

TURKISH VALIDITY AND RELIABILITY STUDY OF CANCER EMPOWERMENT SCALE

Elanur Yılmaz Karabulutlu¹, Gülcan Bahçecioğlu Turan² & Seda Karaman³

¹Department of Nursing, Faculty of Health Sciences, Erzurum Teknik University, Erzurum, Turkey

²Department of Nursing, Faculty of Health Sciences, Fırat University, Elazığ, Turkey

³Department of Internal Medicine Nursing, Faculty of Nursing, Ataturk University, Erzurum, Turkey

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SUMMARY

Background: The present study aims to adapt “Cancer Empowerment Scale” to Turkish and to test its validity and reliability.

Subjects and methods: This methodological study consisted of 286 cancer patients receiving treatment. Cancer Empowerment Scale (CES) were used in this study.

Results: The scale’s content validity index was found as .96. Total Cronbach’s alpha coefficient of the scale is 0.93. Cronbach’s alpha coefficient is 0.92 for personal strength dimension, 0.95 for social support dimension, 0.87 for healthcare and 0.94 for community support. Item factor loads were found to range between 0.40 and 0.87 and item total correlation coefficients were found to be between 0.32 and 0.59. Confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) conducted supported the 4 factor structure of the scale. CFA results showed good fit index values.

Conclusions: Turkish version of Cancer Empowerment Scale is a valid and reliable measurement tool to evaluate the empowerment states of cancer patients. With this scale, it is thought that by evaluating the empowerment status of cancer patients and determining the deficiencies in this issue, it will provide supportive interventions to patients in clinical practice according to their needs.

Key words: cancer empowerment scale – reliability - Turkish adaptation - validity

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INTRODUCTION

The developments in diagnosis, evaluation and treatment opportunities along with technological developments have led to a decrease in mortality at a young age, increase in life expectancy, control of infectious diseases in many countries and increases in the number of chronic diseases (Korkmaz et al. 2019). Cancer, which is accepted to be among chronic diseases, is considered as one of the important health problems of our day due to its frequency and high mortality rates and increasing environmental cancer causing factors (World Health Organization 2018, Hausman 2019). For this reason, empowering cancer patients has become a significant issue especially with the increase in the number of patients fighting cancer as a chronic disease (Siegel et al. 2020, van den Berg et al. 2013).

Empowerment of cancer patients is an empowerment process in which patients take their disease, treatment and care under control and specialize in their disease (van den Berg et al. 2013, Marzorati et al. 2018). With the empowerment of cancer patients, the aim is to enable patients to take active part in their own care by increasing their self-confidence, to inform patients about their disease, to authorize the patient, to provide peer support, to enable patients to fulfil their normal daily activities and to meet their basic needs, to conduct their daily roles, to maintain their health and well-being and to increase their social support (van den Berg et al. 2013, Jørgensen et al. 2018,

Marzorati et al. 2018). In this context, “empowered patient” defines patients who are the active subjects of the empowerment process and who become enabling individuals (Nazlı & Oğuz 2018, Bailo et al. 2019). Therefore, it is thought that the concepts of patient participation, participation in health services, self-management and patient-oriented care are effective in the empowerment of patients (Nazlı & Oğuz 2018).

The issue of empowering patients has been receiving increasing attention recently and it is considered as important from different perspectives (Chiapperino & Tengland 2016). The first of these perspectives is the fact that empowerment is a social right and that all individuals should be supported to gain strength and mastery in their lives, regardless of who they are (Agner & Braun 2018). Another perspective is that patient empowerment potentially contributes to the quality of life and well-being of patients (Bailo et al. 2019). The third perspective is that patient empowerment is necessary in health system due to limited resources which require patients to take more responsibility (Khuntia et al. 2017, Bailo et al. 2019). Patient empowerment is becoming more significant in studies related with healthcare and health. It has been shown patient empowerment in chronic diseases causes increased patient satisfaction related with care, dependence and care results (Kambhampati et al. 2016, Yeh et al. 2018). In studies conducted with the empowerment of cancer patients, it has been found that it has a positive effect on patients’

coping with cancer and pain management and increases quality of life (Shin & Park 2017, Castro et al. 2016). However, questions still remain about empowering the barriers of patients with different cancer types in managing their care in general (Jørgensen et al. 2018).

