate physical activity, kinesiophobia, activities of daily life and quality of life in individuals with Chronic Obstructive Pulmonary Disease (COPD) in different phenotypes.

Methods: A total of 163 individuals was included in the study. Individuals were divided into 4 groups according to respiratory distress and a control group was formed. Individual dyspnea levels were assessed with the Modified Medical Research Council Dyspnea Scale, physical activity levels with the International Physical Activity Questionnaire, kinesiophobia with the TAMPA Kinesiophobia Scale, and daily activities were assessed by the London Daily Life Chest Activity Scale. The quality of life was assessed by the Nottingham Health Profile and by the St. George's Respiratory Questionnaire.

The results: Physical activity score was the lowest in group D ($p<0.05$). The mean score of kinesophobia was highest in group D, the lowest in the control group ($p<0.05$), and there was no difference between group A, group B and group C ($p>0.05$). SGRQ(Symptoms) score was higher in group C and group D, lowest in the control group ($p<0.05$).

Conclusions: Individuals with COPD with different phenotypes have different physical activity and kinesophobia values. Symptoms of disease increased, dyspnea and kinesophobia findings increased and quality of life decreased.

1. Introduction

Chronic obstructive pulmonary disease (COPD) is a common chronic disease and the most common cause of respiratory failure [1]. Due to the slow progression and the chronic nature of the disease, the individual experiences an increased burden of disease [2]. As COPD causes progressive airway obstruction and dyspnea, the level of daily activity is restricted and there is a gradual deterioration in the level of functional performance [3]. When the dyspnea is acute and severe, it causes emotional stress, which prevents any activity (such as hobbies that require physical effort) that would increase the symptoms of the individuals. The physical activity level of patients with a more sedentary lifestyle is decreasing steadily for fear of dyspnea and the low physical activity level severely affects the emotional, social, behavioral, self-care, mobility, sleep and rest functions of individuals with COPD [4, 5]. Another important symptom of COPD is a pain. Previous studies have reported that in individuals with COPD, pain affects physical activity, anxiety, and depression [6, 7]. Pain affects individuals with COPD 3.7 times more in daily activities than healthy people [8]. Studies of kinesiophobia as a cause of physical activity avoidable in individuals with COPD with differing severity of respiratory symptoms is limited [9-11]. The relationship of kinesiophobia in different phenotypes of COPD has not been investigated. For this reason, our study was planned to "Evaluate physical activity, kinesiophobia, daily living activities and quality of life in individuals with COPD in different phenotypes".

2. Materials and Methods

A cross-sectional study was carried out at The Bolu Abant Izzet Baysal University, Training and Research Hospital, Chest Diseases Service. The study was approved by the Bolu Abant Izzet Baysal University Clinical Researches Ethics Committee with the protocol number 2016/43, patients and healthy subjects who decided to participate in the study signed an informed consent form. The inclusion criteria were as follows: being a volunteer to participate in the study, being diagnosed with COPD by a chest physician. Exclusion criteria were as follows: having any serious medical condition (i.e. Arrhythmia or other heart problems), having undergone surgery which would prevent physical activity in the recent past.

2.1 Subjects

A total of 163 individuals was included in the study. 118 of the subjects included in the study had COPD and the other 45 were asymptomatic. Individuals with COPD who participated in the study were classified according to the criteria established by GOLD [12]. Group A (n=11) had low risk, few symptoms; Group B (n=26) had low risk, multiple symptoms; Group C (n=32) high risk, less symptom; D group (n=49) was formed from high risk, multiple symptomatic patients and a control group (n=45).

2.2 Measurements

Data were collected via face-to-face interviews with researchers. Within the scope of the present study, demographic information such as age, height, weight, body mass index (BMI), marital status and educational status was questioned. Dyspnea levels of subjects were evaluated using the modified Medical Research Council dyspnea scale (m MRC). This is a categorical scale ranging from 0 to 4, where patients choose the statement that best describes their dyspnea level from five choices [13]. The pain Visual Analog Scale (VAS) is a unidimensional measure of pain intensity, which has been widely used in diverse adult populations. VAS is a horizontal straight line, ranging from 0 (no symptom) to 10 cm (maximum severity) [14].

