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PSYCHOMETRIC PROPERTIES OF THE TURKISH VERSION OF THE FACIT-DYSPNEA SCALE IN CANCER PATIENTS

ABSTRACT

Purpose: This study aimed to investigate the validity and reliability of the Turkish version of the Functional Assessment of Chronic Illness Therapy (FACIT)-Dyspnea Short Form in patients with cancer.

Methods: Fifty-two patients with cancer with complaint of dyspnea were included in the study. The validity and reliability of the FACIT-Dyspnea were evaluated via exploratory and confirmatory factor analyses, construct validity, internal consistency [Cronbach's alpha (α)], test-retest reliability [intraclass correlation coefficient, (ICC)], item-total correlations and split-half tests. For construct validity, correlations between FACIT-Dyspnea and Eastern Cooperative Oncology Group (ECOG), Performance Scale, Medical Research Council Dyspnea Scale, Cancer Dyspnea Scale and EuroQol 5-Dimension 3-Level questionnaire (EuroQoL-5D-3L) were examined.

Results: Factor Analyses results showed that the FACIT-Dyspnea has a unifactorial structure, with all items having high factor loadings. Significant correlations were found between the FACIT-Dyspnea and the ECOG, Medical Research Council Dyspnea Scale, Cancer Dyspnea Scale, and EuroQoL-5D-3L scores ($p< 0.05$). Cronbach's α of the FACIT-Dyspnea was found to be 0.973 and ICC was 0.85. Item-total correlations for items in the FACIT-Dyspnea ranged from 0.695 to 0.948. In the split-half test, the Cronbach's α for the first part of the FACIT-Dyspnea was 0.937 and for the second part was 0.955.

Conclusion: The Turkish version of FACIT-Dyspnea is valid and reliable in patients with cancer and is suitable for use by researchers and clinicians.

Keywords: Cancer, Dyspnea, Factor analysis, Health-related quality of life, Validity and reliability

KANSER HASTALARINDA FACIT-DISPNEA SKALASININ TÜRKÇE VERSİYONUNUN PSİKOMETRİK ÖZELLİKLERİ

ÖZ

Amaç: Bu çalışmada Kronik Hastalık Terapisinin Fonksiyonel Değerlendirmesi (FACIT)-Dispne Kısa Formu'nun Türkçe versiyonunun kanser hastalarında geçerliliğini ve güvenilirliğini araştırmak amaçlandı.

Yöntem: Çalışmaya dispne şikayeti olan elli iki kanser hastası dahil edildi. FACIT-Dispne'nin geçerliliği ve güvenilirliği, açıklayıcı ve doğrulayıcı faktör analizleri, yapı geçerliliği, iç tutarlılık [Cronbach alfa (α)], test-tekrar test güvenilirliği [sınıf içi korelasyon katsayısı (ICC)], madde-toplam korelasyonları ve split-half testleri ile değerlendirildi. Yapı geçerliliği için FACIT-Dispne ile Doğu Kooperatif Onkoloji Grubu (ECOG), Performans Ölçeği, Medikal Araştırma Konseyi Dispne Ölçeği, Kanser Dispne Ölçeği ve EuroQol 5-Boyutlu 3-Seviyeli anket (EuroQoL-5D-3L) arasındaki korelasyonlar incelendi.

Bulgular: Faktör Analizi sonuçları, FACIT-Dispne'nin tek faktörlü bir yapıya sahip olduğunu ve tüm maddelerin yüksek faktör yüklerine sahip olduğunu gösterdi. FACIT-Dispne ile ECOG, Medikal Araştırma Konseyi Dispne Ölçeği, Kanser Dispne Ölçeği ve EuroQoL-5D-3L arasında anlamlı korelasyonlar bulundu ($p<0,05$). FACIT-Dispne'nin Cronbach α'sı 0,973 ve ICC 0,85 olarak bulundu. FACIT-Dispne'deki maddelerin toplam madde korelasyonları 0,695 ile 0,948 arasında değişmekteydi. Split-half testinde, FACIT-Dispne'nin ilk bölümü için Cronbach α'sı 0,937 ve ikinci bölümü için 0,955 idi.

