

The Predictive Role of Psychological Status and Disease Severity Indexes on Quality of Life Among Patients with Non-CF Bronchiectasis

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Abstract

OBJECTIVE: Bronchiectasis is a chronic suppurative lung disease that significantly impacts the patients' quality of life. The aim of this study is to evaluate the relationship between quality of life and patient's psychological status and bronchiectasis disease severity indexes in patients with non-cystic fibrosis bronchiectasis. We also aimed to investigate the validity and reliability of Turkish version of Quality of Life Questionnaire-Bronchiectasis (V3.1) in Turkish adult bronchiectatic patients.

MATERIAL AND METHODS: In total, 90 stable non-cystic fibrosis bronchiectatic adult patients were enrolled in this study. At baseline, dyspnea score, body mass index, lung function tests, sputum cultures, number of exacerbations and hospital admissions, and disease severity indexes were recorded. All of the participants underwent quality of life assessment using both Quality of Life Questionnaire-Bronchiectasis V3.1 and Short Form-36 questionnaires, and psychological status was evaluated by using Hospital Anxiety and Depression Scale.

RESULTS: In all study participants, anxiety was diagnosed in 27/90 (30%) of patients, and depression was diagnosed in 37/90 (41%) of patients. Patients with anxiety and depression had lower quality of life scores in various domains ($P = .026-.001$), and Hospital Anxiety and Depression Scale scores negatively correlated with several quality of life domains ($r = -0.216$ to 0.343). Female patients had higher risk for depression (55% vs 22%, $P = .002$) and worse quality of life than males ($P = .016-.038$). Several life quality scores of both instruments were worse in patients with moderate-severe disease severity indexes when compared with those of mild groups. Moreover, Turkish version of newly described Quality of Life Questionnaire-Bronchiectasis V3.1 questionnaire was found to be a reliable and valid instrument to evaluate the quality of life.

CONCLUSION: These results emphasize the importance of mental health and disease severity as significant determinants of the life quality in patients, particularly female patients with non-cystic fibrosis bronchiectasis.

KEYWORDS: Anxiety, depression, non-CF bronchiectasis, quality of life

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INTRODUCTION

Bronchiectasis causes recurrent pulmonary infections and loss of lung function by worsening respiratory symptoms. It is fact that psychological disorders such as anxiety and depression are more prevalent in subjects with chronic airway diseases such as bronchiectasis which are often underdiagnosed and undertreated.¹⁻³ Additionally, it has been reported that depression and anxiety are associated with worse health outcomes. Therefore, screening psychological alterations in patients with non-cystic fibrosis (CF) bronchiectasis may help to clarify the impact of mood state on quality of life.¹⁻⁵

The concept of quality of life is a multidimensional subjective assessment of one's own health and life perception. Previous studies have been conducted to evaluate the possible impaired quality of life determinants in these patients.²⁻⁶ It was found that dyspnea, cough, lung function, exacerbations and hospitalization rate, extension in the computed tomography (CT), and decreased exercise tolerance can impact on the performance of daily activities and consequently on the quality of life. Moreover, there might be various extrapulmonary factors including psychological state that can determine the quality of life.¹⁻⁶

Bronchiectasis is a highly heterogeneous disease presenting with different disease severity up to requiring lung transplantation. Recently, 2 composite disease-specific prognostic indices have been developed for bronchiectasis, the Bronchiectasis Severity Index (BSI) and the FACED scores. Both scores predict risk of mortality, hospitalization and exacerbations.^{7,8} However, there are limited data about the ability of these scores to predict the quality of life.

In previous literature, generic instrument such as Short Form-36 (SF-36) to measure general quality of life has been internationally recognized as a global measure of quality of life in several diseases. It has advantages of easy administration and the ability to measure the impact of a disease and related treatments on both physical and mental health

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and has been validated for Turkish language.⁹ It involves a patient's perception of performance in the physical and mental domains; however, a disease-specific instrument has been neglected.^{10,11} Therefore, disease-specific quality of life instrument such as Quality of Life-Bronchiectasis (QoL-B) V3.1 was created to use specifically in patients with bronchiectasis. It was designed to assess respiratory symptoms and treatment burden in addition to general instrument domains and was recognized as a common instrument in research studies in this field.¹² However, QoL-B V3.1 questionnaire has not been validated in Turkish language yet.

