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Assessment of the fear of progression in Turkish cancer patients: a validation and reliability study fear of progression questionnaire short form

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Abstract

Background This study sought to translate and validate the Fear of Progression Questionnaire-Short Form (FoP-Q-SF) for use in assessing the FoP among Turkish cancer patients.

Methods A sample of 185 cancer patients who were undergoing active treatment at Ege University Oncology Clinic participated in this study. The FoP-Q-SF was translated into Turkish and its psychometric properties were assessed. The questionnaire's reliability was evaluated using Cronbach's alpha and McDonald's omega, while its validity was tested via confirmatory factor analysis (CFA) and correlation with established measures such as the Hospital Anxiety and Depression Scale (HADS) and European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire Core-30 (EORTC QLQ-C30).

Results The FoP-Q-SF demonstrated high internal consistency (Cronbach's alpha = 0.89, McDonald's omega = 0.89) and a strong unidimensional structure based on CFA (CFI = 0.987, TLI = 0.984, RMSEA = 0.078, SRMR = 0.076). Significant correlations were found between the FoP-Q-SF scores and related anxiety measures, including the HADS-D, HADS-A and EORTC QLQ-C30 emotional and total scores (0.395–0.578, $p < 0.01$). The known-groups validity analysis revealed that the FoP-Q-SF scores were higher among female cancer patients ($p < 0.001$), which was consistent with the findings of previous studies, while no significant associations were observed with cancer patients' age, marital status, perceived income, educational status or psychiatric history.

Conclusions The FoP-Q-SF is a valid and reliable tool for assessing the FoP among Turkish cancer patients, which renders it suitable for clinical and research applications in this population.

Keywords Fear of progression, Cancer, Validation, Türkiye

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Introduction

Over the past two decades, the field of oncology has undergone significant advances, including the development of improved detection methods and the introduction of new agents and treatment strategies. These developments have resulted in higher survival rates for many cancer patients, even in those diagnosed with advanced or metastatic disease. However, despite all the advancement, the lack of curative treatments, particularly at advanced stages, inevitably means that most patients experience cancer progression. The fear of progression (FoP) refers to an individual's the anxiety that cancer may recur or spread to other organs. The prevalence of the FoP among cancer patients varies significantly, with prior studies reporting rates ranging from 0 to 86%, depending on the patient population, type of cancer and tool used to measure this fear [1]. This wide prevalence range underscores the complexity of the FoP and the importance of tailored approaches to assessing and managing it in different clinical settings [2].

Whether cancer is diagnosed in the metastatic or early stage, it is crucial to not only focus on survival rates but also to actively work towards enhancing the patient's quality of life. Such efforts can make patients more comfortable and help them to cope better with the challenges of their treatment. The FoP is linked to a range of physical and psychological challenges, including fatigue, diminished quality of life, distorted illness perceptions, difficulties with psychological adjustment, reliance on maladaptive coping strategies (e.g. denial), intrusive thoughts and a heightened intolerance of uncertainty. It is also associated with low self-efficacy, reduced optimism and lack of social support, as well as with increased medical side effects [3–6].

Approximately 10–30% of cancer patients are clinically diagnosed with anxiety or depression, conditions that often persist throughout the disease trajectory [7]. Despite this prevalence, current tools and criteria for diagnosing psychiatric anxiety disorders (e.g., adjustment disorder, generalized anxiety disorder) are not tailored for individuals with chronic illnesses like cancer [8]. This limitation is particularly significant in Türkiye, which ranks among the upper countries in Europe for cancer incidence, with approximately 240,000 new cancer cases diagnosed annually according to GLOBOCAN data from 2022 [9]. These high prevalence rates in Türkiye highlight the urgent need for tools that can accurately assess and address cancer-specific psychological concerns, particularly Fear of Progression (FoP).

After it was determined that the FoP in relation to chronic illnesses such as cancer can lead to a decrease in patients' quality of life, studies were conducted on tests that could facilitate the evaluation of this issue. For instance, Herschbach and colleagues developed the Fear of Progression Questionnaire (FoP-Q) for this purpose, which demonstrated solid psychometric properties in patients with chronic conditions, including diabetes mellitus, rheumatic and inflammatory diseases and cancer, with a Cronbach's alpha of 0.70 [8]. The FoP-Q is a comprehensive self-report questionnaire comprised of 43 items, which are rated on a five-point Likert scale ranging from 'never' to 'very often'. The items are categorised into five dimensions namely, affective reactions, partnership/family issues, occupation, loss of autonomy and coping with anxiety. In addition to the full version of the FoP-Q, Mehnert et al. developed a short form of the questionnaire (FoP-Q-SF) that was specifically validated in a sample of breast cancer patients in Germany (Cronbach's alpha = 0.90) [10]. Subsequent validation studies of the FoP-Q-SF in English, Mandarin, Portuguese, and Malaysian not only reported consistently high reliability (Cronbach's alpha values ranging from 0.86 to 0.93) but also highlighted its utility as a cost-effective and versatile tool for assessing FoP in diverse clinical and research settings within psycho-oncology [11–13].