“Cancer Empowerment Scale” developed by Van den Berg et al. in 2013 is a 40 item scale that has a high validity and reliability and it was developed to understand whether patients are getting stronger in dealing with the disease during their illness (van den Berg et al. 2013). In literature review, no scales were found in Turkey evaluating whether patients got stronger in dealing with the disease during their illness. For this reason, it is thought that translating this scale into Turkish, evaluating the empowerment states of cancer patients and finding out the deficiencies will provide patients with supportive interventions according to their needs.

Research questions

- Is Cancer Empowerment Scale a valid scale for Turkish community?
- Is Cancer Empowerment Scale a reliable scale for Turkish community?

SUBJECTS AND METHODS

Type of the Study

The study has a methodological type.

Sample and Population of the Study

Cancer patients receiving treatment as inpatient in the Oncology and Hematology Clinic of a university hospital in Erzurum, Turkey between July 2017 and December 2018 formed the population of the study. 286 cancer patients who agreed to participate within the aforementioned population between the specified dates were included in the sample. It is recommended to reach a group that is at least 5-10 times the number of scale items for the adaptation of a scale into another culture (Seçer 2015). For this reason, the scale aimed to reach at least five times of the number of items in the scale (40) and thus, 286 patients were reached.

Data Collection Instruments

Personal Information Form

The form includes questions regarding the demographic features of the patients (age, gender, marital status, educational status) and questions about the disease (type of cancer, duration of disease, stage, treatment received).

Cancer Empowerment Scale (CES)

Cancer Empowerment Scale” developed by Van den Berg et al. in 2013 is a 40 item scale developed to understand the empowerment states of patients in dealing with their disease during their illness (van den

Berg et al. 2013). It is a 5-Likert type scale. 1 shows the response “totally disagree”, 2 shows “disagree”, 3 shows “neutral”, 4 shows “agree” and 5 shows “totally agree”. It consists of 4 dimensions as personal strength (19 items; 3,4,10,12,13,15,18,20,21,26,30,31,32,33,34,35,37,38,40), social support (9 items; 5,7,8,9,16,24,25,27,39), healthcare (6 items; 1,6,14,17,22,29) and community support (6 items; 2,11,19,23,28,36). The increase in the total score and sub-dimension scores of the scale shows that the patients have been empowered during this disease process.

Data Collection Procedure

In the study, the data were collected from inpatient cancer patients of a university hospital in Erzurum between July 2017 and December 2018. The data were collected with “Personal Information Form” and “Cancer Empowerment Scale” in patients’ rooms by the researcher GBT through face-to-face interview in 10-15 minutes after the patients were provided with the required information. The researcher reached 380 cancer patients who were receiving treatment in the specified dates. The study was completed with 286 patients because 65 of these patients were did not speak Turkish (it was not possible to communicate), 26 of these patients did not want to participate in the study and 3 patients quit while filling in the questionnaire form. With the number of obtained data, the sample size was considered to be sufficient and the process of filling in questionnaires was stopped on December 30.

Data Assessment

Statistical software program SPSS 17.0 and LISREL 8.8 package program were used to analyse the data obtained. The information in the Personal Information Form of the patients was assessed with numbers and percentage. For validity study; expert views, Bartlett tests, Kaiser-Meyer-Olkin Index (KMO), Exploratory Factor Analysis, Confirmatory Factor Analysis and Principal Component Analysis were used to find out the content and construct validity. For reliability study; Cronbach’s a coefficient, Pearson Correlation analysis, item-total score correlation were used to find out the internal consistency and homogeneity.

Ethical Considerations

Written permission was taken from the owner of the scale to adapt the Cancer Empowerment Scale into Turkish. 17/04/2017 dated and 2017-3/12 numbered approval was taken from a University Faculty of Nursing Ethics Committee and written official permission was taken from the hospital the study was conducted in.

Stages in adaptation of the scale to Turkish

The scale was translated into Turkish and then back translated for language validity. For the evaluation of content validity, the scale was presented to the opinions of 7 experts. The experts were asked to evaluate whether each item measured cancer patients’ empowerment

states and to evaluate the understandability of the items between 1 and 4 on a chart. On this chart, 1 was used as “not appropriate”, 2 was used as “should be made appropriate”, 3 was used as “appropriate but needs minor changes” and was used as “very appropriate”. After content validity was completed, the scale was evaluated by a Turkish language expert in terms of the language used, meaning, discourse and grammar. Validity of the scale was tested with construct analysis; test-retest validity for two weeks during the data collection process, internal consistency and item analysis method were used to measure reliability (Çapık et al. 2018, Güngör 2016).