Understanding the factors affecting the quality of life in patients with non-CF patients allows us to develop new treatment plans to improve their quality of life. Therefore, the present study specifically aimed to evaluate the quality of life of these patients by using newly created QoL-B V3.1 questionnaire and also to assess its relationship with clinical indices, particularly psychological status and disease severity. Besides them, this study was also conducted to assess the reliability and validity of the QoL-B V3.1 questionnaire for subjects with non-CF bronchiectasis in our population.

MATERIAL AND METHODS

Subjects

This cross-sectional study included patients with a diagnosis of non-CF bronchiectasis and aged 18 years and older who attended the adult bronchiectasis unit for routine annual review. Patients who have participated in European Multicenter Bronchiectasis Audit and Research Collaboration (EMBARC) study were enrolled in this study, and written consent forms were obtained from all patients.¹³ The present study protocol was approved by the Marmara University School of Medicine Institutional Review Board (No. 09.2016.151).

In all cases, the diagnosis of bronchiectasis was based on the clinical history of mucopurulent sputum and radiological confirmation of high-resolution computed tomography (HRCT) scanning (Siemens, Germany). A radiologist blind to the study interpreted the HRCT scans and assessed the severity of radiologic presentation with evaluation of each lobe. Radiographic extension was assessed based on the number of bronchiectatic lobes as local (1 lobe) or expanded. Patients with CF, malignancy, pregnancy, known cognitive impairment were excluded from the study. All patients had not had any exacerbation for at least 4 weeks. Medical records were reviewed, and patients' medical history, medications, comorbidities, past history, microbiological analysis of sputum, number of disease exacerbations and hospitalizations within last year were recorded. All patients underwent pulmonary function tests by MIR Spirolab II (Medical International Research, Rome, Italy) according to ATS/ERS (American Thoracic Society/European Respiratory Society) criteria.¹⁴ Body mass index (BMI), modified Medical Research Council (mMRC) dyspnea score, and Charlson comorbidity indexes were calculated.¹⁵ Exacerbation was defined as a person with bronchiectasis with a deterioration in 3 or more of the following key symptoms for at least 48 hours: cough, sputum volume and/or consistency, sputum purulence, breathlessness and/or exercise intolerance, fatigue and/or malaise, hemoptysis, and a clinician determines that

a change in bronchiectasis treatment is required.¹⁶ Subjects were asked to fill the self-reported Hospital Anxiety and Depression Scale (HADS) questionnaire. The questionnaire consists of 14 questions, in which the overall severity of anxiety and depression is rated on a 4-point scale (0-3).¹⁷

Disease Severity Indexes

The severity of bronchiectasis was calculated using indexes such as BSI and FACED in the whole population of the study participants. Bronchiectasis Severity Index was based on age, BMI, FEV₁% predicted, the number of hospital admission and exacerbation within last year, mMRC, bacterial colonization, and the number of involved lobe. FACED score consists of 5 dichotomized variables such as F, FEV₁; A, age; C, chronic colonization of *Pseudomonas*; E, extension; and D, dyspnea (mMRC).¹⁸ Patients were classified into 2 subgroups such as mild and moderate-severe by calculating both severity indexes.

Assessment of Quality of Life

Turkish version of SF-36 form¹¹ was used for assessment of life quality. Physical function, role physical, body pain, general health perception, vitality, social function, role emotional, and mental health were domains. All are summarized in 2 component summary scores, the physical component summary (PCS) and the mental component summary (MCS).¹⁹ All subscale scores range from 0 to 100, higher scores indicate higher levels of functioning.

It is essential to find tools that provide complementary information about the overall effect of bronchiectasis, while being easy to use and interpret. The QoL-B V3.1 is a self-administered, patient-reported outcome measure assessing symptoms, functioning, and health-related quality of life for patients with non-CF bronchiectasis. It is the first disease-specific outcome measure for patients with bronchiectasis and has 37 items on 8 scales: respiratory symptoms, physical and role functioning, emotional functioning, social functioning, vitality, health perception, and treatment burden. Scores were from 0 to 100 and higher scores indicate better health-related quality of life. No total score is calculated since functioning can vary greatly from one domain to another.^{12,20}

Validation and Reliability of the Turkish Version of Quality of Life-Bronchiectasis V3.1

The original version of the QoL-B V3.1 provided by EMBARC study group was translated from English to Turkish by 2 individuals including 1 academic and 1 clinician in pulmonary disease area both are fluent in English. Then, each question was checked to form a comprehensible one by a health professional fluent in English and a harmonized final text was constructed. The final Turkish version was translated back into English. After obtaining the approval of EMBARC center, the pilot testing was conducted on randomly selected patients, and it was observed that all items were clearly understandable by Turkish patients.