Sonuç: FACIT-Dispne'nin Türkçe versiyonu, kanser hastalarında geçerli ve güvenilirdir ve araştırmacılar ve klinisyenler tarafından kullanılmaya uygundur.

Anahtar Kelimeler: Kanser, Dispne, Faktör analizi, Sağlıkla ilgili yaşam kalitesi, Geçerlilik ve güvenilirlik

INTRODUCTION

Cancer is a major health problem worldwide and one of the leading causes of mortality and morbidity, caused by the uncontrolled growth and spread of cancer cells resulting from DNA damage due to genetic and environmental factors (1). Cancer treatment methods, including chemotherapy, radiotherapy, surgery, molecular targeted agents, hormone therapy, and immunotherapy, often lead to side effects that can be further intensified by the cancer itself. The most common side effects are pain, fatigue, anxiety-depression, toxicity, muscle weakness, nausea-vomiting and dyspnea. Dyspnea develops in patients with cancer as a result of many different pathologies. Conditions such as airway obstruction, pleural or pericardial effusion, or phrenic nerve compression due to tumor mass, as well as pneumonia, pulmonary embolism, reduced lung capacity, cardiac toxicity, anemia, fatigue, and cachexia related to cancer treatments may lead to dyspnea (2).

Dyspnea also known as breathlessness or air hunger, is a subjective experience of respiratory discomfort. Although gender, cancer types, presence of metastasis, cancer treatments, smoking history, environmental factors and comorbidities change the incidence of dyspnea, dyspnea develops in 10-90% of patients with cancer (3). Patients diagnosed with early-stage cancer report low rates of dyspnea, while up to 90% of patients with advanced-stage cancer experience dyspnea symptoms (4). Dyspnea, a significant clinical problem in all stages of cancer from diagnosis to the advanced stage, is particularly common in advanced stages, highlighting the critical importance of its assessment and management in these patients.

Dyspnea is an important determinant of functional exercise capacity, daily living activities, and quality of life in patients with cancer, and increased severity decreases survival rates (4). Monitoring dyspnea is crucial, as its frequency and severity tend to increase with cancer progression, making it an important prognostic indicator for various health parameters (4). However, cancer-related dyspnea is difficult to assess because it is a complex, multidimensional, and subjective sensation, and little attention is paid to treatment methods for dyspnea in patients with cancer. Dyspnea requires consideration of various aspects during evaluation, such as sensory-perceptual experience, emotional state, and its overall impact on daily living activities; therefore, the use of an assessment tool that measures these dimensions in patients with cancer is essential (5,6).

Although the Medical Research Council (MRC) scale and Cancer Dyspnea Scale (CDS) are frequently used in dyspnea researchs, these scales can not assess multiple aspects of a patient's dyspnea experience or sufficiently reflect factors related to functional limitations (4). The Functional Assessment of Chronic Illness Therapy (FACIT)-Dyspnea is a 33-item questionnaire to measure dyspnea and dyspnea-related limitations, and then a 10-item short form was developed (7). Different versions of the 10-item short form of the FACIT-Dyspnea have been shown to provide consistent, reliable, and valid assessment of dyspnea and dyspnea-related limitations (5,8). However, to our knowledge, no study has been conducted to validate the Turkish version of the FACIT-Dyspnea Short Form. Therefore, the present study aimed to examine the validity and reliability of the Turkish version of the FACIT-Dyspnea Short Form in patients with cancer.

METHOD

Study Design

This research is a cross-sectional and methodological study conducted to determine the validity and reliability of the Turkish version of the FACIT-Dyspnea Short Form in patients with cancer. The study was conducted between September 2021 and June 2022 at Dokuz Eylül University Hospital, Department of Medical Oncology. All participants gave written consent. The study was approved by the Dokuz Eylül University Non-invasive Research Ethics Committee (decision number: 2021/27-19, date: 06.10.20) and was carried out in accordance with the Declaration of Helsinki.