RESULTS

When the patients’ descriptive features were examined, the mean age of the patients was found as 54.03±16.71. It was found that 57.7% (165) of the patients were male, 88.1% (252) were married, 32.2% were primary education graduates. It was found that 33.5% (96) of the patients had genitourinary system cancer and 45.8% (131) had stage 2 disease, 55.2% (158) had a disease duration of 1-5 years and 38.5% (110) were receiving chemotherapy-radiotherapy (C-R) treatment. 59.4% (169) of the patients were found to have metastasis (Table 1).

Validity

Content Validity

Content Validity Index (CVI) was used to prove both language and culture equivalence and content validity of the scales with numerical values and to evaluate expert opinions healthily. >0.80 content validity indicates the adequacy level of the items (Çapık et al. 2018). Analysis result showed that Content Validity Index (CVI) was 0.96. In this case, the scale’s content validity was found to be statistically significant (Çapık et al. 2018). Thus, no items were omitted from the scale.

Exploratory Factor Analysis

In Table 2, it can be seen that KMO value of the scale is 0.91, while Bartlett sphericity test value is $\chi^2=797.306$ (df = 780; p=0.000) significant. KMO test is accepted as the sample adequacy measurement technique (Seçer 2015). KMO value being lower than 0.50 is interpreted as it is not possible to continue factor analysis, while KMO value being 0.90 and higher is interpreted as marvellous sample adequacy (Çokluk et al. 2016). KMO value obtained from the study shows that adequate sample was reached. The values obtained in the study indicated that factor analysis could be performed on the data and that analyses could be continued.

Factor analysis showed that the scale had four dimensions, in parallel with the original structure of the scale and that it explained 58.224% of the total variance. It is stated that the variance rate explained by a scale should be higher than at least 52% (Seçer 2015).

Table 1. Descriptive Characteristics of the Patients

	n	%
Mean age (Mean ±SD)	54.03±16.71	
Gender		
Female	121	42.3
Male	165	57.7
Marital Status		
Married	252	88.1
Single	34	11.9
Level of Education		
Illiterate	46	16.1
Literate	70	24.5
Primary	92	32.2
High school	51	17.8
College/University and higher	27	9.4
Disease type		
Lung CA	63	22.0
Breast CA	59	20.6
Gastrointestinal System Cancers	45	15.7
Genitourinary System Cancers	96	33.5
Endocrine System Cancers	7	2.4
Leukaemia	6	2.1
Skin cancers	10	3.5
Disease stage		
Stage 1	63	22
Stage 2	131	45.8
Stage 3	72	25.2
Stage 4	20	7.0
Disease duration		
0-1 years	96	33.6
1 -5 years	158	55.2
5 years and longer	32	11.1
Presence of metastasis		
Yes	116	40.6
No	169	59.4
Treatments received		
Chemotherapy	107	37.4
Radiotherapy	6	2.1
Hormonotherapy	4	1.4
Surgical treatment	33	11.5
K-R	110	38.5
K-R-C	5	1.7
K-C	21	7.3

Table 2. The EFA results of Cancer Empowerment Scale

Value of KMO	0.91
Value of Bartlett’s Test	
χ^2	7974.306
df	780
p	0.000
Total Variance Explained %	58.224
Value of Eigenvalues	
Personal Strength	11.784
Social support	5.940
Healthcare	2.440
Community	3.125

Table 3. Cronbach’s alpha, item number, score average, standard deviation and correlation values of the total and sub-dimensions of Cancer Empowerment Scale

Factor	Personal strength	Social support	Healthcare	Community	Cronbach’s alpha	Item number	Mean ± SD
Personal strength	1				0.92	19	76.19±10.09
Social support	0.273*	1			0.95	9	33.88±8.29
Healthcare	0.451*	0.318*	1		0.87	6	23.33±4.37
Community support	0.502*	0.076	0.219*	1	0.94	6	20.21±6.00
Total Empowerment	0.852*	0.633*	0.633*	0.622*	0.93	40	153.68±20.35