Reliability Analysis

The internal consistency of the QoL-B V3.1 was evaluated by using Cronbach's alpha for the global QoL-B V3.1 subscale score. A Cronbach's alpha coefficient of 0.70 was considered to be acceptable in literature.²¹ The item and total score

relationship was tested by using Pearson's correlation coefficient and Spearman's rank correlation as appropriate.

Validity Analysis

The validity of Turkish version of QoL-B V3.1 was tested by using convergent validity between currently available measures such as SF-36 and QoL-B V3.1 similar domains. Neither treatment burden nor respiratory symptom domain scores were included because they did not have corresponding domains with SF-36 domains. Discriminant validity was tested by using the correlation analysis between QoL-B V3.1 domains and lung function, mMRC, duration of disease, Charlson comorbidity index, exacerbation and hospitalization rate within last year, and HADS score.

Statistical Analysis

All statistical analyses were performed using the Statistical Package for Social Sciences version 23.0 software (IBM Corp.; Armonk, NY, USA). Descriptive statistics for normally distributed continuous data were shown as means \pm standard deviations. Median (minimum–maximum) values were used to assess non-normally distributed data. Categorical variables were compared by chi-square test, and Fisher's exact test was used if the number of expected values was lower than 5 in 4-cell tables. To compare the mean values of continuous variables between 2 groups, *t*-test was used for normally distributed data and Mann–Whitney *U* test was used for non-normally distributed data. Correlations between normally distributed data were tested by Pearson's correlation coefficient, and Spearman's rank correlation test was used for non-normally distributed data. Cronbach's alpha computing was used for reliability analysis, convergent validity and discriminant validity tests were used for validation analysis. *P* values $<.05$ were considered statistically significant.

RESULTS

Psychological Status and Disease Severity Indexes

In this cross-sectional study, a total number of 90 patients with the diagnosis of non-CF stable bronchiectasis were included in the final analysis. Among the 118 patients with bronchiectasis who had been diagnosed, 3 patients with previously

diagnosed as common variable immunodeficiency disease and 10 patients with CF were excluded from the study. Five patients did not provide consent for participation (Figure 1).

Demographic data and clinical indices are depicted in Table 1. Anxiety was diagnosed in 27 (30%) and depression was diagnosed in 37 (41%) of 90 non-CF bronchiectatic patients based on HADS score. A moderately positive correlation was identified between HADS anxiety and depression scores ($r = 0.597$, $P = .001$). When the patients are grouped based on gender, female patients had statistically higher rates of depression than male patients (55% vs 22%, $P = .002$). Depression scores negatively correlated with the duration of disease ($r = -0.30$, $P < .003$) and positively correlated with Charlson comorbidity index ($r = 0.209$, $P < .048$). Anxiety scores correlated with the exacerbation rate within last year ($r = 0.279$, $P = .008$). However, anxiety and depression were not related with BSI and FACED disease severity indexes.

All of our non-CF bronchiectatic patients' quality of life scores showed the lowest point in role physical subscale and the highest point in pain subscale of the SF-36 life quality index. In QoL-B V3.1 questionnaire, the lowest point in treatment burden subscale and the highest point in emotional functioning subscale were found. When the association between quality of life and demographic variables is assessed, based on gender, in females, role limitation due to physical health problems in SF-36 and in QoL-B V3.1 was lower in females than that of males ($P < .016$ and $P < .038$, respectively), other domains were gender insensitive. In all population, working status resulted in statistically important changes in various domains of both quality of life instruments, particularly worse scores in unemployed and housewife groups ($P < .022$ – $.0001$). However, education level did not result in any statistical change in the quality of life scores. When the extent of bronchiectasis was discriminated by CT, there was no statistically significant correlation with the psychological status and quality of life scores. Acute exacerbation rate of disease negatively correlated with SF-36 role physical, general health, vitality, social function, PCS, and MCS domains ($r = -0.294$,