Demographic information was recorded, and the participants completed the questionnaires. Participants were asked to complete the Eastern Cooperative Oncology Group-Performance Status (ECOG-PS), FACIT-Dyspnea Short Form, CDS, MRC, and EuroQol 5-Dimension 3-Level questionnaire (EuroQoL-5D-3L) questionnaires. The researchers contacted the participants by phone 7-10 days after their appointments to repeat the FACIT-Dyspnea Short Form (retest).

Translation of the FACIT-Dyspnea

Although permission for the Turkish version of the questionnaire was obtained through facit.org, the translation protocol was still followed (9). Two bilingual (Turkish and English) native Turkish translators independently translated the FACIT-Dyspnea Short Form from English into Turkish, and the final version was synthesized by comparing the two translations. One of the translators was a health care professional while the other translator was not informed about the study. The English back translation of the FACIT-Dyspnea was prepared by two independent translators (who were fluent in Turkish, and native English speakers) who had not seen the original English version, and a single version was agreed upon after comparing the two versions. The pre-final version was approved by a bilingual committee of translators and health professionals (two physiotherapists and one medical doctor). Cognitive debriefing interviews were conducted with 10 patients with cancer using the pre-final version. To assess content validity, the

expert committee evaluated the relevance and congruence of each item in the FACIT-Dyspnea Short Form with the underlying construct. For each expert, the percentage of items deemed relevant was calculated, and the mean relevance percentage across all experts was computed, which was found to be 100%. The FACIT organization approved the Turkish translation as conceptually equivalent to the original Turkish version.

Participants

The population of the study consisted of volunteer individuals who were being treated as outpatients at the Dokuz Eylül University Hospital Department of Medical Oncology had a diagnosis of cancer and complaints of dyspnea, and met the inclusion criteria for the study. The sample size was calculated as a minimum of 50 people, at least 5 times the number of items (10). Volunteers who were over 18 years of age, diagnosed with stage I-IV cancer and receiving anti-cancer treatment, had dyspnea symptoms, and were literate in Turkish were included. Individuals who had difficulty understanding or completing the questionnaires were excluded from the study.

Data Collection

Socio-demographic and clinical information of the participants was evaluated.

Performance Status

Performance status was evaluated with the ECOG-PS (11). This scale is scored from 0 to 5, with each score indicates a functional status and the amount of assistance required, and is widely used to assess functional performance status in patients with cancer (12).

Dyspnea

FACIT-Dyspnea Short Form, developed by the FACIT organization, is a 10-item questionnaire used to assess dyspnea experienced by participants in activities performed in the last 7 days (7). Dyspnea during activities is graded on a 4-point Likert scale (0, no dyspnea; 1, mild dyspnea; 2, moderate dyspnea; 3, severe dyspnea; 4, I have not done this in the last 7 days). The participant who has not performed the specified activity in the last 7 days is questioned whether he/she cannot do this activity due to shortness of breath or for another reason. A high score indicates high dyspnea intensity or functional limitations (7).

CDS is a 12-item scale that evaluates dyspnea in patients with cancer and includes 3 subscales: effort, discomfort and anxiety. CDS items are scored ranging from 1 (not at all) to 5 (very much), and the total score is between 0 and 48. CDS subscale scores range from 0-20 for effort, 0-16 for anxiety, and 0-12 for discomfort. Increased scores indicate increased dyspnea severity (13).

MRC scale consists of 5-items regarding perceived breathlessness and is commonly used to measure the severity of dyspnea. Participants rated their level of dyspnea from 0 (no dyspnea) to 5 (very severe dyspnea, too breathless to leave home, or breathless when dressing or undressing) (14).

Health-Related Quality of Life

Health-related quality of life (HRQoL) was assessed with EuroQoL-5D-3L. The first part of the scale has five dimensions consisting of mobility, self-care, usual activities, pain/discomfort and anxiety/depression, and the items are rated with 3 options (no problem, some problem, extreme problem). In the second part, the participant was asked to rate their health status from 0 (worst health) to 100 (best health) on a 20-cm visual analog scale (15).

