RESEARCH ARTICLE

Cansu Yilmaz[1]
Murat Acat[2]
Serkan Oner[3]
Habibe Inci[4]
Didem Adahan[4]

[1]Department of Family Medicine, Araç Goverment Hospital, Kastamonu, Türkiye
[2]Department of Pulmonary Diseases, Faculty of Medicine, Karabük University, Karabük, Türkiye
[3]Department of Radiology, Faculty of Medicine, İzmir Bakırçay University, İzmir, Türkiye
[4]Department of Family Medicine, Faculty of Medicine, Karabük University, Karabük, Türkiye

***Corresponding Author:***
*Habibe Inci*
*mail: drhbesler@hotmail.com*

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konuralptipdergi@duzce.edu.tr
konuralptipdergisi@gmail.com
www.konuralptipdergi.duzce.edu.tr

# Evaluation of the Effect of Comorbid Bronchiectasis on Quality of Life in Patients with Chronic Obstructive Pulmonary Disease

**ABSTRACT**

**Objective:** The objective of this study was to evaluate the effect of comorbid bronchiectasis on quality-of-life in patients with Chronic Obstructive Pulmonary Disease (COPD).

**Methods:** 103 patients were diagnosed with COPD were included in our study. Spirometric measurements were made. The following measurement tools were used to collect data: 6-Minute Walk Test (6MWT), Modified Medical Research Council (mMRC) dyspnea scale, COPD Assessment Test (CAT), St. George Respiratory Questionnaire (SGRQ), and Short Form 36 (SF-36) quality-of-life questionnaire. Furthermore, all the patients' high Resolution Computed Tomography (HRCT) images for the last three years were included in the study.

**Results:** 93.2% of the patients were male, with a mean age of 64.79 ± 9.35 years. It was found that SGRQ and SF-36 quality of life scores decreased to approximately half of the full score in all patients. The volume/forced vital capacity (FEV1/FVC) values in the first second of forced expiration were significantly lower in the group with bronchiectasis. A significant correlation was found to exist between the patients' mMRC dyspnea scale and CAT scores, 6MWT distances, and all subscales of SGRQ and SF-36. In addition, a significant correlation was also found to exist between FEV1 values and all subscales of SGRQ, and between subscales of SF-36.

**Conclusions:** In our study, when we compared the quality-of-life scores of the patients with COPD and bronchiectasis with those with COPD alone, we found that the quality-of-life of both groups was impaired, but there was no significant difference between them.

**Keywords:** Bronchiectasis, Chronic Obstructive Pulmonary Disease, Quality of Life.

# Kronik Obstrüktif Akciğer Hastalığı Olan Hastalarda Komorbid Bronşektazinin Yaşam Kalitesine Etkisinin Değerlendirilmesi

**ÖZET**

**Amaç:** Bu çalışmanın amacı Kronik Obstrüktif Akciğer Hastalığı (KOAH) olan hastalarda eşlik eden bronşektazinin yaşam kalitesine etkisini değerlendirmektir.

**Gereç ve Yöntem:** Çalışmamıza KOAH tanısı konan 103 hasta dahil edildi. Spirometrik ölçümler yapıldı. Veri toplamak için, 6 Dakika Yürüme Testi (6MWT), Modifiye Tıbbi Araştırma Konseyi (mMRC) dispne ölçeği, KOAH Değerlendirme Testi (CAT), St. George Solunum Anketi (SGRQ) ve Kısa Form 36 (SF-36) yaşam kalitesi anketini içeren ölçüm araçları kullanıldı. Ayrıca tüm hastaların son üç yıla ait yüksek Çözünürlüklü Bilgisayarlı Tomografi (HRCT) görüntüleri çalışmaya dahil edildi.

**Bulgular:** Hastaların %93,2'si erkek olup, yaş ortalaması 64,79 ± 9,35 yıldı. Tüm hastalarda SGRQ ve SF-36 yaşam kalitesi puanlarının tam puanın yaklaşık yarısına kadar azaldığı bulundu. Zorlu ekspirasyonun ilk saniyesindeki volüm/zorlu vital kapasite (FEV1/FVC) değerleri bronşektazi tanılı grupta anlamlı olarak daha düşüktü. Hastaların mMRC dispne skalası ile CAT skorları, 6DYT mesafeleri ve SGRQ ve SF-36'nın tüm alt ölçekleri arasında anlamlı bir ilişki bulundu. Ayrıca FEV1 değerleri ile SGRQ'nun tüm alt ölçekleri ve SF-36'nın alt ölçekleri arasında da anlamlı bir ilişki bulundu.