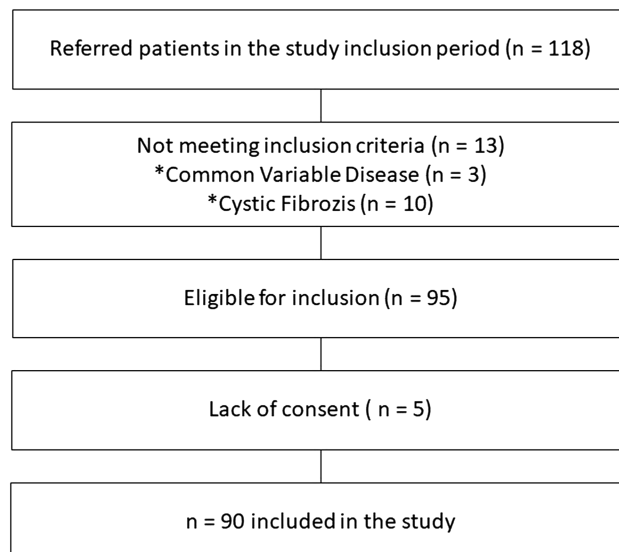


Figure 1. Flowchart of the patient recruitment and selection process.

Table 1. Study Population

Total	90
Age	45 ± 17
Gender (F/M)	53/37
BMI (kg/m ²)	25.7 ± 5.8
mMRC score	1.57 ± 0.99
0-1	49 (54%)
2-4	41 (46%)
Years since diagnosis	7.8 ± 7.7
Current smoker, n (%)	15 (17%)
Pulmonary function test	
FVC (Forced Vital Capacity) pred%	78.5 ± 25.7
FEV ₁ (Forced Expiratory Volume in one second) pred%	66.1 ± 29.2
FEV ₁ /FVC%	68.8 ± 14.1
FEV ₁ pred < 50%, n (%)	26 (29%)
Acute attack (years)	2.86 ± 2.0
Hospitalization rate (years)	1.08 ± 0.99
Charlson comorbidity score	1.44 ± 0.86
Radiological status (single lobe/advanced)	12/78
Disease severity indexes	
BSI (mild/moderate-severe)	46(51%)/44(49%)
FACED (mild/moderate-severe)	60(67%)/30(33%)
Depression, n (%)	37 (41%)
Anxiety, n (%)	27 (30%)

Data are presented as mean ± SD.
 BMI, body mass index; SD, standard deviation; BSI, Bronchiectasis Severity Index; mMRC, modified Medical Research Council.

$P = .005$; $r = -0.217$, $P = .04$; $r = -0.215$, $P = .042$; $r = -0.304$, $P = .004$; $r = -0.276$, $P = .009$; $r = -0.275$, $P = .009$, respectively). Additionally, acute exacerbation rate negatively correlated with QoL-B V3.1 role functioning domain ($r = -0.244$, $P = .021$). Charlson comorbidity index negatively correlated with various domains of SF-36 and QoL-B V3.1 ($P = .014$ -.001 and $P = .044$ -.027, respectively).

We found lower scores in several domains of QoL-B V3.1 and SF-36 in patients with moderate-severe BSI and FACED severity index groups when compared with those in mild groups (Tables 2 and 3). Patients with anxiety or depression were more likely to have a lower quality of life scores when compared with non-depressed or non-anxious patients. In SF-36 questionnaire, body pain, vitality, social function, mental health, and MCS domain scores were lower in patients with depression than patients without ($P = .001$, $P = .017$, $P = .006$, $P = .026$, and $P = .027$, respectively). Anxious patients had lower scores in vitality, mental health, and MCS domains using SF-36 questionnaire than non-anxious patients ($P = .036$, $P = .018$, and $P = .005$, respectively). When QoL-B V3.1 questionnaire was assessed, only social functioning domain score was lower in anxious patients than non-anxious patients. When we correlated HADS scores with life quality scores, depression scores negatively correlated with SF-36 social function and body pain scores ($r = -0.235$, $P = .026$; $r = -0.343$, $P = .001$, respectively). Anxiety scores negatively correlated with SF-36 vitality, social function, MCS scores, and QoL-B V3.1 emotional function scores ($r = -0.235$, $P = .026$; $r = -0.216$, $P = .041$; $r = -0.299$, $P = .004$; $r = -0.231$, $P = .029$, respectively).