Statistical Analysis

Statistical analyses were conducted using the SPSS v.26 (Armonk, NY: IBM Corp.). Participants' clinical and socio-demographic characteristics were analyzed using descriptive statistics.

For the validity analysis of the FACIT-Dyspnea Scale-Short Form, exploratory factor analysis [principal axis factoring, direct oblimin (EFA)], confirmatory factor analysis (CFA), and construct validity were examined (16). Prior to EFA and CFA, the suitability of the dataset for factor analysis and the adequacy of the sample size were assessed using the Kaiser-Meyer-Olkin (KMO) and Bartlett's Sphericity test. For the dataset to be suitable for factor analysis, Bartlett's Sphericity Test must be significant ($p<0.05$). A KMO value of 0.60 or higher indicates that the sample size is adequate for factor analysis (17). CFA was conducted using maximum likelihood estimation with AMOS 23.0. goodness of fit indices were determined (18).

For construct validity, correlations between FACIT-Dyspnea Scale and ECOG-PS, MRC, CDS and EuroQoL-5D-3L scale were examined using the Pearson test. Correlation coefficients (rho, r) <0.40 were considered weak, 0.40-0.60 were considered moderate, and >0.60 were considered high correlation (19).

The reliability of the FACIT-Dyspnea Scale was measured by Cronbach's alpha (α), test-retest [intraclass correlation coefficient (ICC)], item-total correlations and split-half tests. Cronbach's α was calculated to assess the internal consistency of the FACIT-Dyspnea Scale items. Cronbach's α above 0.7 indicate adequate internal consistency (20). The interpretation of ICC's was as follows: low reliability (ICC <0.40), moderate reliability (ICC = 0.40-0.75), high reliability (ICC >0.75), and excellent reliability (ICC ≥0.90) (21). For item-total correlations, correlation coefficients greater than 0.3 were determined as acceptable levels (20). Statistical significance was set at $p<0.05$.

RESULTS

Sixty-two outpatients with cancer at Dokuz Eylül University Hospital were assessed for eligibility based on the inclusion criteria. Five participants were excluded from the study due to the absence of dyspnea symptoms, three were excluded for not completing the questionnaires, and two were excluded for refusing to participate. Consequently, 52 patients with cancer with complaint of dyspnea were included in the study (Figure 1).

The mean age of the participants was 60.80±11.43 years, and 17 were female (32.69%) and 35 were male (67.31%). All of the participants in the current study had stage 4 cancer (100%). Most of the participants had lung cancer (51.92%). It was determined that the participants experienced moderate to severe dyspnea, while their performance status was found to be at a moderate level. Table 1 shows the characteristics of the participants.

Validity

Factor Analysis

EFA and CFA was conducted to determine the underlying dimensions of the FACIT-Dyspnea Scale-Short Form and to enhance the validity of the questionnaire by understanding the factor structure. The EFA and CFA results of the FACIT-Dyspnea Scale are shown in Table 2. In the FACIT-Dyspnea Scale, a single factor with an eigenvalue greater than one was identified, with an eigenvalue of 8.14, accounting for 81.44% of the explained variance. In the rotated factor matrix of the FACIT-Dyspnea Scale, the lowest factor loading was 0.770, while the highest was 0.955. It was determined that the FACIT-Dyspnea Scale has a unifactorial structure, all items had high factor loadings, with none having a factor loading below 0.30, indicating that it would not be appropriate to remove any items from the scale.