**Sonuç:** Çalışmamızda KOAH tanılı ve bronşektazi tanılı hastaların yaşam kalitesi puanlarını tek başına KOAH tanılı hastalarla karşılaştırdığımızda her iki grubun yaşam kalitesinin bozulduğunu ancak aralarında anlamlı bir fark olmadığını bulduk.

**Anahtar Kelimeler:** Bronşektazi, Kronik Obstrüktif Akciğer Hastalığı, Yaşam Kalitesi

## INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable, and treatable disease characterized by persistent respiratory symptoms and airflow limitation caused by airway and/or alveolar inflammation, generally resulting from significant exposure to noxious gases and particles (1). On the other hand, bronchiectasis is a condition that causes permanent dilatation of the bronchi and destroys the elastic and muscular components of their walls, usually due to acute or chronic infection (2,3). It has been reported that patients with bronchiectasis have more frequent hospitalizations, more severe airflow limitation, higher pulmonary artery pressure, and more extended stay in intensive care unit and hospital than those without bronchiectasis. However, despite all these negative effects, it has also been reported that bronchiectasis does not increase mortality (2,3).

COPD and bronchiectasis have many common features both physiopathologically and clinically. Both diseases are common particularly in the elderly; therefore, it is possible to see patients with simultaneous COPD and bronchiectasis. It has been reported that 50% of patients with moderate and advanced COPD have bronchiectasis and there is a relationship between the two, suggesting that COPD may be a risk factor for bronchiectasis (4,5)

Previous research conducted with COPD patients shows that High-Resolution Computed Tomography (HRCT) studies provide direct measurements of pulmonary pathologies, and there is a high correlation between some clinical measurements commonly used in COPD patients (volume in the first second of forced expiration (FEV1), C-reactive protein (CRP), sedimentation rate, exacerbation) (6). Pulmonary function measurements are used to measure how much the respiratory system is affected by COPD. In addition to pulmonary function measurements, it is also recommended to use ancillary assessments such as quality-of-life and field tests to determine the patient's quality-of-life and activity level. The social and physical needs of individuals with COPD can be better determined by a realistic assessment of their quality-of-life and participation in activities (7).

This study makes a comparison between patients with COPD and bronchiectasis and those with COPD alone in terms of quality-of-life.

## MATERIAL AND METHODS

Patients who were diagnosed with COPD in the Chest Diseases Polyclinic of the local University Training and Research Hospital by a chest diseases specialist (pulmonologist) according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria between January 2019 and April 2019 were included in this cross-sectional study.

Patients who were 40 years and older and diagnosed with COPD according to the GOLD (2019) criteria (postbronchodilator; volume in the first second of forced expiration/forced vital capacity (FEV1/FVC) <70%), had no exacerbation for at least four weeks, were in a stable period, had the cognitive ability to read, understand, and respond, had HRCT taken within the last three years, agreed to participate in the study, and gave their written consent were included in the study. On the other hand, patients who had physical and mental disabilities, could not perform the pulmonary function test (PFT), did not volunteer to participate in the study, and were unable to perform the 6-minute walk test (6 MWT) (respiratory failure, congestive heart failure, unstable angina, risk of myocardial infarction, neurological disorder/disease, patients with musculoskeletal problems, blood pressure of 90/50 mm/Hg and below or 180/100 mm/Hg and above) were excluded from the study.

A socio-demographic and clinical information form was prepared by the researchers to collect data on age, gender, education, occupation, monthly income, smoking status, presence of other disease and COPD exacerbation, the number of hospitalizations in the last year, and the number of emergency visits in the last year (staying in the emergency room for less than 24 hours).

Modified Medical Research Council (mMRC) dyspnea scale, COPD Assessment Test (CAT), St. George Respiratory Questionnaire (SGRQ), and Short Form 36 (SF-36) quality-of-life scale were administered through face-to-face interviews.

6 MWT was applied to all participants under the supervision of the researcher. The distance they walked at the end of the time was recorded in meters. Percentage of arterial $O_2$ saturation, arterial blood pressure (mmHg), heart rate (min), and dyspnea grade (Modified Borg Scale) were recorded using an oxygen probe before and after the test.

