Brief Methodological Report

Cross-Cultural Adaptation and Psychometric Evaluation of the Turkish Version of the Cancer Behavior Inventory-Brief Version

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Abstract

Context. Cancer Behavior Inventory-Brief Version (CBI-B) is a simple and non-burdensome tool used to evaluate the self-efficacy of the cancer patients.

Objectives. The aim of this study was to examine the psychometric properties of the Turkish version of the CBI-B.

Methods. This methodologic study was conducted on 143 cancer patients who received radiotherapy at the Department of Radiation Oncology at a Training and Research Hospital in Turkey. Data were collected using Medical and Demographic Information Form, CBI-B, Satisfaction With Life Scale, and European Organization for Research and Treatment of Cancer Core Quality of Life Questionnaire (EORTC QLQ-C30). Descriptive statistics, exploratory factor analysis, and correlation coefficients were used for the analysis of data.

Results. Exploratory factor analysis confirmed four-factor structure explaining 74.7% of the total variance: 1) Maintaining Independence and Positive Attitude, 2) Participating in Medical Care, 3) Coping and Stress Management, and 4) Managing Affect. The CBI-B had acceptable internal consistency (Cronbach $\alpha = 0.87$) and test-retest reliability (intraclass correlation coefficient = 0.961) and concurrent validity with Satisfaction With Life Scale and EORTC QLQ-C30 scores. The measures of life satisfaction and quality of life were positively correlated with CBI-B, whereas the symptom levels and the functions (with the exception of the role function) were negatively correlated.

Conclusion. The CBI-B was found to be a valid and reliable inventory for assessing the self-efficacy of Turkish cancer patients. The CBI-B, is a simple and brief measure of self-efficacy for coping with cancer, could be easily used in clinical and research settings. J Pain Symptom Manage 2017;54:929−935. © 2017 American Academy of Hospice and Palliative Medicine. Published by Elsevier Inc. All rights reserved.

Introduction

Self-efficacy theory is widely used in behavioral sciences and human-related fields.[1] Self-efficacy refers to the individual perceptions about his or her abilities to attain a desired goal to execute a course of action. Individual preferences while attaining certain goals and the situations or the settings that the individuals may encounter have an impact over their coping skills and actions.[1,2] The abilities of the individuals to

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control or master their behaviors play a key role in challenging situations that require high coping skills.[3]

The extent to which the individuals cope with the difficulties and the ways that they handle these difficulties form the basis of their beliefs about their self-efficacy. At the same time, these beliefs influence their motivations about their goals and expectations.[4,5] People with high efficacy are more likely to engage in effective activities and demonstrate greater persistence in trying to achieve desired goals.[4–6] Besides, quality of life and satisfaction levels of the people with higher coping capacity may live longer with lower stress and depression levels.[2]

Cancer is an adaptation process that may threaten psychosocial functions of the individuals and challenge their coping skills.[3] Self-efficacy is highly influential over cancer patients' skills to cope with the stress they encounter during their treatment course and survivorship period.[2,3] During cancer treatment, patients suffer from stress caused by uncertainty about the future, difficulties that they face while performing their daily and professional activities, along with financial problems and the side effects of the treatment.[7] Self-efficacy is highly important for the patients in adaptation to this new stage of life requiring considerable endurance in coping with the physical and psychological difficulties caused by cancer and its management.[6]

Similar to the rest of the world, cancer incidence is rapidly increasing in Turkey and becoming one of the main causes of death.[8] The growing rates of cancer incidence in Turkey increase the importance of the studies evaluating the patients' self-efficacy to cope with cancer. Cancer Behavior Inventory-Brief Version (CBI-B), which is used to evaluate the self-efficacy of the patients while coping with the stress related to cancer diagnosis and treatment, has been derived from the Cancer Behavior Inventory-Long Version that includes 33 items. The construction of the CBI-B is based on the need for shorter assessment instruments that are not burdensome for cancer patients. This shorter assessment instrument may lead to an easier evaluation of self-efficacy to cope with cancer in the field of clinical oncology.[3] However, to our knowledge, this was the first study in Turkey using an assessment instrument to evaluate the self-efficacy of the cancer patients. The purpose of this single-institution study was to adapt the CBI-B developed by Heitzmann et al.[3] into Turkish language and culture to test the practicability, reliability, and validity in Turkish culture.

Methods
Design and Setting

This methodologic study was conducted between February and August 2015 at the ambulatory radiotherapy unit of the Department of Radiation Oncology of a Training and Research Hospital, which is located in Ankara, Turkey. This center performs the treatment of various cancer types and approximately 60–70 patients per day receive ambulatory radiotherapy.