In the Path Diagram of the CFA, the factor loadings of the FACIT-Dyspnea Short Form items were significant and the standardized regression coefficients ranged between 0.60 and

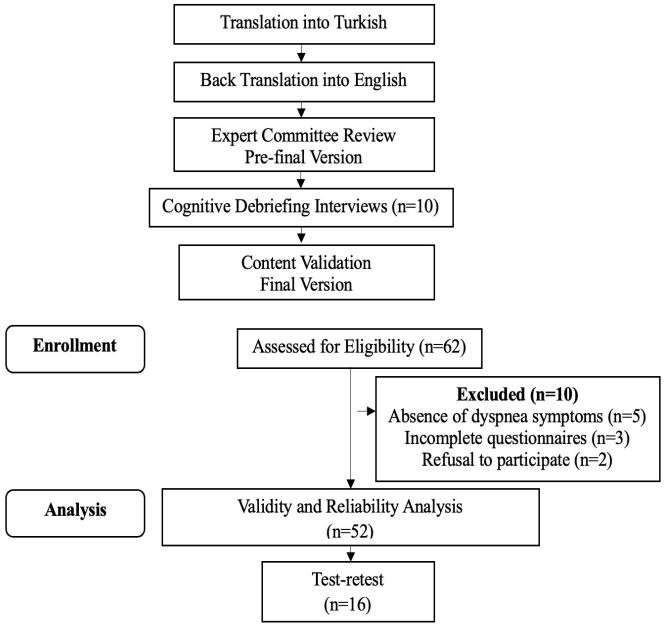

Figure 1. Flow diagram of the study.

Table 1. Characteristics of participants (n=52)

Variable	Mean ± SD n (%)
Age, years	60.80±11.43
Weight, kg	69.82±16.60
Height, m	1.70±0.09
BMI, kg/m^2	24.40±6.52
ECOG-PS	3.19±0.59
FACIT Dyspnea Scale-Short Form	23.58±9.18
CDS	25.71±11.55
CDS - effort	11.79±5.03
CDS - discomfort	7.17±4.58
CDS - anxiety	6.75±2.94
MRC	4.15±1.17
EuroQoL-5D-3L	0.07±0.37
EuroQoL-5D-3L (VAS)	44.13±23.57
Gender: Female/male	17 (32.69)/35 (67.31)
Age group: ≤59/60-69/≥70	22 (42.31)/19 (36.54) / 11 (21.15)
Marital status: Married/single	38 (73.08)/14 (26.92)
Education status: Primary school/ high school/university or above	32 (61.95)/13 (25.00)/7 (13.45)
Smoking: Current smoker/non-smoker/past smoker	2 (3.85)/18 (34.62)/32 (61.54)
Cancer type	
Lung	27 (51.92)
Colorectal	5 (9.62)
Breast	4 (7.69)
Kidney	3 (5.77)
Prostate	2 (3.85)
Stomach	2 (3.85)
Pancreas	2 (3.85)
Other	7 (13.46)
Chemotherapy: Yes/no	40 (76.92)/12 (23.08)
Radiotherapy: Yes/no	18 (34.62)/34 (65.38)
Hormone: Yes/no	2 (3.85)/50 (96.15)
Surgery: Yes/no	8 (15.38)/44 (84.62)

SD: Standard Deviation, n: Number; %: Percentage, kg: Kilogram, m: Meter; BMI: Body Mass Index, FACIT: Functional Assessment of Chronic Illness Therapy, VAS: Visual Analog Scale, CDS: The Cancer Dyspnea Scale, MRC: The Medical Research Council.

0.99 (Figure 2). In the CFA, the Goodness of Fit Index (GFI) χ^2/df was found to be 3.066, indicating that the FACIT-Dyspnea Scale has an acceptable fit, as this value falls within the range of 3.0 to 5.0. It was determined that the Normed Fit Index (NFI), comparative fit index (CFI) and GFI values of the FACIT-Dyspnea scale were acceptable, but the Root Mean Square Error of Approximation (RMSEA) values showed low fit.

Construct Validity

For construct validity, correlations between FACIT-Dyspnea Scale and ECOG-PS, MRC, CDS, EuroQoL-5D-3L scale were examined (Table 3). Statistically significant positive correlations were found between FACIT-Dyspnea Scale and ECOG-PS, MRC and CDS ($p<0.05$). Statistically significant negative correlations were found between FACIT-Dyspnea Scale and EuroQoL-5D-3L scale scores ($p<0.05$).