An experienced technician made the lung volume measurements using a Spirolab III color LCD device. Measurements were made as per the criteria defined by the American Thoracic Society/European Respiratory Society (ATS/ERS) in 2005 (8).

The Modified Medical Research Council (mMRC) dyspnea scale is a 5-digit scale consisting of progressively increasing degrees of dyspnea, from Stage 0 (I am breathless only during strenuous exercise) to Stage 4 (I am unable to leave the house due to shortness of breath or I am out of breath while dressing and undressing). The higher the scale score, the more severe the dyspnea perception (9).

The COPD Assessment Test (CAT) is an 8-item scale that evaluates health status in COPD (10). Its validity and reliability were tested in Turkey by Yorgancıoğlu et al. (11). Each question is scored between 0 and 5 (0 is the best and 5 is the worst).

St. George Respiratory Questionnaire (SGRQ) is used to assess the health-related quality-of-life in patients with COPD. It includes symptoms, activity, and impact on daily life. Scores vary between 0 and 100, and 0 represents the best health condition and 100 the worst health condition (12). The Turkish validity and reliability study of the SGRQ quality-of-life questionnaire was carried out by Polatlı et al. (13).

Short form-36 (SF-36) quality-of-life scale consists of 36 questions under the following 8 main sections: physical function, social function, physical role difficulty, mental state role, mental health, energy/vitality, pain, and general perception of health. Each main section is scored between 0 and 100. 0 indicates the worst health, and 100 the best health (14). The Turkish validity study of the scale was conducted by Koçyiğit et al. (15).

All the patients' HRCT scans taken using a 16-detector spiral CT scanner (Toshiba Alexion, Tokyo, Japan) within the last three years were used in the study. In addition, the same expert radiologist evaluated the images on a workstation (Vitreasoftware 6.5, VitalImages, Toshiba Medical Systems). The scoring system reported by Silvia et al. (16) was used for HRCT findings.

**Statistical Analysis:** The obtained data were analyzed using SPSS software package (v.21). Continuous variables were expressed in mean ± standard deviation (SD), and qualitative variables in numbers and percentages. The Chi-square test was used for comparing categorical variables between groups. Kolmogorov Smirnov test was used to test the normality of the continuous variables. Since the data were not normally distributed, Mann-Whitney U test was used to compare two groups, and Kruskall-Wallis H test to make a comparison between three or more groups. Finally, the relationship between the measured variables was evaluated using Spearman's ordinal number correlation. The statistical significance was set at 5%.

The study was carried out upon the approval of the Ethics Committee of Non-Invasive Clinical Researches, Faculty of Medicine, the local University (Date: January 11, 2019, Approval No: 1/11).

## RESULTS

103 COPD cases followed-up in the Chest Diseases Polyclinic of the local University Training and Research Hospital were included in the study. Based on the HRCT data, the cases were grouped into two: those with bronchiectasis (59.2%, n=61) and those without bronchiectasis (40.8%, n=42).

The mean ages of the cases with and without bronchiectasis were 65.7 ± 9.3 years and 63.4 ± 9.5 years, respectively. As for the gender distribution of the groups, 95% (n=58) of the cases with bronchiectasis were male; 90.4% (n=38) of the cases without bronchiectasis were male. There was no significant difference between the two groups in terms of age and gender (p=0.266 and p=0.439, respectively), education level (p=0.689), exposure to harmful gases and particles (p=0.320), attack frequency (p=0.775), additional diseases (p=0.092) and smoking status (p=0.576) (Table 1).