Building on the global validations of the FoP-Q-SF in Western and Eastern Asian populations, this study examines its applicability in Türkiye, a country with unique cultural and healthcare dynamics [10, 12–14]. Strong family ties, which often serve as the primary source of emotional and practical support for patients, play a central role in shaping the cancer care experience in Türkiye. Additionally, cultural perceptions surrounding mental health and emotional well-being can influence how psychosocial challenges like the fear of progression are recognized and addressed. While formal psycho-oncological support services are gradually evolving, they remain less accessible in many regions, reflecting broader challenges observed in psycho-oncology across Europe, where mental health services are often underprioritized [15, 16]. Validating the FoP-Q-SF for the Turkish context is a critical step towards addressing these challenges, enabling tailored interventions, and advancing research on the predictors and management of FoP in Turkish cancer patients. Therefore, this study aimed to translate and validate the FoP-Q-SF for use in Turkish cancer patients. By addressing this gap, the study aims to provide a culturally relevant tool that supports psychosocial assessment in oncology settings and encourages further exploration into the unique aspects of FoP in Türkiye.

Materials and methods

Inclusion

The study sample comprised adults currently receiving cancer treatment at Ege University Oncology Clinic who agreed to participate in the research. The study was conducted between September 2024 and November 2024. Psychometric guidelines recommend 10 participants per

item for validity and reliability analyses; accordingly, the 12-item FoP-Q-SF required at least 120 participants [17–19]. To ensure robust statistical power and generalizability, and to account for potential attrition or data quality issues, 185 participants were included in this study. All the patients who participated in the present study met the following inclusion criteria: (i) currently receiving active cancer treatment, (ii) at least one cycle has passed since the last progression assessment, (iii) had a diagnosis of cancer for at least six months, and (iv) were over 18 years of age.

Patients had to be literate and fluent in the local language. The participants were interviewed during their follow-up hospital visits. They were asked to self-administer the questionnaires; however, if a patient was illiterate or requested assistance, the questionnaire was administered face-to-face by the first author.

Instruments

Socio-demographic and clinical questionnaire

In this study, socio-demographic factors such as age, monthly income, marital status, place of residence, and education level were considered to ensure a diverse and representative sample. Additionally, clinical data such as the type of active cancer treatment (e.g., chemotherapy, immunotherapy, or radiotherapy), time since diagnosis, and disease stage were collected to account for the heterogeneity of the patient population. While these variables were not explicitly analyzed for their impact on Fear of Progression (FoP) scores, their inclusion contributes to the robustness and representativeness of the study sample.

Fear of progression questionnaire-short form (FoP-Q-SF)

The scale developed by Mehnert is a self-report questionnaire designed to measure concerns about disease progression in individuals with chronic illnesses. Ten items are rated on a six-point Likert scale (5 = always, 4 = very often, 3 = sometimes, 2 = rarely, 1 = never). The total score is calculated by summing the responses, resulting in an overall score that ranges from 12 to 60 points, where higher scores are associated with increased anxiety levels. The FoP-Q-SF is a unidimensional scale and does not include subscales or cutoff points [20]. In the original study, the scale demonstrated a total Cronbach's alpha of 0.90 for the 12 items [10].

Comparative measures

The selection of comparative measures in this study was guided by prior validation research of the FoP-Q-SF across various populations, which highlights the importance of evaluating fear of progression in relation to both psychological distress and quality of life [13]. The Hospital Anxiety and Depression Scale (HADS) and the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire Core-30 (EORTC QLQ-C30) were chosen for their demonstrated relevance in similar studies and their established validity in the Turkish population [21, 22]. HADS provides a robust framework for assessing anxiety and depression, key components strongly associated with fear of progression, while EORTC QLQ-C30 offers a comprehensive perspective on quality of life, capturing the broader impacts of physical and emotional well-being in cancer patients [3, 23].

Hospital anxiety and depression scale (HADS)

The HADS is an assessment tool used to evaluate anxiety and depression levels in patients outside of psychiatric clinics. It assesses both anxiety and depression through intertwined questions, albeit scoring them separately. Based on a patient's score, their condition is categorised as 'possible' or 'probable', which provides insight into their current mental state [24]. A Turkish validity and reliability study of the HADS was performed by Aydemir and colleagues, and their translation was used in the present study [21].

European organisation for research and treatment of cancer quality of life questionnaire core-30 (EORTC QLQ-C30)

The EORTC QLQ-C30 is a comprehensive 30-item Likert-type assessment tool [25]. Patients evaluate each item based on their experiences over the past week, with the response options typically ranging from 'Not at all' [1] to 'Very much' [4]. This self-assessment questionnaire measures the impact of both disease and cancer treatment on patients in terms of the physical, emotional, social and functional aspects. A Turkish validity and reliability study of the EORTC QLQ-C30 was conducted by Guzelant et al. in 2007 by Guzelant et al. to accurately assess the quality of life in cancer patients [22].