Reliability and Validity Analysis

In the reliability analysis, internal consistency within the domains of QoL-B V3.1 was generally good with available Cronbach’s alpha scores. For convergent validity, the correlation coefficients of the corresponding domains of SF-36 and QoL-B V3.1 were significant (Table 4). Additionally, for discriminant validity, significant correlations were found between several QoL-B V3.1 domains and mMRC, duration of disease, Charlson comorbidity index, exacerbation and hospitalization rate, HADS score, and FEV₁% predicted except treatment burden and physical functioning (Table 5).

DISCUSSION

Non-CF bronchiectasis has recently gained renewed interest, particularly patients’ general well-being and mental health status become more important for them to lead normal lives. This study demonstrates that the prevalence of depression is higher in female patients with non-CF bronchiectasis, and

Table 2. QoL-B V3.1 Questionnaire in Relation to BSI and FACED Severity Scores

QoL-B V3.1 Questionnaire	Mild BSI Score, n = 46	Moderate-Severe BSI Score, n = 44	P	Mild FACED Score, n = 60	Moderate-Severe FACED Score, n = 30	P
Physical functioning	55.3 ± 33.2	56.4 ± 32.5	.990	56.1 ± 32.7	55.3 ± 33.2	.817
Role functioning	63.9 ± 29.9	57.4 ± 31.6	.233	66.3 ± 28.6	49.5 ± 32.3	.013*
Vitality	58.5 ± 24.8	54.3 ± 25.9	.491	60.8 ± 24.0	47.8 ± 25.9	.022*
Emotional functioning	80.6 ± 19.8	79.2 ± 22.8	.941	82.2 ± 19.6	75.3 ± 23.8	.175
Social functioning	68.8 ± 24.0	65.4 ± 24.3	.626	70.8 ± 22.3	59.7 ± 26.1	.076
Health perceptions	56.6 ± 23.9	45.8 ± 24.8	.037*	57.5 ± 23.6	39.2 ± 23.0	.001*
Respiratory symptoms	70.5 ± 25.6	63.5 ± 25.9	.133	70.9 ± 24.7	59.5 ± 26.9	.048*
Treatment burden	46.3 ± 26.8	51.0 ± 29.2	.426	47.9 ± 27.3	50.0 ± 29.5	.737

Data are presented as mean ± SD.
 QoL-B, Quality of Life-Bronchiectasis; BSI, Bronchiectasis Severity Index; SD, standard deviation.

Table 3. SF-36 Questionnaire in Relation to BSI and FACED Severity Scores

SF-36 Questionnaire	Mild BSI Score, n = 46	Moderate–Severe BSI, n = 44	P	Mild FACED Score, n = 60	Moderate–Severe FACED Score, n = 30	P
Physical function	73.3 ± 21.2	61.1 ± 27.6	.043*	73.8 ± 19.2	54.3 ± 30.5	.005*
Role physical	37.1 ± 17.9	29.8 ± 19.5	.047*	37.8 ± 16.5	25.0 ± 20.8	.005*
Body pain	79.9 ± 21.6	77.3 ± 25.0	.720	80.8 ± 21.8	74.2 ± 25.8	.251
General health	62.4 ± 21.7	47.5 ± 21.9	.003*	60.9±21.0	43.6 ± 22.7	.001*
Vitality	65.7 ± 21.0	52.3 ± 19.8	.001*	65.0 ± 19.5	47.5 ± 20.5	.001*
Social function	75.8 ± 25.3	57.4 ± 32.0	.006*	74.0±25.6	52.5 ± 33.5	.004*
Role emotional	42.4 ± 17.1	34.1 ± 20.6	.085	42.0 ± 16.4	31.1 ± 22.6	.069
Mental health	75.0 ± 20.8	70.3 ± 18.1	.182	76.0±18.9	66.2 ± 19.5	.022*
PCS	62.8 ± 17.5	52.7 ± 23.4	.025*	63.7 ± 16.7	46.1 ± 24.3	.001*
MCS	59.4 ± 17.0	49.7 ± 18.5	.012*	58.8 ± 16.2	46.3 ± 19.8	.002*

Data are presented as mean ± SD.