**Table 1.** Sociodemographic and clinical characteristics of patients

| Variables | All patients | With bronchiectasis | Without bronchiectasis | *p* |
|---|---|---|---|---|
| **Age (year), (mean ± sd)** | 64.7 ± 9.4 | 65.7 ± 9.3 | 63.4 ± 9.5 | 0.266 |
| **Gender, *n* (%)** | | | | 0.439 |
| **Female** | 7 (6.7) | 3 (5) | 4 (9.6) | |
| **Male** | 96 (93.3) | 58 (95) | 38 (90.4) | |
| **Education Status, *n* (%)** | | | | 0.689 |
| **Literate and Primary school** | 73 (70.8) | 44 (72.1) | 29 (69) | |
| **Middle school** | 16 (15.5) | 8 (13.1) | 8 (19) | |
| **High school and University** | 14 (13.7) | 9 (14.7) | 5 (11.9) | |
| **Exposed to harmful gases and particles in the occupation, *n* (%)** | | | | 0.320 |
| **Yes** | 33 (32) | 22 (36) | 11 (26.1) | |
| **No** | 62 (60.1) | 36 (59) | 26 (61.9) | |
| **Did not worker** | 8 (7.9) | 3 (4.9) | 5 (11.9) | |
| **Additional diseases, *n* (%)** | | | | 0.092 |
| **Yes** | 42 (40.7) | 29 (47.4) | 13 (30.8) | |
| **No** | 61 (59.3) | 32 (52.6) | 29 (69.2) | |
| **Smoking status, *n* (%)** | | | | 0.999 |
| **Smoking** | 40 (38.8) | 21 (34.4) | 19 (45.2) | |
| **Never smoking** | 34 (33.0) | 18 (29.5) | 16 (38.1) | |
| **Quit smoking** | 29 (28.2) | 22 (36) | 7 (16.6) | |
| **Smokers, Package/year (mean ± sd) (min-max)** | 29.08±12.23 (10-60) | 28.05±11.28 (10-50) | 30.21 ± 13.43 (10-60) | 0.576 |
| **Applying to the emergency department** | | | | 0.818 |
| **Yes** | 48 (46.6) | 29 (47.5) | 19 (45.2) | |
| **No** | 55 (53.4) | 32 (52.4) | 23 (54.7) | |
| **Hospitalization** | | | | 0.775 |
| **No** | 67 (65.0) | 39 (64) | 28 (66.6) | |
| **1 time** | 18 (17.5) | 10 (16.3) | 8 (19) | |
| **≥ 2 times** | 18 (17.5) | 12 (19.6) | 6 (14.2) | |
| **Total, *n* (%)** | 103 (100) | 61 (59.2) | 42 (40.8) | |

***n*, number; SD: standard deviation.**

FEV1/FVC (%) values were found to be significantly lower in the group with bronchiectasis than in the group without bronchiectasis (p=0.011) (Table 2).

**Table 2.** mMRC dyspnea scale scores, CAT scores, 6 MWT distances, and PFT parameters of the groups

| | All patients mean±SD | With bronchiectasis mean±SD | Without bronchiectasis mean±SD | p |
|---|---|---|---|---|
| **CAT** | 17.61 ± 10.27 | 17.44 ± 10.74 | 17.86 ± 9.67 | 0.831 |
| **mMRC dyspnea scale** | 2.56 ± 1.34 | 2.56 ± 1.38 | 2.57 ± 1.30 | 0.672 |
| **6 MWT (m) (min-max)** | 410.57 ± 154.14 (70-813) | 409.46 ± 154.82 (110-650) | 412.19 ± 155.01 (70-813) | 0.801 |
| **FVC (lt)** | 2.55 ± 0.77 | 2.499 ± 0.75 | 2.62 ± 0.82 | 0.434 |
| **FVC (%)** | 68.53 ± 17.34 | 67.26 ± 18.13 | 70.38 ± 16.15 | 0.269 |
| **FVC (lt)** | 3.15 ± 17.20 | 4.25 ± 22.36 | 1.55 ± 0.55 | 0.209 |
| **FEV1 (%)** | 49.47 ± 15.73 | 47.43 ± 16.05 | 52.43 ± 14.96 | 0.101 |
| **FEV1/FVC (%)** | 56.47 ± 8.12 | 54.83 ± 7.85 | 58.857 ± 8.00 | 0.011 |

Mean: median value, SD: standard deviation, min: minimum, max: maximum, mMRC, Modified Medical Research Council; CAT, Chronic Obstructive Pulmonary Disease Assessment Test; 6 MWT, 6-Minute Walk Test; PFT, pulmonary function test; FVC, forced vital capacity; FEV1, volume in the first second of forced expiration; FEV1/FVC, volume in the first second of forced expiration/forced vital capacity

It was found that there was a significant relationship between the number of admissions to the emergency department and the number of hospitalizations in the last year due to COPD acute exacerbations and all subscales of SF-36 quality-of-life scale and SGRQ. A significant negative correlation was found to exist between the FVC (lt) and FEV1 (lt) values of the patients and the number of admissions to the emergency department, and between the FVC (lt), FEV1 (lt), FEV1 (%), FEV1/FVC (%) values and the number of hospitalizations (Table 3).