Reliability

Table 4 shows the results of Cronbach's α, test-retest and Split-Half tests conducted for the reliability of the FACIT-Dyspnea Scale. The Cronbach's α for FACIT-Dyspnea Scale was 0.973, which indicates that the FACIT-Dyspnea Scale has very high internal consistency. In addition, item-total correlations were examined for scale homogeneity. Item-total correlations for items in the FACIT-Dyspnea Scale ranged from 0.695 to 0.948. In the test-retest analysis conducted on 16 patients with cancer, the Turkish version of the FACIT-Dyspnea Scale showed high to excellent reproducibility in the test-retest analysis [ICC=0.85 (0.74-0.91)]. In the split-half test, the Cronbach's α of the first part of the FACIT-Dyspnea Scale was found to be 0.937 and the second part was found to be 0.955. The correlation coefficient between the two parts of the FACIT-Dyspnea Scale was 0.965, the spearman-brown coefficient was 0.982, and the guttman split-half coefficient was 0.979.

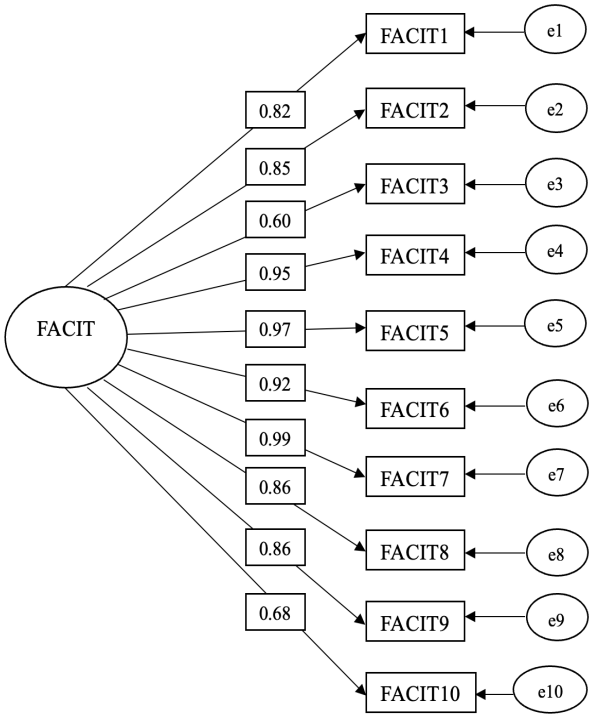

Figure 2. Path diagram of the confirmatory factor analysis
FACIT: Functional Assessment of Chronic Illness Therapy.

Table 2. Factor analysis of FACIT-Dyspnea Short Form

FACIT-Dyspnea Short Form items	Factor loadings	Eigenvalue	Variance explained
Q1	0.893	8.14	81.44
Q2	0.929	0.82	
Q3	0.742	0.43	
Q4	0.921	0.26	
Q5	0.955	0.19	
Q6	0.955	0.07	
Q7	0.955	0.06	
Q8	0.934	0.03	
Q9	0.940	0.00	
Q10	0.770	0.00	
Goodness of fit indices	**Values**	**Threshold values**	**Results**
χ^2/df	3.066	<5.00	Acceptable fit
NFI	0.938	>0.80	Acceptable fit
CFI	0.957	>0.90	Acceptable fit
GFI	0.902	>0.90	Acceptable fit
RMSEA	0.151	<0.08	Low fit

FACIT: Functional Assessment of Chronic Illness Therapy, χ^2/df: Chi-Square / Degrees of Freedom, NFI: Normed Fit Index, CFI: Comparative Fit Index, GFI: Goodness of Fit Index, RMSEA: Root Mean Square Error of Approximation.