Language equivalence and pilot testing

The translation of the FoP-Q-SF involved forward translation, back translation and the harmonisation of the back-translated versions. Initially, permission to use the questionnaire was obtained from the original authors via email. The scale was then translated from its validated English version into Turkish by two psychiatrists and three oncologists using the parallel blind method. After the translations were compared and any inconsistencies were resolved, a certified translator back-translated the text into English. Both the English and Turkish versions were sent to the original authors, who approved their accuracy.

To evaluate the cultural and linguistic appropriateness of the Turkish version, a pilot test was conducted with 20 cancer patients undergoing active treatment. Feedback

from participants reported no difficulties in understanding the items. The pilot test results were thoroughly reviewed by the research team, and no modifications were deemed necessary. All the researchers agreed on the final version of the FoP-Q-SF used for the subsequent validity and reliability analyses in this study.

Statistical analyses

The statistical analyses in the present study were conducted using the Statistical Package for the Social Sciences (SPSS) version 25, the AMOS software package (IBM Corporation, Chicago, IL, USA), and JASP (Version 0.19.2) [Computer software]. The categorical variables were reported as frequencies (n) and percentages (%), while the numerical data were presented as means and standard deviations to illustrate the patient distributions. The normality of the variable distributions was assessed using the Skewness–Kurtosis values within the range of -2 to +2, complemented by the Shapiro-Wilk test for confirmation. The means and standard deviations of the subscales and total item scores of the scale were also calculated.

For the reliability analysis, Cronbach's alpha and McDonald's omega were calculated. A Cronbach's alpha value above 0.7 was considered acceptable in terms of internal consistency, while McDonald's omega was computed to provide a more robust reliability index, particularly in the presence of heterogeneous factor loadings. Internal consistency estimates with their 95% confidence intervals were reported. Corrected item-total correlations were calculated, with a >0.30 threshold used to ensure each item contributed adequately to the construct, in line with psychometric standards [26].

The validity of the scale was assessed using confirmatory factor analysis (CFA). Item-scale relationships were evaluated with factor loadings considered statistically significant at $p<0.05$, and loadings ≥ 0.3 were deemed acceptable for meaningful contributions to the construct being measured [17, 27]. Model fit was assessed using established cutoff criteria: Comparative Fit Index (CFI) >0.95 for good fit and >0.90 for acceptable fit, Tucker–Lewis Index (TLI) >0.95 for good fit and >0.90 for acceptable fit, root mean squared error of approximation (RMSEA) <0.05 for close fit, 0.05–0.10 for acceptable fit, and >0.10 for poor fit, and standardised root mean square residual (SRMR) <0.08, indicating a good model fit [28–31].

The known-groups validity was assessed using demographic variables such as age, gender, marital status, perceived income, and educational status, as well as clinical factors like psychiatric history. These variables were included based on their theoretical relevance to psychological outcomes and their potential to reflect differences in fear of progression. The analyses were conducted using Student's t-test, the Mann–Whitney U test, and one-way analysis of variance (ANOVA), with statistical significance set at $p<0.05$.

The relationships between the FOP-Q-SF scale scores and the scores for related measures such as the HADS and EORTC QLQ-C30 were evaluated using the Pearson correlation test. Effect sizes were interpreted based on Cohen's guidelines (small: $r=0.1$, medium: $r=0.3$, large: $r=0.5$) [32]. This assessment was intended to establish the concurrent validity of the utilised questionnaire by examining the relationships between the FOP-Q-SF scores and those of other validated measures.

By employing the above-mentioned methods, the present study comprehensively analysed the reliability and validity of the FOP-Q-SF, thereby ensuring the robustness and credibility of the reported results.

Ethical approval

Ethical approval was obtained from the Ege University Non-Interventional Ethical Committee (24-9.1T/55). Informed consent was obtained from all patients.

Results

Socio-demographic and medical variables

This study included 185 cancer patients with a median age of 61 years (range: 30–85). The majority were female (62.7%) and married (74.7%), with 60% reporting a monthly income below the minimum wage. Over half of the participants (54.5%) had completed primary school, and 24.3% had a history of psychiatric disorders. Among them, 20.5% had previously used psychiatric medications, and 10.2% were current users.

Regarding cancer characteristics, 33% of the patients were treated for breast cancer. Most (84.9%) were receiving chemotherapy, with 15.1% on immunotherapy. Intravenous treatments were predominant (92.4%), while 7.6% received oral therapies. Over half of the patients (55.1%) were undergoing 1st-line treatment, and 66.5% had been diagnosed more than a year ago (Table 1).