**Table 3.** The relationship between admission to the emergency department and hospitalization, quality of life, and PFT values

| | Admission to the emergency room | | Hospitalization | |
|---|---|---|---|---|
| | **r** | **p** | **r** | **p** |
| **SF-36 physical function** | -0.536 | <0.001 | -0.633 | <0.001 |
| **SF-36 physical restraint** | -0.524 | <0.001 | -0.578 | <0.001 |
| **SF-36 emotional restraint** | -0.528 | <0.001 | -0.562 | <0.001 |
| **SF-36 energy** | -0.460 | <0.001 | -0.489 | <0.001 |
| **SF-36 mental health** | -0.301 | 0.002 | -0.270 | 0.006 |
| **SF-36 social function** | -0.424 | <0.001 | -0.511 | <0.001 |
| **SF-36 pain** | -0.358 | <0.001 | -0.426 | <0.001 |
| **SF-36 general health** | -0.416 | <0.001 | -0.319 | 0.001 |
| **SGRQ symptom** | 0.759 | <0.001 | 0.633 | <0.001 |
| **SGRQ activity** | 0.513 | <0.001 | 0.618 | <0.001 |
| **SGRQ effect** | 0.587 | <0.001 | 0.596 | <0.001 |
| **SGRQ total** | 0.631 | <0.001 | 0.658 | <0.001 |
| **FVC (lt)** | -0.216 | 0.028 | -0.381 | <0.001 |
| **FVC (%)** | -0.096 | 0.333 | -0.136 | 0.171 |
| **FEV1 (lt)** | -0.238 | 0.016 | -0.404 | <0.001 |
| **FEV1 (%)** | -0.154 | 0.121 | -0.215 | 0.029 |
| **FEV1/FVC (%)** | -0.170 | 0.087 | -0.258 | 0.009 |

SF-36, short form 36; SGRQ, St. George respiratory questionnaire; PFT, pulmonary function test; FVC, forced vital capacity; FEV1, volume in the first second of forced expiration; FEV1/FVC, volume in the first second of forced expiration/forced vital capacity

When the relationship between the number of cigarettes smoked and the quality-of-life was analyzed, it was found that there was a significant negative correlation between the number of cigarettes smoked and the following subscales of SF-36 quality-of-life scale: physical function (r=-0.374, p=0.019), energy (r=-0.360, p=0.024), and social function (r=-0.373, p=0.019). A significant and positive correlation was found to exist between all subscales of SGRQ (SGRQ; symptom r=0.388, p=0.013, activity r=0.568, p<0.001, affected r=0.409, p=0.009, total r=0.500, p =0.001).

When the mean scores for SF-36 quality-of-life scale and SGRQ were evaluated, it was found that the scores for the physical limitation (48.28 ± 48.01), emotional limitation (50.33 ± 48.69), and energy (51.67 ± 22, 34) scales were observed to decrease by approximately half of the full score. It was observed that the SGRQ symptom (48.01 ± 24.93) and activity (54.60 ± 29.39) scores

deteriorated more than the effect (32.67 ± 23.05) and total (41.99 ± 23.35) scores.

When the patients with and without bronchiectasis were compared in terms of quality-of-life parameters, no significant difference was found to exist between the groups (p>0.05). When the total score of HRCT findings (bronchiectasis, dilatation severity, peribronchial thickening, tree-in-bud, mucous plugs, air trapping, fibrotic collapse/consolidation, bulla, emphysema) of all cases, and SF-36 and SGRQ quality-of-life parameters were compared, no significant correlation was found to exist between the total score for HRCT findings and the quality-of-life scores (p>0.05).

When the relationship between HRCT data and PFT parameters was evaluated, it was found that the extent of bronchiectasis was negatively correlated with FEV1 (%) and FEV1/FVC (%), dilatation severity, and bullae, and FEV1/FVC (%) values were negatively correlated with emphysema. It was observed that there was a significant negative correlation between FEV1 (%) and FEV1/FVC (%) values (Table 4).