BSI, Bronchiectasis Severity Index; PCS, physical component summary; MCS, mental component summary; SF-36, Short Form-36; SD, standard deviation.

they have worse role functioning scores in quality of life questionnaires than male patients. In all patients, we have demonstrated that anxiety and depression resulted in worse quality of life scores. In our study, BSI and FACED bronchiectasis severity indexes were not related with anxiety and depression; however, these indexes provided an accurate prediction of life quality. Moreover, acute exacerbation rate within the last year had negative impact on several quality of life domains.²² Our results demonstrated that Turkish version of QoL-B V3.1 is a reliable and valid instrument for the evaluation of the quality of life among patients with non-CF bronchiectasis.

To date, several studies showed higher rates of anxiety and depression in patients with non-CF patients by using HADS scores which are consistent with our findings.^{1-5,23} The HADS scores of this population were shared with our previous study.²⁴ We found 30% of patients with anxiety and 41% of patients with depression and anxiety were related with high exacerbation rate within the last year. In an earlier study, Oliveira et al² confirmed the same relation between anxiety and high frequent exacerbations. Moreover, the most important finding of our study is the presence of poorer quality of life scores in patients with psychological problems by using newly created disease-specific instrument QoL-B V3.1. This relation was previously reported in similar studies; however, they generally used SGRQ (Saint George Respiratory Questionnaire), Seattle Obstructive Lung Disease Questionnaire instruments to assess quality of life but not bronchiectasis-specific one, QoL-B V3.1.²⁻⁵ In our study, when the patients were grouped based on gender, female patients had statistically higher rates of depression than male patients similar to the previous studies.^{1,2,25} Moreover, our study also raises an important issue concerning the relationship between female gender and worse quality of life especially the role functioning domain. Coexistence of depression and bronchiectasis and consequently worse quality of life reflect the vulnerability of female patients and point to their special needs. In this study, neither psychological status nor quality of life correlated with the extent of bronchiectasis area on CT scan that has been

affirmed by other similar studies.^{3,6,26} Taken together, these findings suggested that psychological factors and quality of life might be originated from distinct mechanisms unrelated to the radiologic disease extension.

As expected, we found that disease severity had a significant impact on the quality of life. To our knowledge, this is the first study that investigates the relation between the quality of life using the QoL-B V3.1 instrument and the BSI and FACED disease severity indexes combined with mental health assessment. In our study, we found lower scores of quality of life in patients with moderate–severe BSI and FACED groups when compared with mild groups by using both instruments. This finding is in line with the earlier published multidimensional severity assessment studies.^{10,11} Terpstra et al¹¹ used QoL-B questionnaire and reported that an increasing severity of disease was correlated with lower scores in QoL-B; however, they did not study any psychological problem as an additional determinant factor. In a similar structure of our study, Sahin et al²⁷ evaluated the relation between the quality of life, psychological status, and severity of disease in the same study and they found moderate positive correlation between severity score and quality of life total score, additionally, anxiety and depression scores were significantly higher in the severe subgroup; however, their study group was only bronchiectatic patients with COPD (Chronic Obstructive Pulmonary Disease) not all bronchiectasis groups were included, and they used SGRQ instrument not disease-specific QoL-B V3.1 questionnaire. In a Turkish bronchiectatic population, it has been reported that BSI and FACED severity scores were negatively associated with 6-minute walking distance and health status assessed by SGRQ questionnaire; however, a disease-specific quality of life questionnaire was not used.²⁸ Visser et al²⁹ in Australian largest cohort, found that BSI and FACED severity scores were negatively correlated with QoL-B domain scores without evaluating the effect of psychological state of patients on the quality of life. Taken together, these findings and our results indicate that quality of life by newly described QoL-B V3.1 instrument is related with mental status and disease severity in patients with