The International Physical Activity Questionnaire (IPAQ), short version allows an estimate of time spent per week on different physical activities, in order to classify individuals as sedentary, irregularly active (A or B), active, or very active. For the purpose of analysis, this classification was converted to continuous values expressed as metabolic equivalent minutes per week (MET-min/wk), for each domain alone (walking activity, moderate physical activity, and vigorous physical activity) and in combination (sum of all physical activity) [15, 16]. The TAMPA Kinesiophobia Scale (TSK) evaluates the pain-related fear of injury/re-injury due to movement and activities. The TSK consists of 17 questions which identify fear of injury/re-injury due to activities with item scores ranging from 1 (strongly disagree) to 4 (strongly agree) which are tallied to a potential total score ranging between 17 to 68 [17].

The London Chest Activity of Daily Living Scale (LCADL) consists of 15 questions designed to measure dyspnea during routine daily activities in patients with COPD. The LCADL consists of 4 components: self-care, domestic, physical, and leisure. Patients score from 0 to 5. The total scores range from 0 to 75 with higher scores corresponding to a greater limitation in the activity of daily life [18]. The St George's Respiratory Questionnaire (SGRQ) was used to assess the quality of life. The SGRQ has 76 items that are divided into three sections including symptoms, activity, and impacts. Scores for each section and the total score range from 0-100, with high scores indicating poor health status [19]. The Nottingham Health Profile (NHP) is a general quality of life questionnaire that measures health problems, as perceived by individuals and the extent to which these problems affect daily activities. The questionnaire consists of 38 items and evaluates health status-related sub-dimensions: energy (3 items), pain (8 items), emotional reactions (9 items), sleep (5 items), social insulation (5 items) and physical activity (8 items). The questions require ''yes/no'' responses. Each part is scored between 0 and 100, where ''0'' represents the best health status and ''100'' represents the worst health status [20]. The most commonly used fatigue scale is the Fatigue Severity Scale (FSS) developed by Krupp [21]. The FSS is a 9 question validated instrument that indicates a perception of fatigue that might require medical intervention and is scored using a 7-point Likert scale where a score of 7 is associated with greater amounts of fatigue. The sum of responses is taken and divided by a number of items for the scale score [22].

2.3 Statistics

The Kolmogorov-Smirnov test was used to investigate whether the numerical properties are normally distributed. One-way ANOVA model was used to compare the 5 groups in terms of numerical properties with normal distribution and Kruskal-Wallis test (Tukey) was used in group comparisons in terms of non-normal distribution. Since age had a significant effect on some characteristics, the age effect was eliminated from the ANCOVA model. Significant p values are marked in bold and letters are placed on the upper right side of the percentage values to indicate group differences. This notation indicates that the difference between the percentages that are on the same line and have completely different letters is significant. Differences between common or same-letter percentages were not found statistically significant. The statistical significance level was 0.05. The data were analyzed using IBM SPSS 20.0 software (IBM Corporation, New York, USA).

3. Results

Descriptive statistical values of individual height, weight, and BMI measurements are given in Table 1. There were no significant differences between the groups in terms of height, body weight and body mass index ($p > 0.05$). There was no significant difference between the Group A and the control group's age averages. The mean age of the control group was statistically significantly lower than the other three groups ($p < 0.05$, Table 1).

Parameters	Group A (n=11) $\bar{X} \pm SD$	Group B (n=26) $\bar{X} \pm SD$	Group C (n=31) $\bar{X} \pm SD$	Group D (n=47) $\bar{X} \pm SD$	Control Group (n=45) $\bar{X} \pm SD$	p
Age (year)	$51.45^{ab} \pm 12.61$	$57.88^{b} \pm 11.84$	$59.32^{b} \pm 12.98$	$63.77^{b} \pm 11.08$	$43.40^{a} \pm 12.93$	**<0.0001***
Height (cm)	170.55 ± 9.51	167.31 ± 6.35	165.46 ± 7.22	166.85 ± 7.21	166.58 ± 7.50	0.417
Weight (kg)	84.73 ± 7.93	70.62 ± 10.78	75.47 ± 9.30	73.65 ± 17.61	73.52 ± 10.68	0.051
BMI (kg/m^2)	29.30 ± 3.47	25.28 ± 3.99	27.73 ± 4.32	26.60 ± 6.85	26.60 ± 4.50	0.219

*p<0.05; $^#$Ancova test; One-way variance analysis; BMI: Body mass index; SD: Standard deviation. Significant p values are marked in bold and letters are placed on the upper right side of the percentage values to indicate group differences

Table 1: Descriptive values related to age, height, weight and BMI values of individuals.