Table 3. Construct validity of the FACIT-Dyspnea Short Form

	FACIT Dyspnea Scale-Short Form	
	r	p
ECOG-PS	0.274	**0.049***$^{\phi}$
MRC	0.808	**<0.001***$^{\phi}$
CDS - effort	0.738	**<0.001***$^{\phi}$
CDS - discomfort	0.721	**<0.001***$^{\phi}$
CDS - anxiety	0.656	**<0.001***$^{\phi}$
CDS	0.760	**<0.001***$^{\phi}$
EuroQoL-5D-3L	-0.459	**0.001***$^{\phi}$
EuroQoL-5D-3L (VAS)	-0.461	**0.001***$^{\phi}$

FACIT: The Functional Assessment of Chronic Illness Therapy, MRC: The Medical Research Council Dyspnea Scale, CDS: The Cancer Dyspnea Scale, VAS: Visual Analog Scale.
*: $p<0.05$, $^{\phi}$: Pearson Correlation Analysis.

Table 4. Cronbach's alpha and split-half test results of FACIT-Dyspnea Short Form			
Test (mean ± SD)	**Re-test (mean ± SD)**	**p**	**ICC**
28.69±2.89	28.63±3.05	0.564	0.85 (0.74-0.91)
Part	**Cronbach's alpha**		**Number of items**
Part 1	0.937		5
Part 2	0.955		5
FACIT-Dyspnea Scale	0.973		10
FACIT: Functional Assessment of Chronic Illness Therapy, SD: Standard Deviation, ICC: Intraclass Correlation Coefficients.			

DISCUSSION

Dyspnea is a respiratory discomfort experience that frequently develops in patients with cancer. The complex and multidimensional nature of dyspnea makes evaluation challenging. This study aimed to examine the validity and reliability of the Turkish version of the FACIT-Dyspnea Short Form in patients with cancer. The Turkish version of the FACIT-Dyspnea Short Form has demonstrated high reliability and validity, establishing it as an effective tool for assessing dyspnea in patients with cancer.

Psychometric studies on the FACIT-Dyspnea Form have been conducted in COPD and systemic sclerosis (7,8,22-24), with only one study examining its psychometric properties in patients with cancer (5). Ku et al. (5) examined the validation of the Korean version of the FACIT-Dyspnea Scale, reporting that 38.03% of the study population consisted of patients with breast cancer. However, they did not share information on the participants' cancer stages or the severity of dyspnea. In the current study, all participants had advanced cancer and 51.92% of the participants had lung cancer. The present study found that participants experienced moderate to severe levels of dyspnea.

In the EFA results, it was determined that the factor loadings of the items of the FACIT-Dyspnea Scale ranged from 0.770-0.955, and all items had high factor loadings. In the Turkish FACIT-Dyspnea Scale, the eigenvalue of the first factor was greater than one, the remaining factors were less than 1.0, and the first factor accounted for approximately 81.44% of the total variance. Similar to the current study, Choi et al. (7) reported the presence of a dominant first factor in the factor analysis performed to reduce the 33-item FACIT-Dyspnea questionnaire to 10 items, accounting for approximately 78% of the total variance.

In the CFA results, it was observed that the Turkish version of the FACIT-Dyspnea scale had acceptable fit indices for χ^2/df, NFI, CFI, and GFI except RMSEA. Similar to this study, Choi et al. (7) reported that the RMSEA was 0.152 in the CFA results. Although not all fit index values were statistically significant, it was suggested that the model fit could still be adequate. Additionally, since RMSEA is influenced by sample size, it may be disregarded in models with a small sample size (<250) (25,26). Based on this situation, the CFA indicates an acceptable fit to a unifactorial model. Consistent with the present study, Choi et al. (7), reported that the FACIT-Dyspnea Scale has a unifactorial structure, whereas Ku et al. (5) found that the Korean version of the FACIT-Dyspnea Scale exhibits a bifactorial structure.