Item analysis and internal consistency

The mean FoP score for the 185 participating patients was 33.8 ± 11.1. The total scale demonstrated high reliability, with both Cronbach's alpha and McDonald's Omega coefficients at 0.89, indicating excellent internal consistency (Table 2). An analysis of Cronbach's alpha values after the removal of individual items revealed no significant changes, confirming the robustness of the scale. Item-total correlations ranged between 0.38 and 0.72, with no items falling below the acceptable threshold of 0.30 or displaying negative correlations, thus validating the retention of all items (Table 3).

Table 1 Clinical characteristics of the sample ($N = 185$)

	N	%
Age, mean +/- sd	59,1 +- 11,36	
Gender		
Female	116	62,7
Male	69	37,3
Mounthly income		
< 17,000 TL	111	60,0
17,000–30,000 TL	54	29,2
30,000–50,000 TL	20	10,8
Marital status		
Maried	137	74,1
Single	17	9,2
Widowed	20	10,8
Divorced	11	5,9
Having children		
No	22	11,9
Yes	163	88,1
Living environment		
Urban	160	86,5
Rural	25	13,5
Educational Status		
Primary school	86	46,5
Middle school	26	14
High school	44	23,8
University	29	15,68
Working Status		
Actively employed	15	8,1
Left before illness	59	31,9
Left after illness	46	24,9
On leave	10	5,4
Never worked	55	29,7
Caregiver		
Lives alone	20	10,8
Partner	125	67,6
Child	33	17,8
Bride/Groom	1	0,5
Elders	6	3,2
Psychiatric History		
Psychiatric Disease		
Yes	45	24,3
No	140	75,7
Psychiatric drug use		
Yes	38	20,5
No	147	79,5
Family Psychiatric History		
Yes	23	12,4
No	162	87,6
Disease Stage		
Metastatic	146	78,9
Early Stage	39	21,1
Time Since Diagnosis		
≤ 1 year	69	37.3
> 1 year	116	62.7
Treatment		

Table 1 (continued)

	N	%
Chemotherapy	157	84,9
Immunotherapy	28	15,1
Treatment Delivery Method		
Oral	14	7,6
Intravenous	171	92,4
Treatment Line		
1st line	102	55,1
2nd line	56	30,3
3rd line or more	27	14,6
Diagnosis		
Breast	61	33,0
Colorectal	35	18,9
Lung	24	13,0
Ovary	14	7,6
Melanoma	7	3,8
Others	44	23,8

Table 2 Internal consistency of the FoP-Q-SF

	Estimate	95% CI lower bound	95% CI upper bound
Cronbach's α	0.891	0.867	0.915
McDonald's ω	0.892	0.869	0.915

Validity analysis: construct and concurrent validity

To verify the unidimensional structure of the Fear of Progression Questionnaire Short Form (FoP-Q-SF) in the Turkish cancer patient sample, a Confirmatory Factor Analysis (CFA) was conducted. The analysis demonstrated an acceptable fit in terms of RMSEA (0.078, 90% CI: 0.059–0.098), an excellent fit in terms of CFI (0.987) and TLI (0.984), and a satisfactory fit according to SRMR (0.076). All items demonstrated significant loadings on the single factor, ranging from 0.46 to 0.86, suggesting that each item meaningfully contributes to the overall construct of Fear of Progression (Fig. 1). The statistically significant factor loadings for all items ($p < 0.001$) confirm that the FoP-Q-SF effectively measures a single construct in this sample.

The FoP-Q-SF demonstrated significant positive correlations with key anxiety-related measures, including the HADS Total Score ($r = 0.560$, $p < 0.001$), the HADS Anxiety Subscale ($r = 0.573$, $p < 0.001$), and the EORTC-Q30 Total Score ($r = 0.519$, $p < 0.001$) and Emotional Functioning Subscale ($r = 0.578$, $p < 0.001$). Moderate correlations were observed with the HADS Depression Subscale and certain EORTC-Q30 subscales. Additionally, a weak negative correlation was identified with the EORTC Global Health Status (r = -0.293, $p < 0.001$) (Table 4).

Known-groups validity

In the univariate analysis, the FoP-Q-SF scores were not found to be associated with the patients' age, gender, marital status, perceived income, educational status or psychiatric history. However, the FoP-Q-SF scores were found to be higher in the female patients ($p < 0.001$).