There was no difference in smoking rates among the groups ($p > 0.05$). When previous smoking status was examined, it was observed that group B and group C had a higher pack-year smoking history. The incidence of disease, except COPD, was significantly higher in group C and group D. Pain frequency was significantly higher in group B, group C and group D. The frequency of referral to the hospital due to COPD in the last 3 months was higher in group D ($p < 0.05$, Table 2).

	Group A		Group B		Group C		Group D		Control G.		
	n	%	n	%	n	%	n	%	n	%	p
Gender											
Woman	3	27.3	7	26.9	13	40.6	20	40.8	18	40	0.696
Male	8	72.7	19	73.1	19	59.4	29	59.2	27	60	
Marital status											
Married	7	70.0[ab]	23	88.5[b]	26	81.3[ab]	33	67.3[a]	28	62.2[a]	**<0.0001**[*]
Single	0	0.0[a]	2	7.7[a]	2	6.3[a]	0	0.0[a]	15	33.3[b]	
Widow	3	30.0[a]	1	3.8[b]	4	12.5[c]	16	32.7[a]	2	4.4[c]	
Do you smoke?											
Yes	6	54.5	11	42.3	9	28.1	9	18.4	15	33.3	0.08
No	5	45.5	15	57.7	23	71.9	40	81.6	30	66.7	
If the answer is no, have you used it before?											
Yes	2	40.0[a]	13	86.7[b]	14	60.9[ab]	23	56.1[a]	11	37.9[a]	**0.036**
No	3	60	2	13.3	9	39.1	18	43.9	18	62.1	
Have you been hospitalized in the last 3 months because of COPD?											
Yes	1	10.0[a]	13	52.0[b]	15	51.7[b]	32	68.1[b]	1	10.0[a]	**0.009**
No	9	90	12	48	14	48.3	15	31.9	9	90	
Do you have pain?											
Yes	2	18.2[a]	11	42.3[b]	12	38.7[b]	18	38.2[b]	6	13.3[a]	
No	9	81.8	15	57.7	19	61.3	29	61.7	39	86.7	
How often do you have pain?											
Continuous	0	0.0[b]	1	8.3[ab]	0	0.0[b]	11	57.9[c]	1	16.7[ab]	**0.002**[*]
From time to time	2	100	11	91.7	11	100	8	42.1	5	83.3	

Significant p values are marked in bold and letters are placed on the upper right side of the percentage values to indicate group differences

Table 2: Socio-demographic information of individuals.

There was a significant difference between group D and other groups for LCADL$_{(Domestic)}$, LCADL$_{(Physical)}$, LCADL$_{(Leisure)}$, LCADL$_{(Total)}$ (p<0.05). There was a significant difference between group C and group A, B, and control group for LCADL$_{(Total)}$ (p<0.05). There was no significant difference between group A and control group for LCADL$_{(Total)}$ (p> 0.05, Table 3). SGRQ$_{(Symptoms)}$ was highest in group C and D, lowest in the control group. SGRQ$_{(Activity)}$ score was higher in group D, lowest in the control group. SGRQ$_{(Impact)}$ score was higher in group D, lowest in the control group. There was no significant difference between group A and group B for SGRQ$_{(Total)}$ (p> 0.05, Table 3). NHP$_{(Total)}$ score was higher in and lower in the control group, compared to other groups (p<0.05, Table 3).