*p<0.01

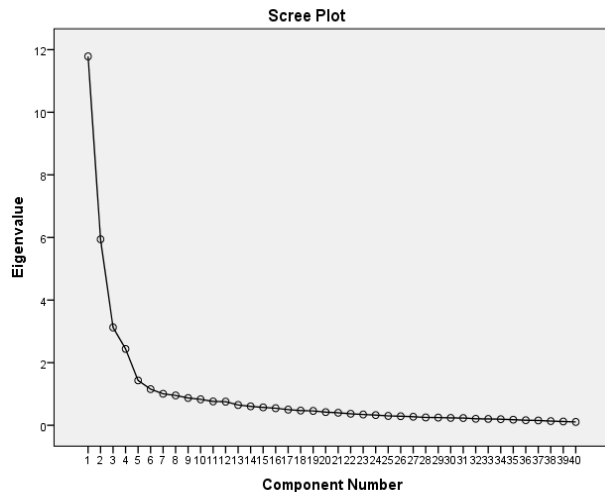


Figure 1. Scree plot of the scale

Eigenvalues of the scale dimensions were calculated as 11.784 for personal strength dimension, as 5.940 for social support dimension, 2.440 for healthcare dimension and as 3.125 for community dimension. When the factor load values of the scale were checked by using Varimax rotation techniques, it was found that all of these values were higher than 0.32 (0.40-0.87) and thus it was found that there were no items that should be omitted from the scale (Seçer 2015). Scree plot of the scale is shown in Figure 1.

The scree plot graph confirms the 40-item and four dimension structure of the scale. Finally, correlation values between the factors of the scale were checked and whether there were multiple connection problems in the scale was tested. Table 3 shows the correlation values.

Çokluk et al. (2016) stated that correlation values between the factors should not be too high ($\beta > 0.85$) in order to be able to speak of discriminant validity in a scale (Çokluk et al. 2016). Table 3 shows that the correlation coefficient between the factors is smaller than 0.85 and that the scale does not have multiple connection problem.

Confirmatory Factor Analysis

After exploratory factor analysis showed the four factor structure of the scale, confirmatory factor analysis was made to confirm this structure. Figure 2 shows the path diagram obtained with confirmatory factor analysis.

The factor structure obtained through the confirmatory factor analysis of Cancer Empowerment Scale shows that the four dimension scale structure tested with EFA is confirmed. Table 4 shoes CFA fit values.

Table 4 shows that fit index values of the model were found as $\chi^2/df = 2.63$, RMSEA = 0.076, CFI = 0.90, RMR = 0.062, SRMR = 0.056 and NFI = 0.92 and model fit was found as acceptable (Capik 2014).

As a result of EFA and CFA, it was found that Turkish form of 40-item Cancer Empowerment Scale with 4 sub-dimensions was confirmed with no changes in the original scale form. All the results obtained show that the scale has high validity in Turkish culture.

Reliability

In the analyses conducted for reliability, the data were reapplied to 80 patients from the sample on which EFA was conducted and pretest-posttest correlation was found as 0.99 ($p < 0.001$). This value showed that the scale had high external reliability and a stable structure (Tavşanel 2019, Tezbaşaran 2008). In addition, Cronbach’s α internal consistency coefficient was tested to find out the internal consistency and this value was measured as 0.93 for the whole scale. Internal consistency coefficient was found as 0.92 for personal strength dimension, as 0.95 for social support, as 0.87 for health care and as 0.94 for community support. These values indicate that the internal consistency coefficient was high (Özdamar 2017, Çokluk et al. 2016) (Table 3). Item-total correlation coefficients showed that all item total correlation coefficients are above 0.30 (0.32-0.59).

Table 4. Results of the confirmatory factor analysis for the Cancer Empowerment Scale

Fit criteria	Found	Appropriate	Acceptable
χ^2/df	2.630	<2	<5
RMSEA	0.076	<0.05	<0.08
CFI	0.900	>0.95	>0.90
RMR	0.062	<0.05	<0.08
SRMR	0.056	<0.05	<0.08
NFI	0.920	>0.95	>0.90

RMSEA: Root Mean Square Error of Approximation; CFI: Comparative Fit Index; RMR: Root Mean Square Residual; SRMR: Standardized Root Mean Square Residual; NFI: Normed Fit Index