Table 4. Correlation Analysis Between the SF-36 and QoL-B V3.1 Questionnaires

QoL-B V3.1/SF-36 Questionnaires	Physical Function	Role Functioning	Vitality	Emotional Function	Social Function	Health Perception	Respiratory Symptoms	Treatment Burden
Physical function	NS	0.514*	0.436*	0.290**	0.314**	0.434*	0.553*	-0.318
Role physical	NS	0.581*	0.426*	0.256**	0.364*	0.451*	0.545*	NS
Body pain	NS	0.438*	0.498*	0.334**	0.328**	0.370*	0.463*	NS
General health	NS	0.448*	0.361*	NS	0.342**	0.412*	0.478*	NS
Vitality	NS	0.475*	0.477*	0.325**	0.351**	0.426*	0.504*	NS
Social function	NS	0.505*	0.366*	0.254**	0.296**	0.353**	0.436*	NS
Role emotional	NS	0.467*	0.409*	0.237**	0.278**	0.408*	0.403*	NS
Mental health	NS	0.405*	0.498*	0.422*	0.312**	0.344**	0.456*	NS
PCS	NS	0.474*	0.371*	NS	0.315**	0.383*	0.447*	-0.322**
MCS	NS	0.388*	0.407*	0.265**	0.253**	0.305**	0.342**	NS

NS, non-significant; PCS, physical component summary; MCS, mental component summary QoL-B; Quality of Life-Bronchiectasis; BSI, Bronchiectasis Severity Index; SF-36, Short Form-36.
*P < .05; **P < .000-.05.

Table 5. Correlation Analysis Between the QoL-B V3.1 Scores and Clinical Variables

QoL-B V3.1 Questionnaire	Physical Functioning	Functioning Role	Vitality	Emotional Functioning	Social Functioning	Health Perception	Respiratory Symptoms	Treatment Burden
mMRC	0.048	-0.311*	-0.289**	-0.184	-0.228*	-0.377**	-0.324**	0.097
Duration of disease	-0.112	-0.258**	-0.177	-0.095	-0.247*	-0.278**	-0.138	0.06
Charlson comorbidity index	0.043	-0.216*	-0.234*	-0.145	-0.047	-0.173	-0.213*	0.042
Exacerbation rate	0.062	-0.244	-0.104	0.025	-0.098	-0.078	-0.206	0.063
Hospitalization rate	-0.157	-0.211	-0.212	-0.119	-0.204	-0.176	-0.263**	0.031
FEV ₁ % pred	-0.047	0.316**	0.312*	0.196	0.235*	0.366**	0.371**	0.063
Anxiety score	0.017	-0.167	-0.181	-0.231*	-0.174	-0.061	-0.101	0.085
Depression score	-0.025	-0.126	-0.172	-0.191	-0.117	-0.081	-0.125	0.097

*P < 0.05; **P < 0.000-.014.
QoL-B, Quality of Life-Bronchiectasis; mMRC, modified Medical Research Council.

non-CF bronchiectasis. Usually, quality of life questionnaires are generated in English and translated to other languages. The reliability and validity of these questionnaires should be evaluated in each country before using these instruments worldwide.^{30,31} Therefore, we confirmed that the Turkish version of QoL-B V3.1 was a reliable and valid instrument in Turkish population. The reliability was observed by high Cronbach's alpha coefficients, and we found significant correlations between similar domains of SF-36 and QoL-B V3.1. In addition, QoL-B V3.1 was able to discriminate between patients according to, Charlson comorbidity index, duration of disease, HADS score, FEV₁% predicted, mMRC, exacerbation and hospitalization rate within last year.

The main limitation of the present study is the small sample size since the prevalence of this orphan disease is very low. Additionally, single center study limits the generalizability of these principal findings. In cross-sectional design, it fails to assess temporary changes in the quality of life as we did not measure the change by responsiveness to treatment over time.

To date, many studies have assessed the impact of different factors on life quality of non-CF bronchiectatic patients; however, the key point of our study is to assess the quality of life of non-CF bronchiectatic patients based on psychological status and disease severity using the most widely used disease-specific QoL-B V3.1 questionnaire. Since we have demonstrated those patients with psychological alterations have the worse scores in quality of life evaluation, all bronchiectatic patients are needed to screen for anxiety and depression regardless of disease severity.

Ethics Committee Approval: Marmara University School of Medicine Ethics Committee (Approval No: 09.2016.151).

Informed Consent: Written informed consent was obtained from the patients who agreed to take part in the study.

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