Daily Activities of Individuals	Group A		Group B		Group C		Group D		Control G.		
	n	%	n	%	n	%	n	%	n	%	p
Gender											
Woman	3	27.3	7	26.9	13	40.6	20	40.8	18	40	0.696
Male	8	72.7	19	73.1	19	59.4	29	59.2	27	60	
Marital status											
Married	7	70.0[ab]	23	88.5[b]	26	81.3[ab]	33	67.3[a]	28	62.2[a]	**<0.0001***
Single	0	0.0[a]	2	7.7[a]	2	6.3[a]	0	0.0[a]	15	33.3[b]	
Widow	3	30.0[a]	1	3.8[b]	4	12.5[c]	16	32.7[a]	2	4.4[c]	
Do you smoke?											
Yes	6	54.5	11	42.3	9	28.1	9	18.4	15	33.3	0.08
No	5	45.5	15	57.7	23	71.9	40	81.6	30	66.7	
If the answer is no, have you used it before?											
Yes	2	40.0[a]	13	86.7[b]	14	60.9[ab]	23	56.1[a]	11	37.9[a]	**0.036**
No	3	60	2	13.3	9	39.1	18	43.9	18	62.1	
Have you been hospitalized in the last 3 months because of COPD?											
Yes	1	10.0[a]	13	52.0[b]	15	51.7[b]	32	68.1[b]	1	10.0[a]	**0.009**
No	9	90	12	48	14	48.3	15	31.9	9	90	
Do you have pain?											
Yes	2	18.2[a]	11	42.3[b]	12	38.7[b]	18	38.2[b]	6	13.3[a]	-
No	9	81.8	15	57.7	19	61.3	29	61.7	39	86.7	
How often do you have pain?											
Continuous	0	0.0[b]	1	8.3[ab]	0	0.0[b]	11	57.9[c]	1	16.7[ab]	**0.002***
From time to time	2	100	11	91.7	11	100	8	42.1	5	83.3	

LCADL: London Chest Activity of Daily Living; SGRQ: St. George's Respiratory Questionnaire; NHP: Nottingham Health Profile; SD: Standard deviation. Significant p values are marked in bold and letters are placed on the upper right side of the percentage values to indicate group differences.

Table 3: Daily activities of life and quality of life of individuals

The fatigue severity of group D was significantly higher than the other groups (p<0.05). Although there was no difference between the fatigue severity of group B and group C, fatigue severity values of these groups were significantly higher than group A and the control group (p<0.05). For group A, there was no difference between control group (p>0.05). The mean score of kinesiophobia was highest in group D and lowest in control group. There was no difference between group A, group B and group C (p>0.05, Table 4). When IPAQ score of group D was the lowest. There was no difference between group A and control group (p>0.05, Table 4).

Comparison	Group A $\overline{X} \pm$ SD	Group B $\overline{X} \pm$ SD	Group C $\overline{X} \pm$ SD	Group D $\overline{X} \pm$ SD	Control Group $\overline{X} \pm$ SD	p
VAS (cm)	0.55[b] ± 1.17	1.55[a] ± 2.46	1.43[a] ± 2.39	2.11[a] ± 3.35	.76[b] ± 2.04	0.047[*]
FSS	28.64[ab] ± 14.47	39.81[b] ± 11.33	47.63[b] ± 13.65	56.12[c] ± 9.75	22.20[a] ± 11.52	**<0.0001[*]**
TSK	39.00[a] ± 7.77	39.81[a] ± 6.28	42.00[a] ± 6.66	45.57[b] ± 8.94	33.89[c] ± 8.60	**<0.0001[*]**
IPAQ (MET-min/week)	1963.98[a] ± 1249.42	1154.41[ab] ± 1311.65	790.36[b] ± 1040.18	183.72[c] ± 366.04	1969.90[a] ± 1476.33	**<0.0001[*]**

VAS: Visual Analog Scale; FSS: Fatigue Severity Scale; TSK: Tampa Scale for Kinesiophobia; IPAQ: International Physical Activity Questionnaire; SD: Standard deviation; MET: Metabolic equivalent Significant p values are marked in bold and letters are placed on the upper right side of the percentage values to indicate group differences

Table 4: Comparison of VAS, FSS, TSK, and IPAQ values of individuals.

4. Discussion

As a result of our study, it was observed that COPD individuals with different phenotypes had different physical activity and kinesiophobia values. It was found that having a different disease severity, affected individuals' activity of daily life and quality of life. However, there is a difference between physical activity and kinesiophobia, fatigue and quality of life among COPD individuals and healthy individuals; as symptoms of disease increased, dyspnea and kinesiophobia findings and quality of life worsened.