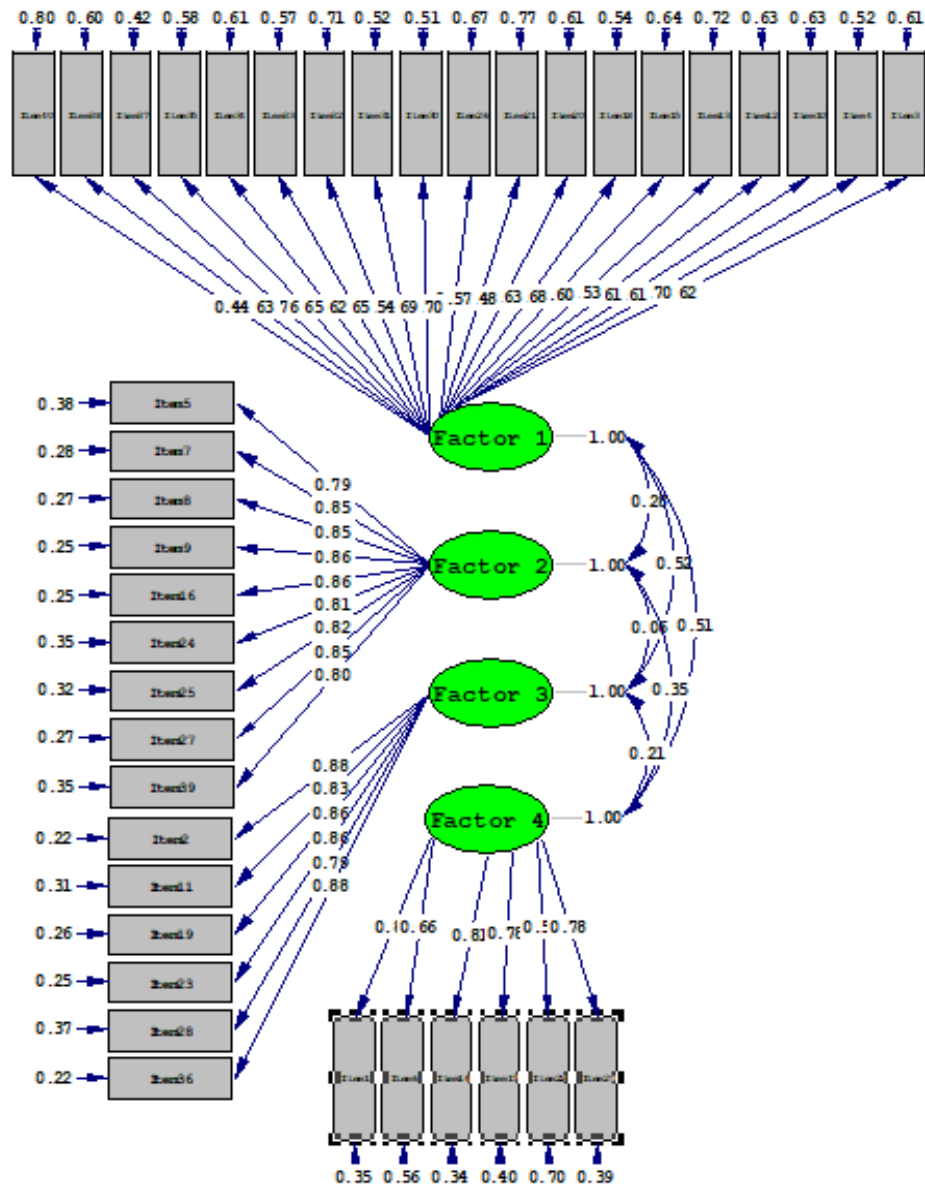


Figure 2. PATH diagram regarding the factor structure of the scale

DISCUSSION

When the literature was reviewed, no specific scale evaluating the empowerment states of cancer patients in Turkey was found. Therefore, Turkish reliability and validity study was conducted for “Cancer Empowerment Scale” developed by Van den Berg et al. in 2013. This section discusses the finding related with 40-item and 4-subdimension Cancer Empowerment Scale.

Validity

In this study, construct validity of Turkish adaptation of CES was tested with EFA and CFA. Before analysing the construct validity, KMO value and Barlett Sphericity Test values were calculated to find out the adequacy of sample size. KMO value was calculated as 0.91, while Barlett Sphericity Test was calculated as $\chi^2=7974.306$, df: 780; $p=0.000$. In the original of the scale developed

by Van den Berg et al. (2013), KMO value was found as 0.86, while Barlett Sphericity Test was found as $\chi^2(780)=3439.36$, $p<0.000$ (van den Berg et al. 2013). In literature, it is stated that KMO value should be at least 50 and higher and Barlett Sphericity Test value should be statistically significant (Çokluk et al. 2016). These results show that the number of data is sufficient to conduct factor analysis.