Participants

While calculating the sample size, we planned to reach to a number of patients that is at least 10 times the number of the items of the inventory. We concluded that 143 cancer patients is a sufficient number for the sample of the study. Only the patients older than 18 years who were diagnosed with cancer, read and write in Turkish, had no psychotic disorder or mental retardation, and agreed to take part in the research were included in our study.

Measures

Data collection form comprises three parts. The first part includes Medical and Demographic Information Form, the second part consists of the CBI-B, whose validity and reliability is tested, and the final part comprises the Satisfaction With Life Scale and the European Organization for Research and Treatment of Cancer Core Quality of Life Questionnaire (EORTC QLQ-C30), which are used to test criterion validity of the CBI-B.

Medical and Demographic Information Form. This form is developed by the study researchers using the literature. The form includes 20 questions on sociodemographic characteristics of the patients (age, gender, marital status, education, income level, number of family members etc.) and the variables about the disease and treatment (cancer type, cancer history, family history, etc.).

Cancer Behavior Inventory-Brief Version. CBI-B, which was developed by Heitzmann et al.,[3] is derived from the Cancer Behavior Inventory-Long, version 2.0, which includes 33 items. This inventory includes 12 items used to evaluate self-efficacy of the patients for coping with cancer. Following each item is a Likert-type scale that ranged from 1 (not at all confident) to 9 (totally confident). The score of the scale is obtained by summing the scores of all individual items and higher scores refer to higher degree of self-efficacy in coping with cancer. The instrument was assessed on three groups of cancer patients, and Cronbach alpha coefficients for each sample were $\alpha = 0.84$, $\alpha = 0.84$, and $\alpha = 0.88$, respectively. Exploratory factor analysis of the first sample of 735 patients conducted to assess construct validity of the inventory yielded four factors: 1) Maintaining Independence and Positive Attitude, 2) Participating in Medical Care, 3)

Coping and Stress Management, and 4) Managing Affect. The finding was then supported using confirmatory factor analysis with data from the second and the third samples of 199 and 370 patients, respectively.[3]

The Satisfaction With Life Scale. The Satisfaction With Life Scale (SWLS) is a five-item scale that was constructed by Diener et al.[9] to determine the life satisfaction of the participants, who rated each item on a seven-point Likert-type scale (1 = strongly disagree, 7 = strongly agree). Cronbach alpha coefficient of the original study of Diener et al. was 0.87 and test-retest coefficient was reported at 0.82.[9] The Turkish version of the SWLS developed by Yetim[10] had a Cronbach alpha coefficient of 0.86 and a test-retest coefficient of 0.73. The maximum and minimum scores to be obtained from the SWLS are 35 and 5, respectively. Higher scores indicate a higher degree of life satisfaction.[10]

European Organization for Research and Treatment of Cancer Core Quality of Life Questionnaire. EORTC QLQ-C30 was developed by the European Organization for Research and Treatment of Cancer.[11] Turkish version of the questionnaire was developed by Guzelant et al.[12] EORTC QLQ-30 contains 30 items and three headings: 1) functional difficulties (physical, role, cognitive, emotional, and social), 2) symptom control (fatigue, pain, and nausea/vomiting), and 3) general well-being. Besides, other items of the scale involve the most frequent symptoms of cancer (including dyspnea, appetite loss, insomnia, constipation, and diarrhea) and financial problems. The first 28 questions are scored with a four-point Likert style (1 = not at all, 2 = a little, 3 = quite a bit, 4 = very much). For the questions 29 and 30, seven-point Likert style (1 = very poor, 7 = excellent) is used to evaluate general well-being. Higher scores received from the "general well-being" indicate higher quality of life. On the other hand, higher scores obtained from the "functional difficulties" and the "symptom control" indicate lower quality of life.[11-13]

Translation Procedure

We first evaluated the language validity of the CBI-B. The original CBI-B form was first translated from English to Turkish by two scholars of nursing and two oncologists, independent of each other. The translators were native speakers of Turkish who were also fluent in English. The translated inventories were checked by a scholar of Turkish language for its clarity and compatibility with Turkish. The Turkish version of the inventory was then translated backward to English by two scholars of English literature who were fluent in English, independent of each other. The comparison of the original inventory and the backward-translated version showed that these two versions were nearly alike. Following the agreement among the researchers on the compatibility, clarity, and the distinctiveness of the items of the inventory, the Turkish version was finalized. Next, a pilot study was conducted over five cancer patients to test the clarity of the Turkish version of the inventory. The findings revealed that the inventory was clear enough, and the data obtained from the pilot study was excluded from the study.