Table 3 Descriptive statistics, corrected item-Total correlations, and Cronbach's alpha if item deleted for the FoP-Q-SF

FoP Questioneire	Min	Max	Mean	Std. Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	1,00	5,00	2,88	1,164	0,669	0,877
2	1,00	5,00	2,49	1,230	0,714	0,875
3	1,00	5,00	3,08	1,274	0,525	0,884
4	1,00	5,00	2,44	1,367	0,535	0,884
5	1,00	5,00	2,56	1,322	0,563	0,882
6	1,00	5,00	3,31	1,443	0,379	0,892
7	1,00	5,00	2,74	1,507	0,563	0,882
8	1,00	5,00	2,54	1,339	0,629	0,878
9	1,00	5,00	3,06	1,479	0,722	0,873
10	1,00	5,00	3,15	1,349	0,636	0,878
11	1,00	5,00	3,32	1,540	0,637	0,878
12	1,00	5,00	2,40	1,423	0,611	0,879

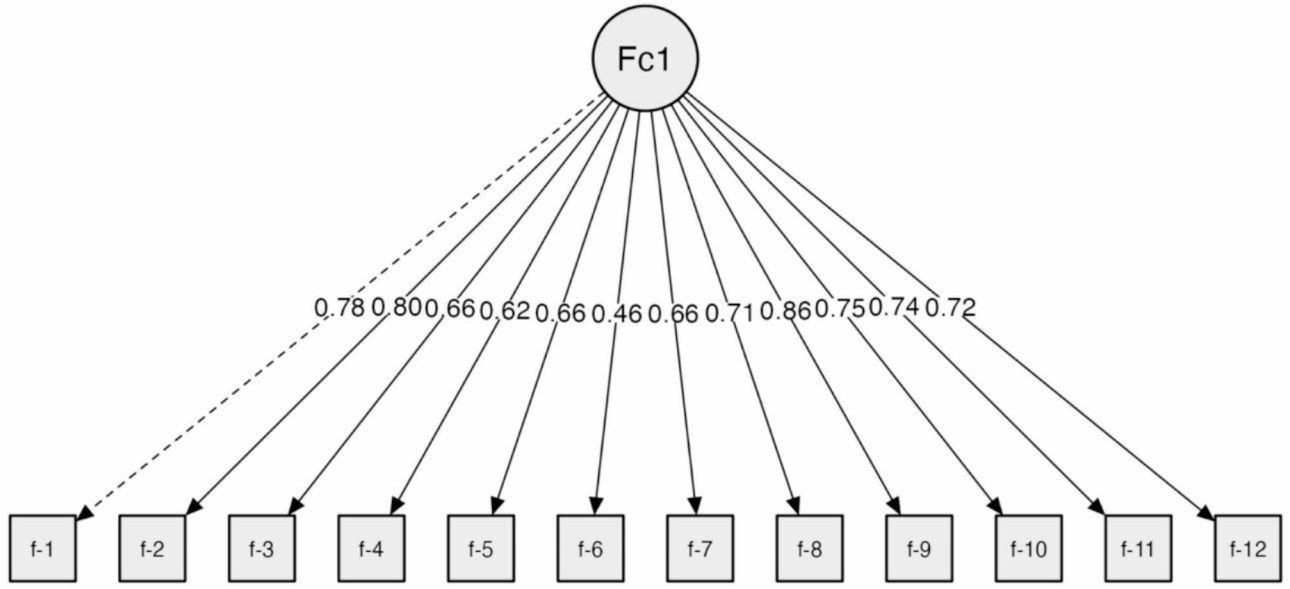

Fig. 1 Standardized factor loading of confirmatory factor analysis for FOPQ-SF

Table 4 Convergent validity: correlations between fear of progression (FoP-Q-SF) and HADS-A, HADS D and EORTC Q30

Questionnaire Scales	Mean Total Score	FoP-Q-SF
HADS—Total score	13,3	0,560*
HADS—Anxiety subscale	6,6	0,573*
HADS—Depression subscale	6,7	0.395*
EORTC-Q30-Total score	64,4	0,519*
EORTC-Global Health Status	8.7	-0,293*
EORTC-Symptom Items	26.5	0,454*
EORTC-Q30-Physical functioning	11,0	0,337*
EORTC-Q30-Role functioning	3,5	0,383*
EORTC-Q30- Emotional functioning	7,6	0,578*
EORTC-Q30-Cognitive functioning	3,2	0,417*
EORTC-Q30-Social functioning	3,8	0,346*

***p* < 0,001**

Discussion

Fear of progression (FoP) is a key psychological challenge for cancer patients, profoundly impacting their quality of life and treatment adherence. While not a formal psychiatric diagnosis, FoP encapsulates the fear, worry, and concern that cancer may return or worsen [33]. Elevated levels of FoP can become dysfunctional, adversely affecting well-being, quality of life, and social functioning [34]. Research suggests that approximately 50% of cancer survivors experience moderate to severe levels of FoP, and many patients express unmet needs in coping with this fear. Addressing FoP is a crucial aspect of psycho-oncology, and its accurate assessment is essential for understanding its impact on cancer patients. In this context, the FoP-Q-SF appears to be a practical and psychometrically sound tool for evaluating FoP among Turkish cancer patients, contributing to ongoing psycho-oncological research.