**Table 4.** The relationship between HRCT findings and PFT parameters

| | FVC (%) | | FEV 1 (%) | | FEV 1/FVC (%) | |
|---|---|---|---|---|---|---|
| | **r** | **p** | **r** | **p** | **r** | **p** |
| **Extension of bronchiectasis** | -0.152 | 0.126 | -0.208 | 0.035 | -0.292 | 0.003 |
| **Dilation severity** | -0.127 | 0.203 | -0.169 | 0.088 | -0.269 | 0.006 |
| **Peribronchial thickening** | 0.063 | 0.529 | 0.078 | 0.432 | 0.020 | 0.841 |
| **Tree in bud (budding tree view)** | -0.087 | 0.382 | -0.130 | 0.192 | -0.174 | 0.078 |
| **Mucus plug** | -0.099 | 0.319 | -0.026 | 0.791 | 0.081 | 0.414 |
| **Air restraint** | -0.126 | 0.204 | -0.091 | 0.358 | -0.006 | 0.952 |
| **Fibrotic collapse/consolidation** | 0.108 | 0.279 | 0.154 | 0.120 | 0.121 | 0.224 |
| **Bulla** | -0.019 | 0.851 | -0.097 | 0.331 | -0.213 | 0.030 |
| **Emphysema** | -0.080 | 0.420 | -0.213 | 0.031 | -0.299 | 0.002 |
| **Total HRCT** | -0.098 | 0.325 | -0.220 | 0.026 | -0.368 | <0.001 |

HRCT, high resolution computed tomography; PFT, pulmonary function test; FVC, forced vital capacity; FEV1, volume in the first second of forced expiration; FEV1/FVC, volume in the first second of forced expiration/forced vital capacity

When the relationship between the patients' mMRC dyspnea scale scores, CAT scores, SF-36 quality-of-life scores, and SGRQ scores were examined, it was found that there was a negative and significant relationship between mMRC dyspnea scale scores and the scores for all the subscales of SF-36 quality-of-life scale (p<0.001). A positive and significant relationship (p<0.001) was found to exist between the subscales. A negative and significant relationship (p<0.001) was found to exist between the CAT scores and the scores for all subscales of SF-36 quality-of-life scale, and a positive and significant relationship (p<0.001) between the CAT scores and the scores for all subscales of SGRQ (Table 5).

**Table 5.** Comparison of mMRC dyspnea scale and CAT scores of all cases in terms of quality of life

| | mMRC | | CAT | |
|---|---|---|---|---|
| | **r** | **p** | **r** | **p** |
| **SF-36 physical function** | -0.771 | <0.001 | -0.837 | <0.001 |
| **SF-36 physical restraint** | -0.634 | <0.001 | -0.685 | <0.001 |
| **SF-36 emotional restraint** | -0.611 | <0.001 | -0.692 | <0.001 |
| **SF-36 energy** | -0.548 | <0.001 | -0.640 | <0.001 |
| **SF-36 mental health** | -0.265 | 0.007 | -0.423 | <0.001 |
| **SF-36 social function** | -0.511 | <0.001 | -0.570 | <0.001 |
| **SF-36 pain** | -0.513 | <0.001 | -0.570 | <0.001 |
| **SF-36 general health** | -0.408 | <0.001 | -0.390 | <0.001 |
| **SGRQ symptom** | 0.703 | <0.001 | 0.786 | <0.001 |
| **SGRQ activity** | 0.743 | <0.001 | 0.739 | <0.001 |
| **SGRQ influence** | 0.700 | <0.001 | 0.786 | <0.001 |
| **SGRQ total** | 0.771 | <0.001 | 0.831 | <0.001 |

mMRC, Modified Medical Research Council; CAT, SF-36, short form 36; SGRQ, St. George respiratory questionnaire

When the relationships between all the cases' 6 MWT distances and FEV1 values and SF-36 quality-of-life scale and SGRQ scores were examined, it was observed that there was a

significant and positive relationship between their 6 MWT distances and scores for all subscales of SF-36 quality-of-life scale (p<0.001). It was observed that there was a significant and negative correlation between their 6 MWT distances and scores for all subscales of SGRQ (p<0.001). A negative and significant relationship was also found to exist between the patients' FEV1 (%) values and their scores for all subscales of SGRQ (p<0.05) and scores for the following subscales of SF-36 quality-of-life scale: physical function, physical limitation, emotional limitation, energy, social function, and general health. A positive and significant relationship (p<0.05) was found to exist between the subscales (Table 6).