In Turkish adaptation study, the total variance explained was 58.2%, personal strength sub-dimension constituted 11.7% of the explained variance, while social support sub-dimension constituted 5.9%, healthcare sub-dimension constituted 2.4% and community sub-dimension constituted 3.1% (Table 2). In the original of the scale developed by Van den Berg et al. (2013), the total variance explained was 53%, personal strength sub-dimension constituted 32% of the explained variance, while social support sub-dimension constituted 9%,

healthcare sub-dimension constituted 5% and community sub-dimension constituted 7% (van den Berg et al. 2013). In parallel with these results, it was found that Cancer Empowerment Scale consisted of 4 sub-dimensions as in the original scale and that factor structure was sufficient.

In the present study, factor loads of all items were found to range between 0.40 and 0.87. In the original of the scale developed by Van den Berg et al. (2013), factor loads of all items were found to range between 0.31 and 0.83. It is stated in literature that acceptable value of factor loads can be as low as 0.30 (Seçer 2015, Büyüköztürk 2017). In line with these results, no items were deleted because all items had a factor load >0.30 .

In the present study, correlation coefficients between the sub-dimensions were lower than 0.85 and it was found that the scale did not have multiple connection problem ($\beta > 0.85$). In the original of the scale developed by Van den Berg et al. (2013), it was found that there was not a great correlation between the dimensions of the scale. It is stated in literature that the correlation values between the factors should not be too high ($\beta > 0.85$) for distinctive validity in a scale (Çokluk et al. 2016). This result shows that there was a distinctive difference between the sub-dimensions of the scale.

Index values calculated to examine the fit of the scale's model were found as $\chi^2/df = 2.63$, RMSEA = 0.076, CFI = 0.90, RMR = 0.062, SRMR = 0.056, and NFI = 0.9. The related fit indices showed that the model was acceptable as it was (Çapık 2014). It was found that the CFA conducted in the original scale also confirmed the 4 dimension structure of the scale.

Reliability

In the present study, total Cronbach's α coefficient was found as 0.93, while it was found as 0.92 for personal strength sub-dimension, as 0.95 for social support sub-dimension, 0.87 for healthcare sub-dimension and as 0.94 for community support sub-dimension. In the original scale developed by Van den Berg et al. (2013), total Cronbach's α coefficient was found as 0.94, while it was found as 0.93 for personal strength sub-dimension, as 0.85 for social support sub-dimension, 0.73 for healthcare sub-dimension and as 0.84 for community support sub-dimension (van den Berg et al. 2013). In literature, Cronbach's α scale reliability being 0.70 and higher is interpreted as the measurement instrument being sufficient to be used in studies, while Cronbach's α scale reliability being 0.80 and higher is interpreted as high reliability (Özdamar 2017, Tavşanel 2019). These results show that CES had a high internal consistency and reliability for measuring the health empowerment of Turkish cancer patients.

In the study, item-total correlation coefficients were between 0.32 and 0.59. In literature, the acceptable value for item selection has been reported as ≥ 0.30 . High correlation coefficient of each item means that the

item is efficient and sufficient to measure the targeted behaviour (Büyüköztürk 2017, Özdamar 2017). The results obtained indicate that the scale has high reliability.

CES was applied on 80 patients with an interval of two weeks for test retest analysis. CES was found to have a positive and high statistically significant association ($p < 0.001$). This result indicates high stability over time and that reliable results can be obtained for more than one application.

CONCLUSIONS

The results obtained were found to be consistent with analysis results of the original scale. 4 factor structure of the study was confirmed with EFA and CFA. The scale's cronbach's α internal consistency coefficient, item total correlation and test-retest analysis were found to have high correlation. These results show that CES, the validity and reliability study of which we conducted in Turkey, is a valid and reliable instrument in measuring the health empowerment levels of cancer patients. With this scale, it is thought that by evaluating the empowerment status of cancer patients and determining the deficiencies in this issue, it will provide supportive interventions to patients in clinical practice according to their needs.

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Contribution of individual authors:

Elanur Yılmaz Karabulutlu: study design, statistical analysis.

Gülcan Bahçecioğlu Turan: study design, data collection, first draft, statistical analysis.

Seda Karaman: study design.

All authors approval of the final version.

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Correspondence:

Ass. Prof. Gülcan Bahçecioğlu Turan, RN, PhD
Department of Nursing, Faculty of Health Sciences, Firat University Elazığ
Elazığ, Turkey
E-mail: glcnbah@hotmail.com