In our study, it was observed that individuals with COPD had different severe pain complaints when grouped according to the severity of the disease. Significant pain complaints were observed in groups B, C, and D, in which symptoms of COPD were evident, compared to group A and the control group. However, as the symptoms of the disease increased, both the severity and frequency of pain were observed to increase. 45-94% of individuals with COPD are affected by pain [23]. Lee reported that pain severity was associated with increased dyspnea, fatigue and decreased the quality of life in COPD subjects [23]. Individuals with COPD have been shown to have about 2.5 times more pain than healthy adults [8]. It has been emphasized that kinesiophobia is particularly important in COPD, although not adequately investigated[9, 8]. In our study, group D had the highest, the control group had the lowest kinesiophobia score. Especially with the decrease of physical activity level, the increase of dyspnea, the adoption of a more sedentary lifestyle, the level of anxiety and fear of the individual is increasing. As the symptoms of COPD become more apparent, this difference seems to be even greater. In individuals with COPD, it has been reported that when dyspnea is acute and severe, it causes emotional stress and in some cases, it is at a level of fear of death [24]. HajGambari reported that the physical activity levels of individuals with COPD were lower than healthy subjects[8]. Lee reported that two-thirds of COPD patients had a low physical activity level and in addition, dyspnea

and depression were independently associated with low physical activity [25]. Correlation between physical activity and kinesiophobia was not observed in the same study, but kinesiophobia scores of individuals with COPD were reported to be higher than healthy individuals. Roelofs reported that the kinesiophobia scores were significantly associated with sports/hobbies and job incapacity [26].

In our study, the quality of life and fatigue parameters of COPD groups was similar. Group D, which had the lowest quality of life and highest fatigue severity, Group A had the highest quality of life and lower fatigue severity. Increased fatigue is associated with decreased pulmonary capacity, exercise tolerance, and impaired quality of life in patients with moderate to severe COPD. It has been reported that increasing severity of illness, increases the fatigue levels of individuals with COPD, limiting the functional capacity of the patient in the later stages and decreasing the quality of life [27-29].

In our study, when we looked at LCADL scores in general, it was seen that individuals with COPD became more inadequate in activity of daily life, paralleling the increased COPD symptoms in the total score of the questionnaire and all sub parameters. When the groups were examined, LCADL$_{(Total)}$ scores of Group A and the control group were similar. In other groups, it was seen that the score of LCADL$_{(Total)}$ increased as the symptoms of COPD increased. Especially in female COPD patients, the symptoms of the disease negatively affect the activity of daily life and in the individuals who cannot fulfill the tasks of activity of daily life, a feeling of adequacy can be observed. The approaches that can help patients with COPD to be more independent and more active in daily life will be important to increase the quality of life of patients, as limited daily activity can also affect the quality of life of the individual. Patients have defined the first three activities they have difficulty doing in everyday life, stair climbing, walking and daily work [30].

The SGRQ scale used to assess disease-specific quality of life was lower in all parameters of quality of life in COPD patients compared to healthy controls. When the healthy group and the mild COPD group were examined for quality of life, it was observed that there was no difference at NHP, which is a measurement for general quality of life, compared to the SGRQ results which is specific for COPD. Studies have reported that the quality of life is associated with many parameters such as COPD disease duration, dyspnea, number of exacerbations, obesity severity, age, sex, COPD complications, fatigue, exercise capacity and muscle strength [31, 32]. Emotional, social, behavioral functions, self-care, mobility, enjoyment of hobbies, sleep and rest functions are significantly affected by COPD [24]. In a previous study, quality of life was reported to be affected by kinesiophobia [33].