**Table 6.** Comparison of 6 MWT distances and FEV 1 (%) values of all cases in terms of quality-of-life parameters

| | **6 MWT** | | **FEV1 (%)** | |
|---|---|---|---|---|
| | **r** | **p** | **r** | **p** |
| **SF-36 physical function** | 0.719 | <0.001 | 0.370 | <0.001 |
| **SF-36 physical restraint** | 0.658 | <0.001 | 0.269 | 0.006 |
| **SF-36 emotional restraint** | 0.674 | 0.001 | 0.274 | 0.005 |
| **SF-36 energy** | 0.508 | <0.001 | 0.224 | 0.024 |
| **SF-36 mental health** | 0.343 | <0.001 | 0.064 | 0.523 |
| **SF-36 social function** | 0.576 | <0.001 | 0.250 | 0.011 |
| **SF-36 pain** | 0.463 | <0.001 | 0.179 | 0.073 |
| **SF-36 general health** | 0.332 | 0.001 | 0.236 | 0.017 |
| **SGRQ symptom** | -0.617 | <0.001 | -0.247 | 0.012 |
| **SGRQ activity** | -0.662 | <0.001 | -0.356 | <0.001 |
| **SGRQ influence** | -0.637 | <0.001 | -0.320 | 0.001 |
| **SGRQ total** | -0.693 | <0.001 | -0.348 | <0.001 |

6 MWT, 6-Minute Walk Test; FEV1, volume in the first second of forced expiration; SF-36, short form 36; SGRQ, St. George respiratory questionnaire

## DISCUSSION

In our study, the rate of bronchiectasis was found to be 59.2% among the patients followed-up with a diagnosis of COPD in our country. The parameters of quality-of-life were found to be low in all the cases with or without bronchiectasis.

The gold standard method in the diagnosis of bronchiectasis is Thorax HRC (17). Patel et al. (18) found bronchiectasis on HRCT in 27 (50%) of 54 COPD patients. O'Brien et al. (19) also reported bronchiectasis in 29% of 110 COPD cases screened by computed tomography of the thorax. Kurtulgan et al. (20) found bronchiectasis in 58.3%, bronchial wall thickening in 43.3%, and emphysema in 58.3% of 60 patients with COPD. In our study, bronchiectasis was detected in 61 (59.2%) of 103 COPD patients according to the HRCT images.

COPD is often accompanied by comorbidities that may have a significant impact on prognosis, and cardiovascular diseases are the most important of these comorbid diseases (21). It was reported that 54.3% of the patients had at least one other disease accompanying COPD, and the most common comorbidity was cardiovascular diseases with 30.4% (22). In our study, it was seen that 40.6% of the patients had a concomitant disease, and cardiovascular diseases ranked the first with 35.8%. It was found that the groups with and without bronchiectasis showed similar characteristics in terms of comorbidity distribution. This can be explained by the fact that smoking is an important risk factor for both diseases.

Donaldson et al. (23) conducted a study with 109 patients and reported that acute exacerbations in COPD negatively affected the decrease in FEV1. Gudmundson et al. (24) included 416 patients with COPD in their study to analyze the risk of readmission in patients with COPD and related risk factors and found that patients with low quality-of-life were admitted to the hospital more frequently. In our study, in accordance with the literature, the quality-of-life was found to be low within one year in the patients who were admitted to the emergency department or hospitalized more frequently due to COPD exacerbations

Cough, sputum complaints, and annual loss in FEV1 are thought to decrease with smoking cessation, and this positively affects the quality-of-life (25). In their study involving 102 cases followed-up with the diagnosis of COPD, Akbay et al. (26) found a correlation between the SGRQ symptom score and the duration of smoking (pack/year). Ince et al. (27) reported that there was no significant relationship between smoking, which is an important risk factor in the development of COPD, and quality-of-life scores. In our study, it was found that the quality-of-life of the patients was affected as the number of cigarettes smoked increased. According to both quality-of-life

questionnaires, as the number of cigarettes smoked increased, the limitation of physical activities of the patients increased. In addition, according to the SF-36 quality-of-life questionnaire, the patients' energy and social activities were affected by the number of cigarettes smoked.