Data were collected by conducting face-to-face interview with the patients, who agreed to participate in the study. The participants were informed about the scope of the study and the interviews lasted between 15 and 20 minutes. The re-test of the study was conducted three weeks after the first study via phone on 35 cancer patients, which comprised 25% of the whole sample size of 143 patients.

Ethical Considerations

During the first step of the study, we contacted Heitzmann and Merluzzi, the developers of the CBI-B, via e-mail and obtained the required permission to translate the inventory into Turkish. Necessary permission was also obtained from the Ethical Board Committee of the institution that the study was conducted at (no: 50687469−1491-90−14/1648.4−127). Patients were informed before the study, and their informed consent was obtained.

Data Analysis

SPSS 22 packet program was used for data analysis. While analyzing Medical and Demographic Information, descriptive statistics (number, percentage, mean ± SD) were used. Exploratory factor analysis was used to test construct validity of the inventory. Kaiser-Meyer-Olkin test was used to evaluate the appropriateness of the sample size. Item-total correlations and Cronbach alpha coefficient were calculated to determine the internal consistency reliability of the 12-item CBI-B. Test-retest reliability was measured to correlation between the scales and consistency over time, whereas Pearson correlation coefficient was used to find the correlation between test-retest measures. $P < 0.05$ was used for statistical significance.

Results

Sample Characteristics

Table 1 lists some of the descriptive characteristics of the participants. Accordingly, 34.3% of the participants were women, and 65.7% were men. The mean age of the patients was 57.18 ± 17.23; 76.9% of the patients were married and 33.6% were graduates of

Table 1
Determination of Demographic Characteristics and Cancer Types (*n* = 143)

Demographic Characteristics and Cancer Types	*n*	%
Sex		
Female	49	34.3
Male	94	65.7
Age		
18–34	20	14.0
35–45	16	11.1
46–55	26	18.2
56–65	56	39.2
> 65	25	17.5
People lived together		
Yes	128	89.5
No	15	10.5
Cancer history		
Yes	37	25.9
No	106	74.1
Family history		
Yes	52	36.4
No	91	63.6
Cancer type		
Breast cancer	29	20.3
Prostate cancer	25	17.5
Lung cancer	23	16.1
Brain tumor	15	10.5
Head and neck cancer	13	9.1
Hematologic malignancies	8	5.6
Rectum cancer	8	5.6
Endometrial cancer	5	3.5
Skin cancer	5	3.5
Bladder cancer	3	2.1
Testicular cancer	3	2.1
Soft tissue tumor	2	1.4
Colon cancer	1	0.7
Gastric cancer	1	0.7
Liver cancer	1	0.7
Renal cancer	1	0.7

Table 2
Item Analysis and Internal Consistency of Cancer Behavior Inventory-Brief Version (*n* = 143)

Items	Corrected Item-Total Correlation	Cronbach Alpha If Item Deleted
1. Maintaining independence	0.691	0.856
2. Maintaining a positive attitude	0.747	0.853
3. Maintaining a sense of humor	0.731	0.852
4. Expressing feelings about cancer	0.659	0.857
5. Maintaining activities (work, home, hobbies, social)	0.702	0.854
6. Trying to be calm throughout treatments and not allowing scary thoughts to upset me	0.752	0.851
7. Actively participating in treatment decisions	0.533	0.865
8. Asking physicians questions	0.618	0.860
9. Seeking social support	−0.160	0.912
10. Sharing my worries or concerns with others	0.475	0.868
11. Managing nausea and vomiting	0.561	0.863
12. Coping with physical challenges	0.720	0.853

internal consistency of the items of the scale, is suggested to be between 0.70 and 0.95 for high internal consistency.[15] Cronbach alpha coefficient of the 12th item of CBI-B was 0.87, indicating high internal consistency. When the ninth item of the CBI-B was excluded in Table 2, Cronbach alpha coefficient increased to 0.91. However, because the Cronbach alpha coefficient of the inventory was over 0.70 (α = 0.87), which indicated high internal consistency, and we intend to provide a comparable inventory, we did not exclude the ninth CBI-B item from the inventory.

Test-retest reliability analysis of the scales used in this study was conducted to find consistency over time. Table 3 demonstrates the test-retest reliability coefficients of the CBI-B, SWLS, and EORTC QLQ-C30 scales. Test-retest coefficient of the CBI-B was 0.961 (P < 0.001), indicating positive and statistically significant test-retest correlation.