The independence of individuals with COPD is an important psychological and physiological condition. It has been previously reported that patients who are more anxious about exercise are more emotionally affected by their illness [34]. Therefore, research into the role of emotional processes in exercise intolerance, especially measures to assess exercise-related fears, in individuals with COPD should be undertaken. In our study, the effects of the disease may be more pronounced because individuals with advanced COPD have significantly higher kinesiophobia scores. When group A, B, and C were compared to the control group, it was observed that in individuals whose at home and

out-of-home activities are affected, an avoidance of physical activity and exercise, due to fear of triggering symptoms of illness, arises. Especially with the decrease in physical activity level, the adoption of a more sedentary lifestyle, the individual's kinesiophobia scores are increasing. This research found that patients with low physical activity level, dyspnea, fatigue, pain, kinesiophobia were found to have lower activity of daily life and quality of life scores. The daily living activities and quality of life of individuals with COPD in different phenotypes are affected at different rates. Although the most common symptom in COPD is dyspnea, considering different symptoms such as kinesiophobia may be important for treatment programs. The assessment of the anxiety status of individuals and the low average age of the control group is a limitation of our study. In future studies investigating the effects of symptoms such as kinesiophobia in elderly COPD patients will be necessary. Also, following detailed assessments of COPD phenotypes, it is important to create an individual-specific physiotherapy/nursing program. Therefore, we recommend that future studies should be specific to COPD phenotypes.

5. Conclusions

Our study showed that the physical activity levels of COPD patients are low, the increase in dyspnea, fatigue, pain and kinesiophobia correlated with worsening in activity of daily living and quality of life scores. In our study, respiratory problems and fatigue caused symptom anxiety in COPD patients and this resulted with the symptom of kinesiophobia, avoidance and lack of participation causing inadequate participation in activity of daily living and worsened quality of life.

Data Availability

The data sets used and/or analyzed during the current study can be obtained from the corresponding author on reasonable request.

Conflicts of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding Statement

References

1. Halbert RJ, Natoli JL, Gano A, et al. Global burden of COPD: systematic review and meta-analysis. Eur Respir J (2006): 523-532.
2. Schikowski T, Adam M, Marcon A, et al. Association of ambient air pollution with the prevalence and incidence of copd. Eur Respir J 44 (2014): 614-626.
3. Kelly JL, Elkin SL, Fluxman J, et al. Breathlessness and skeletal muscle weakness in patients undergoing lung health screening in primary care. COPD 10 (2013): 40-54.

4. Hartman JE, Boezen HM, de Greef MH, et al. Consequences of physical inactivity in chronic obstructive pulmonary disease. Expert Rev Respir Med 4 (2010): 735-745.

5. Lilly EJ, Senderovich H. Palliative care in chronic obstructive pulmonary disease. J Crit Care 35 (2016): 150-154.

6. Bentsen SB, Rustoen T, Miaskowski C. Prevalence and characteristics of pain in patients with chronic obstructive pulmonary disease compared to the Norwegian general population. J Pain 12 (2011): 539-545.

7. Blinderman CD, Homel P, Billings JA, et al. Symptom distress and quality of life in patients with advanced chronic obstructive pulmonary disease. J Pain Symptom Manage 38 (2009): 115-123.

8. HajGhanbari B, Holsti L, Road JD, et al. Pain in people with chronic obstructive pulmonary disease (COPD). Respir Med 106 (2012): 998-1005.

9. Bossenbroek L, ten Hacken NH, van der Bij W, et al. Cross-sectional assessment of daily physical activity in chronic obstructive pulmonary disease lung transplant patients. J Heart Lung Transplant 28 (2009): 149-155.

10. Christensen VL, Holm AM, Kongerud J, et al. Occurrence, characteristics, and predictors of pain in patients with chronic obstructive pulmonary disease. Pain Manag Nurs 17 (2016): 107-118.

11. De Peuter S, Janssens T, Van Diest I, et al. Dyspnea-related anxiety: The dutch version of the breathlessness beliefs questionnaire. Chron Respir Dis 8 (2011): 11-19.

12. Vogelmeier CF, Criner GJ, Martinez FJ, et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive lung disease 2017 report. Gold executive summary. Am J Respir Crit Care Med 195 (2017): 557-582.

13. Bestall JC, Paul EA, Garrod R, et al. Usefulness of the medical research council (mrc) dyspnoea scale as a measure of disability in patients with chronic obstructive pulmonary disease. Thorax 54 (1999): 581-586.

14. Janssen DJ, Spruit MA, Uszko-Lencer NH, et al. Symptoms, comorbidities, and health care in advanced chronic obstructive pulmonary disease or chronic heart failure. J Palliat Med 14 (2010): 735-43.