In their study comparing COPD patients with a healthy control group, Ince et al. (27) reported that the scores for the limitations in physical function, vitality, and general health subscales of SF-36 quality-of-life scale were significantly higher in the COPD group than in the control group. In our study, consistent with the literature, it was observed that the quality-of-life deteriorated in patients with COPD, and the scores were low in the physical activity subscales in both quality-of-life questionnaires. In the SGRQ, both the activity score and the symptom score decreased by half in COPD patients, and according to the SF-36 questionnaire, physical limitation, emotional limitation, and energy scores were affected more than other sections. Since SF-36 evaluates general health in one of its subscales and SGRQ evaluates the effects of disease-specific symptoms, we believe that using both questionnaires together provide complementary information about the quality-of-life in COPD patients. When we analyzed the groups with and without bronchiectasis separately, it was found that the quality-of-life scores decreased in the group with bronchiectasis, but there was no significant difference between the two groups. We are of the opinion that in our cases bronchiectasis was not advanced due to the low rate of bronchiectasis spreading to the lobes in the lung, and therefore the symptoms did not reach a level that would further reduce the quality-of-life.

The diffuse airflow limitation is the most prominent functional finding in COPD. This restriction is demonstrated by forced expiration tests. FEV1 and FEV1/FVC ratios calculated from the forced expiration curve are the most reliable of these tests (20). In their study on 107 bronchiectasis patients, Sevgili et al. (28) reported that an obstructive-type respiratory dysfunction was observed in 72.9% of the patients in the pulmonary function test. Kurtulgan et al. (20) reported that the number of cases with bronchiectasis, emphysema, and air trapping was significantly higher in COPD patients with an FVC lower than 70%. As for the correlation between HRCT findings and PFT values in our study, it was observed that as the prevalence of bronchiectasis and emphysema areas increased, the FEV1 and FEV1/FVC values were negatively affected. The FEV1 and FEV1/FVC values were found to be low in our study, indicating obstruction in the airways, and this result was consistent with the literature.

The most prominent symptom in COPD patients is a chronic, progressive, and persistent dyspnea. Dyspnea increases especially during exercise and acute attacks and limits the patient's activities in daily life (29). One of the most important scales used in the evaluation of dyspnea is mMRC dyspnea scale. In their study comparing all scales of the SF-36 quality-of-life questionnaire with non-functional parameters, Soyyiğit et al. (30) reported that there was a significant relationship between mMRC dyspnea scale scores and the scores for the general health, physical function, social function, and energy scales. In our study, it was observed that mMRC dyspnea scale score was significantly correlated with all sub-parameters of both quality-of-life scales, and patients with high mMRC dyspnea scale scores had a low quality-of-life score, but there was no significant difference between the groups with and without bronchiectasis in terms of mMRC dyspnea scale score.

Although mMRC dyspnea scale only focuses on the shortness of breath, CAT provides a more comprehensive insight into the impact of COPD on patients' quality-of-life (11). In their study on 366 COPD patients, Miyazaki et al. (31) reported that the CAT scores correlated moderately well with all components of the SGRQ and SF-36 quality-of-life scale. In a multicenter study on 312 COPD patients aged 40-75 in Turkey, the relationship between CAT questionnaire and the SF-36 and SGRQ questionnaires was examined, and it was reported that there was a statistically significant relationship between the SF-36 scores and the CAT scores (13). In our study, it was observed that the patients' scores for all subscales of SGRQ and SF-36 worsened as their CAT scores increased, which was in line with the literature. However, no significant difference was found to exist between the groups with and without bronchiectasis in terms of CAT score.

Cömert et al. (32) reported that there was a significant relationship between SGRQ symptom score and activity score and FEV1 values measured after bronchodilator use. In our study, no significant difference was found to exist between the groups with and without bronchiectasis in terms of FEV1 value. When all the patients were evaluated, it was found that as FEV1 (%) decreased, the scores for all subscales of SGRQ deteriorated. On the other hand, in the SF-36 quality-of-life questionnaire, all subscales except mental health and pain were affected by the decrease in FEV1. In our study, it was found that the decrease in FEV1 value affected the quality-of-life negatively, which was consistent with the literature.

It is known that there is a relationship between the severity of COPD and walking distance. Lee et al. (33) reported a significant relationship between the 6 MWT distance and the

physical component of SF-36 quality-of-life scale and all components of SGRQ. In our study, it was observed that the quality-of-life was proportionally higher in the patients with a longer 6-MWT distance, and the 6-MWT distance was similar in the groups with and without bronchiectasis.

## CONCLUSION

In our study, when the quality-of-life scores of the patients with COPD and bronchiectasis were compared with those with COPD alone, it was found that the quality-of-life of both groups deteriorated, but there was no significant difference between them. We believe that future studies can contribute to the literature by evaluating these two diseases together, examining the effect of this coexistence on symptoms, and showing how much the quality-of-life is affected by this coexistence.

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