Since dyspnea is influenced by physiological, psychological, social, and environmental factors, dyspnea questionnaires should be designed to comprise multidimensional assessments. In the current study MRC, CDS, ECOG-PS, EuroQoL-5D-3L and FACIT-Dyspnea Scale were significantly correlated. Numerous studies have reported the correlation between the MRC and the FACIT-Dyspnea Scale (5,7,22-24). This suggests that the dyspnea scales of each instrument can be used interchangeably in the measurement of dyspnea. The CDS is specifically designed for individuals with cancer and measures the psychometric properties of dyspnea. The MRC measures the difficulty experienced in daily functioning due to dyspnea. The FACIT-Dyspnea Short Form correlated highly with both scales, highlighting its ability to capture the multidimensional aspects of dyspnea experienced by patients with cancer and assess dyspnea severity and impact on daily living.

Performance status plays a vital role in both the functional level and prognosis of patients with cancer, as well as in determining the appropriate treatment plan. Ku et al. (5) reported a significant correlation between the ECOG-PS and the FACIT-Dyspnea scale in a Korean validation study. Damani et al. (27) found a significant correlation between the ECOG-PS and dyspnea severity in their study examining the effect of dyspnea prevalence and severity on HRQOL in patients with advanced cancer, and concluded that dyspnea severity was higher in individuals with worsening ECOG-PS scores. In line with the existing literature, the current study found that the presence and severity of dyspnea had a negative impact on performance status.

HRQoL is a measure of perceived physical and mental health (28). EuroQoL-5D-3L provides insights into both the physical and emotional parameters of HRQoL. Similar to previous studies (5,8,22,23), this research has confirmed a significant

correlation between dyspnea and both physical and emotional functioning. It has been noted that dyspnea negatively impacts physical and emotional well-being. The correlations of the FACIT-dyspnea questionnaire with dyspnea questionnaires, performance measures, and HRQoL assessments indicate that the FACIT-dyspnea questionnaire effectively measures different aspects of dyspnea, making it a suitable evaluation tool for assessing dyspnea in patients with cancer.

Reliability analysis was conducted using Cronbach's α, test-retest, and split-half methods. The Cronbach's α for the Turkish version of the FACIT-Dyspnea Scale was found to be 0.973, indicating excellent internal consistency among the items. In other validation studies, the FACIT-Dyspnea Scale Cronbach's α ranged from 0.90 to 0.949 (5,7,22,23). In the original version of the FACIT-Dyspnea Scale, item-total correlation coefficients ranged from 0.64 to 0.87 (7). Similar to this study, acceptable item-total correlations were observed among the items in the Turkish version of the FACIT-Dyspnea Scale. The Turkish version of the FACIT-Dyspnea Scale demonstrated high reability in the test-retest analysis (ICC=0.85) (0.74-0.91) Validation studies conducted on the original, Swedish and Korean versions of the FACIT-Dyspnea Scale reported ICCs ranging from 0.78 to 0.92, indicating acceptable retest reliability (5,7,22).

Limitations

The present study has some limitations. First, the current study included patients with various types of cancer. Focusing on a single type of cancer could have highlighted the effects of dyspnea in that specific cancer and demonstrated the efficacy of the FACIT-Dyspnea Scale. Second, due to the limited sample size, the discriminative ability of the FACIT-Dyspnea Scale could not be assessed according to cancer stages. In addition, the heterogeneity of the patient group in terms of cancer stages is also considered a limitation of the study.

CONCLUSION

In conclusion, the Turkish version of the FACIT-Dyspnea scale is valid and reliable for assessing the dyspnea of Turkish patients with cancer. The availability of a valid and reliable Turkish version of the FACIT-Dyspnea scale will enable clinicians and researchers to conduct a comprehensive assessment of dyspnea in patients with cancer. The use of the Turkish FACIT-Dyspnea scale in clinical practice and research will allow the monitoring of dyspnea in patients with cancer throughout their treatment and disease processes, providing feedback to healthcare professionals.

Ethics: The study was approved by the Dokuz Eylül University Non-invasive Research Ethics Committee (decision number: 2021/27-19, date: 06.10.20).

Informed Consent: All participants gave written consent.

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Conflict of Interest: The authors declare that there is no conflict of interest.

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