15. Craig CL, Marshall AL, Sjostrom M, et al. International physical activity questionnaire: 12-country reliability and validity. Med Sci SportsExerce 35 (2003): 1381-1395.

16. Saglam M, Arikan H, Savci S, et al. International physical activity questionnaire: Reliability and validity of the Turkish version. Percept Mot Skills 111 (2010): 278-284.

17. Miller RP, Kori SH, Todd DD. The tampa scale: A measure of kinesiophobia. Clin J Pain 7 (1991): 51.

18. Garrod R, Bestall JC, Paul EA, et al. Development and validation of a standardized measure of activity of daily living in patients with severe COPD: The London Chest Activity of Daily Living Scale. Respir Med 94 (2000): 589-596.

19. Jones PW, Quirk FH, Baveystock CM. The st George's Respiratory Questionnaire. Respir Med 85 (1991): Suppl B:25-31; discussion 33-27.

20. Kucukdeveci AA, McKenna SP, Kutlay S, et al. The development and psychometric assessment of the Turkish version of the nottingham health profile. Int J Rehabil Res 23 (2000): 31-38.

21. Krupp LB, LaRocca NG, Muir-Nash J, et al. The fatigue severity scale. Application to patients with multiple sclerosis and systemic lupus erythematosus. Arch Neurol 46 (1989): 1121-1123.

22. Armutlu K, Korkmaz NC, Keser I, et al. The validity and reliability of the fatigue severity scale in Turkish multiple sclerosis patients. Int J Rehabil Res 30 (2007): 81-85.

23. Lee AL, Harrison SL, Goldstein RS, et al. Pain and its clinical associations in individuals with copd: A systematic review. Chest 147 (2015): 246-1258.

24. Atasever A, Erdinc E. Quality of life in COPD. Tuberk Thoraks 51(2003): 446-455.

25. Lee SH, Kim KU, Lee H, et al. Factors associated with low-level physical activity in elderly patients with chronic obstructive pulmonary disease. KJIM 33 (2018): 130-137.

26. Roelofs J, Sluiter JK, Frings-Dresen MH, et al. Fear of movement and (re)injury in chronic musculoskeletal pain: Evidence for an invariant two-factor model of the tampa scale for kinesiophobia across pain diagnoses and dutch, swedish, and canadian samples. Pain 131 (2007): 181-190.

27. Inal-Ince D, Savci S, Saglam M, et al. Fatigue and multidimensional disease severity in chronic obstructive pulmonary disease. Multidiscip Respir Med 5 (2010): 162-167.

28. Nguyen HQ, Donesky-Cuenco DA, Carrieri-Kohlman V. Associations between symptoms, functioning, and perceptions of mastery with global self-rated health in patients with copd: A cross-sectional study. Int J Nurs Stud 45 (2008): 1355-1365.

29. Todt K, Skargren E, Kentson M, et al. Experience of fatigue, and its relationship to physical capacity and disease severity in men and women with copd. Int J Chron Obstruct Pulmon Dis 9 (2014): 17-25.

30. Ebru ÇALIK KÜTÜKCÜ, Hülya ARIKAN, Melda SAĞLAM, et al. Kronik obstrüktif akciğer hastalarında çok boyutlu hastalık şiddeti ve günlük yaşam aktiviteleri arasındaki ilişkinin incelenmesi. JETR 2 (2015): 53-60.

31. Juan P de Torres, Ciro Casanova, Concepción Hernández, et al. Gender associated differences in determinants of quality of life in patients with copd: A case series study. Health Qual Life Outcomes 4 (2006): 72.

32. Peruzza S, Sergi G, Vianello A, et al. Chronic obstructive pulmonary disease (COPD) in elderly subjects: Impact on functional status and quality of life. Respir Med 97 (2003): 612-617.

33. Ozel A, Yumin TE, Tug T, et al. Effects of quadriceps muscle strength and kinesiophobia on health related quality of life in elderly women and men with chronic obstructive pulmonary disease. Konuralp Med J 10 (2018): 333-340.

34. Fischer MJ, Scharloo M, Abbink J, et al. Concerns about exercise are related to walk test results in pulmonary rehabilitation for patients with COPD. Int J Behav Med 19 (2012): 39-47.