The FoP-Q-SF demonstrated high internal reliability, with both Cronbach's alpha (0.89) and McDonald's omega (0.89) exceeding the threshold of 0.70, confirming its strong internal consistency. Previous studies have reported similar reliability across different cultural contexts, such as the Persian (Cronbach's alpha = 0.84, McDonald's omega of 0.84) and Mandarin (Cronbach's alpha = 0.88) versions, as well as the Portuguese version (Cronbach's alpha = 0.86) [12, 13, 35]. The item-total correlations demonstrated a strong alignment between individual items and the scale's overall structure, similar to findings reported in other studies. These high and positive correlations indicate that the items measure similar constructs and that the internal consistency is robust, as observed in other validity studies [12, 13].

Studies have consistently demonstrated the one-dimensional nature of the Fear of Progression Questionnaire Short Form (FoP-Q-SF) through confirmatory factor analyses (CFA), highlighting its capacity to measure a single, coherent psychological construct [10, 14]. Our findings are consistent with these results, as the FoP-Q-SF exhibited strong construct validity and robust item loadings across diverse cultural adaptations, including English, Portuguese, Chinese, and Persian versions [10, 12, 13, 35]. In our study, the item loadings mirrored those reported in previous validations, indicating that each item significantly contributes to the overarching construct of fear of progression [11, 13, 14, 35]. This alignment across various cultural contexts underscores the FoP-Q-SF's reliability and utility as a standardized tool for assessing fear of progression in cancer patients,

further supporting its applicability in both clinical and research settings.

In this study, strong correlations were observed between the FoP-Q-SF and the HADS total score and anxiety subscale, with moderate correlations for the depression subscale. These findings are consistent with other validation studies, which also reported strong associations with HADS scores, particularly anxiety [12, 13, 35]. Regarding quality of life, the moderate correlations found between the FoP-Q-SF and various functional domains align with previous findings from the Persian and Chinese studies, which reported similar relationships with global health and functional subscales [12, 35]. The weak negative correlation between the FoP-Q-SF and global health in this study suggests that better perceived health status is associated with lower fear of progression. These results highlight the robust convergent validity of the FoP-Q-SF across different populations and contexts.

With regard to known-groups validity, higher scores were found among female patients ($p < 0.001$), consistent with prior studies. A meta-analysis revealed that female patients experienced psychiatric symptoms more deeply than males, and another showed higher levels of fear of recurrence in women [36–38]. This may be explained by women's greater tendency to express psychiatric needs and socio-cultural factors such as income disparities, exposure to violence, and gender-based labor division [39, 40].

Theoretical and practical implications

The Fear of Progression Questionnaire-Short Form (FoP-Q-SF) has proven to be a cost-effective and valid tool for assessing fear of progression in Turkish cancer patients. Its robust psychometric properties and unidimensional structure make it a valuable resource for both clinical and research applications. Higher FoP, which can disrupt coping mechanisms, treatment adherence, and overall quality of life similar to anxiety and depression emphasize the necessity of early identification and timely intervention [20, 41]. Furthermore, research underscores that FoP remains one of the most frequently unmet psychosocial needs during cancer treatment and survivorship phases [42]. Recent studies have also highlighted the broader implications of elevated FoP levels, particularly their multidimensional impact on social functioning and healthcare utilization. Patients with heightened FoP may display avoidance behaviors or excessive threat monitoring, which can interfere with adherence to surveillance protocols and treatment regimens. Integrating the FoP-Q-SF into routine psycho-oncological care can provide a structured framework for addressing these challenges.

Routine use of the FoP-Q-SF in oncology settings could enable oncologists to identify patients at risk of poor psychosocial outcomes and facilitate timely referrals for psycho-oncological support. Such interventions may significantly improve treatment adherence, enhance the quality of care, and address unmet psychosocial needs.

Limitations and future directions

This study has several limitations that should be acknowledged. First, although the sample size was sufficient for confirmatory factor analysis, it posed challenges for conducting subgroup analyses, such as factorial invariance testing. For example, the relatively small size of the male subgroup ($n = 69$) limited the reliability of invariance analysis results. Second, the heterogeneity of the cancer types, stages, and treatments (e.g., chemotherapy, immunotherapy) included in the study may influence the generalizability of the findings. For instance, more advanced stages of cancer may be associated with higher levels of Fear of Progression (FoP), and different cancer types might elicit varying levels of FoP [43]. Furthermore, the predominance of female participants and metastatic cases in the sample might limit the representativeness of the broader population of cancer patients. Additionally, the cross-sectional design of this study did not allow for the evaluation of changes in FoP over time.

Building on these limitations, future investigations may delve into various aspects to further enhance the understanding and utility of the FoP-Q-SF. Longitudinal research is needed to assess the sensitivity of the FoP-Q-SF to changes over time and its effectiveness in monitoring psychological outcomes throughout the cancer trajectory. Additionally, future studies should explore how demographic and clinical factors such as gender, treatment modality, and cancer stage influence FoP-Q-SF scores. While prior studies have focused on specific cancer types like breast and colorectal cancer, validating the FoP-Q-SF in a wider range of cancer types and treatment contexts, including oral versus intravenous therapies and immunotherapy, would enhance its generalizability [44, 45]. Expanding its validation to other populations, such as caregivers of cancer patients, and establishing cut-off values for different FoP severity levels in cancer patients could further solidify its clinical and research applications.

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Author contributions

G.Ş. conceived and designed the study. G.Ş., H.C.Y and C.A. contributed to data collection and analysis. P.A and Ö.Ö.S. provided critical revisions and contributed to the interpretation of data. All authors read and approved the final manuscript.

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Data availability
The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
Ethical approval was obtained from the Ege University Non-Interventional Ethical Committee (24-9.1T/55). Informed consent was obtained from all patients.

Competing interests
The authors declare no competing interests.

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References

1. Lebel S, Mutsaers B, Tomei C, Leclair CS, Jones G, Petricone-Westwood D, et al. Health anxiety and illness-related fears across diverse chronic illnesses: A systematic review on conceptualization, measurement, prevalence, course, and correlates. PLoS ONE. 2020;15(7):e0234124.
2. Hinz A, Schulte T, Mehnert-Theuerkauf A, Richter D, Sender A, Brock H, et al. Fear of cancer progression: A comparison between the fear of progression questionnaire (FoP-Q-12) and the concerns about recurrence questionnaire (CARQ-4). Healthcare. 2024;12(4):435.
3. Tran TXM, Jung S-Y, Lee E-G, Cho H, Kim NY, Shim S, et al. Fear of cancer recurrence and its negative impact on health-related quality of life in long-term breast cancer survivors. Cancer Res Treatment: Official J Korean Cancer Association. 2022;54(4):1065–73.
4. Hong SJ, Shin N-M, Jung S. A predictive model of fear of cancer recurrence for patients undergoing chemotherapy. Support Care Cancer. 2020;28:4173–81.
5. Llewellyn CD, Weinman J, McGurk M, Humphris G. Can we predict which head and neck cancer survivors develop fears of recurrence? J Psychosom Res. 2008;65(6):525–32.
6. Koch L, Jansen L, Brenner H, Arndt V. Fear of recurrence and disease progression in long-term (≥ 5 years) cancer survivors—a systematic review of quantitative studies. Psycho-oncology. 2013;22(1):1–11.
7. Mitchell AJ, Chan M, Bhatti H, Halton M, Grassi L, Johansen C, Meader N. Prevalence of depression, anxiety, and adjustment disorder in oncological, haematological, and palliative-care settings: a meta-analysis of 94 interview-based studies. Lancet Oncol. 2011;12(2):160–74.
8. Herschbach P, Berg P, Dankert A, Duran G, Engst-Hastreiter U, Waadt S, et al. Fear of progression in chronic diseases: psychometric properties of the fear of progression questionnaire. J Psychosom Res. 2005;58(6):505–11.
9. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, Jemal A. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. Cancer J Clin. 2024;74(3):229–63.
10. Mehnert A, Herschbach P, Berg P, Henrich G, Koch U. Fear of progression in breast cancer patients–validation of the short form of the fear of progression questionnaire (FoP-Q-SF). Z Psychosomat Med Psychother. 2006;52(3):274–88.
11. Hamid NA, Hamdan NA, Iman Leong Bin Abdullah MF. Validation of the Malay version of the fear of progression Questionnaire-Short form (FOP-Q-SF-M) in Malaysian cancer patients. Malaysian J Med Health Sci. 2021(3).
12. Mahendran R, Liu J, Kuparasundram S, Griva K. Validation of the english and simplified Mandarin versions of the fear of progression questionnaire–short form in Chinese cancer survivors. BMC Psychol. 2020;8:1–7.
13. Silva S, Bártolo A, Santos IM, Paiva D, Monteiro S, editors. Validation of the Portuguese version of the fear of progression Questionnaire-Short form (FoP-Q-SF) in Portuguese cancer survivors. Healthcare: MDPI; 2022.
14. Hinz A, Mehnert A, Ernst J, Herschbach P, Schulte T. Fear of progression in patients 6 months after cancer rehabilitation—a validation study of the fear of progression questionnaire FoP-Q-12. Support Care Cancer. 2015;23:1579–87.
15. Grassi L, Fujisawa D, Odyio P, Asuzu C, Ashley L, Bultz B, et al. Disparities in psychosocial cancer care: a report from the international federation of Psycho-oncology societies. Psycho-Oncology. 2016;25(10):1127–36.
16. Hook K, Bogdanov S. Mental health care in Eastern Europe and central Asia: an analysis of needs and a call for greater investment. Lancet Reg Health–Europe. 2021;10.
17. Tabachnick BG, Fidell LS, Ullman JB. Using multivariate statistics: pearson Boston. MA; 2013.
18. Stevens J. Applied multivariate statistics for the social sciences. Lawrence Erlbaum Associates Mahwah, NJ; 2002.
19. Sousa VD, Rojjanasrirat W. Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: a clear and user-friendly guideline. J Eval Clin Pract. 2011;17(2):268–74.
20. Herschbach P, Dinkel A. Fear of progression. Psycho-oncology. 2013:11–29.
21. Aydemir Ö, Guvenir T, Kuey L, Kultur S. Validity and reliability of Turkish version of hospital anxiety and depression scale. Turk Psikiyatri Derg. 1997;8(4):280–7.
22. Guzelant A, Goksel T, Ozkok S, Tasbakan S, Aysan T, Bottomley A. The European organization for research and treatment of cancer QLQ-C30: an examination into the cultural validity and reliability of the Turkish version of the EORTC QLQ-C30. Eur J Cancer Care. 2004;13(2):135–44.
23. Humphris GM, Watson E, Sharpe M, Ozakinci G. Unidimensional scales for fears of cancer recurrence and their psychometric properties: the FCR4 and FCR7. Health Qual Life Outcomes. 2018;16:1–12.
24. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatrica Scandinavica. 1983;67(6):361–70.
25. Aaronson NK, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ, et al. The European organization for research and treatment of cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. JNCI: J Natl Cancer Inst. 1993;85(5):365–76.
26. Streiner DL, Norman GR, Cairney J. Health measurement scales: a practical guide to their development and use. Oxford University Press; 2024.
27. Tinsley HE, Brown SD. Multivariate statistics and mathematical modeling. Handbook of applied multivariate statistics and mathematical modeling: Elsevier; 2000. pp. 3–36.
28. Bentler PM, Bonett DG. Significance tests and goodness of fit in the analysis of covariance structures. Psychol Bull. 1980;88(3):588.
29. Lt H, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct Equation Modeling: Multidisciplinary J. 1999;6(1):1–55.
30. Kenny DA, Kaniskan B, McCoach DB. The performance of RMSEA in models with small degrees of freedom. Sociol Methods Res. 2015;44(3):486–507.
31. Tabachnick BG, Fidell LS. Using multivariate statistics. Allyn & Bacon. Needham Heights, MA. 2001.
32. Cohen J. Statistical power analysis for the behavioral sciences. routledge; 2013.
33. Grassi L, Caruso R, Riba M, Lloyd-Williams M, Kissane D, Rodin G, et al. Anxiety and depression in adult cancer patients: ESMO clinical practice guideline. ESMO Open. 2023;8(2):101155.
34. Dinkel A, Herschbach P. Fear of progression in cancer patients and survivors. Psycho-oncology. 2018:13–33.
35. Alimolk FH, Patterson P, McDonald FEJ, Asghari-Jafarabadi M, Ahmadi F, Karimimoghaddam Z, Zenoozian S. The Persian version of the fear of progression questionnaire's short form (FOPQ-SF): psychometric features among cancer patients. J Gastrointest Cancer. 2025;56(1):11.
36. Linden W, Vodermaier A, MacKenzie R, Greig D. Anxiety and depression after cancer diagnosis: prevalence rates by cancer type, gender, and age. J Affect Disord. 2012;141(2–3):343–51.
37. Parás-Bravo P, Paz-Zulueta M, Boixadera-Planas E, Fradejas-Sastre V, Palacios-Ceña D, Fernández-de-Las-Peñas C, Alonso-Blanco C. Cancer patients and anxiety: a gender perspective. Int J Environ Res Public Health. 2020;17(4):1302.
38. Pang C, Humphris G. The relationship between fears of cancer recurrence and patient gender: a systematic review and meta-analysis. Front Psychol. 2021;12:640866.
39. Salk RH, Hyde JS, Abramson LY. Gender differences in depression in representative National samples: Meta-analyses of diagnoses and symptoms. Psychol Bull. 2017;143(8):783.
40. Reiss F. Socioeconomic inequalities and mental health problems in children and adolescents: a systematic review. Soc Sci Med. 2013;90:24–31.
41. Pinquart M, Duberstein P. Depression and cancer mortality: a meta-analysis. Psychol Med. 2010;40(11):1797–810.
42. Harrison JD, Young JM, Price MA, Butow PN, Solomon MJ. What are the unmet supportive care needs of people with cancer? A systematic review. Support Care Cancer. 2009;17:1117–28.

43. Luigjes-Huizer YL, Tauber NM, Humphris G, Kasparian NA, Lam WW, Lebel S, et al. What is the prevalence of fear of cancer recurrence in cancer survivors and patients? A systematic review and individual participant data meta-analysis. Psycho-Oncology. 2022;31(6):879–92.
44. Ocalewski J, Michalska P, Izdebski P, Jankowski M, Zegarski W. Fear of cancer progression and health behaviors in patients with colorectal cancer. Am J Health Behav. 2021;45(1):138–51.
45. Ban Y, Li M, Yu M, Wu H. The effect of fear of progression on quality of life among breast cancer patients: the mediating role of social support. Health Qual Life Outcomes. 2021;19:1–9.

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