Table 3
Test-Retest Correlation Analysis of Cancer Behavior Inventory, the Satisfaction With Life Scale and EORTC QLQ-C30 Scales

Scales	Test-Retest Correlation
CBI-B	
r^a	0.961
P^b	0.000
SWLS	
r^a	0.977
P^b	0.000
EORTC QLQ-C30	
r^a	0.945
P^b	0.000

CBI-B = Cancer Behavior Inventory-Brief Version.
[a]Pearson correlation coefficient.
[b]P < 0.05.

primary school; 49% of the participants were retired and 10.5% of them lived alone. More than half of the patients (54.5%) had another chronic illness other than cancer, 42.7% had smoking history, and 76.2% did not consume alcohol; 25.9% had personal cancer history and 36.4% had family cancer history. The most frequent types of cancer were breast, prostate, and lung cancer (20.3%, 17.5%, and, 16.1%, respectively). The periods after cancer diagnosis were 0–3 months (42.0%), 3–6 months (14.6%), 6–12 months (19.6%), 1–3 years (13.3%), 3–5 years (7.7%), and 5–10 years (2.8%).

Reliability
Test-Retest Reliability. Table 2 lists the Corrected Item-Total Correlation and Cronbach alpha if Item Deleted. The analysis of the Corrected Item-Total Correlation analysis shows that the correlation coefficients of all items ranged between 0.475 and 0.752, with the exception of the ninth item of the CBI-B (−0.160). Item-total correlation analysis is suggested to be more than 0.30 for item analysis.[14] On the other hand, Cronbach alpha coefficient, which shows the

Table 4
Correlation Analysis With Each Other of Cancer Behavior Inventory-Brief Version, the Satisfactory With Life Scale and EORTC QLQ-C30 Scales ($n = 143$)

Scales	SWLS	EORTC QLQ-C30
CBI-B		
r^a	0.518	−0.580
P^b	0.000	0.000
EORTC QLQ-C30		
r^a	−0.463	
P^b	0.000	

[a]Pearson correlation coefficient.
[b]$P < 0.05$.

Validity

Concurrent Validity. We used Pearson correlation analysis to find the direction and the power of the relationship between the CBI-B, SWLS, and EORTC QLQ-C30 scales. Statistically significant positive correlation was found between the CBI-B and SWLS ($P < 0.001$, $r = 0.518$). On the other hand, the relationship between CBI-B and EORTC QLQ-30 was negatively correlated and statistically significant ($P < 0.001$, $r = -0.580$) (Table 4). The analysis of the relationship between the CBI-B and "general well-being" heading of the EORTC QLQ-30 scale shows that CBI-B is positively correlated with the general well-being, and this correlation is statistically significant ($r = 0.530$). When the correlation between the CBI-B and the five items of the "functional difficulties" analyzed, there is a positive and statistically significant correlation between the role function and the CBI-B ($r = 0.800$), whereas the correlations between the CBI-B and the physical function ($r = -0.537$), emotional function ($r = -0.475$), social function ($r = -0.472$), and cognitive function ($r = -0.397$) are negative and statistically significant. Regarding the items of the "symptom control," there is negative and statistically significant correlation between the CBI-B and fatigue ($r = -0.475$), nausea/vomiting

($r = -0.262$), pain ($r = -0.380$), dyspnea ($r = -0.315$), insomnia ($r = -0.327$), appetite loss ($r = -0.405$), diarrhea ($r = -0.260$), and financial problems ($r = -0.388$). However, the correlation between the CBI-B and constipation is not statistically significant ($r = -0.159$).

Construct Validity

Exploratory factor analysis was conducted to assess construct validity of the CBI-B (Table 5). Factor analysis based on correlation matrix shows the factor loadings of each item. The analysis shows that factor loadings of each item were above 0.30 and four factors were derived from the 12-item inventory: 1) Maintaining Independence and Positive Attitude, 2) Participating in Medical Care, 3) Coping and Stress Management, and 4) Managing Affect. Items 1, 2, 3, 5, and 12 loaded highly on Factor 1 with loadings ranging from 0.62 to 0.86. Items 6, 7, and 8 loaded highly on Factor 2 with factor loadings ranging from 0.51 to 0.88. Items 4, 10, and 11 loaded highly on Factor 3 with loadings ranging from 0.59 to 0.84. Finally, ninth CBI-B item loaded highly on Factor 4 with a loading of 0.97. These four factors explained 74.7% of the total variance with Factor 1 (Maintaining Independence and Positive Attitude) providing the highest contribution (50.2%).

Discussion

This study conducted the reliability and validity of the Turkish translation of the CBI-B inventory, which is used to evaluate self-efficacy of the cancer patients to cope with the disease. Cronbach alpha coefficients of the original study, which were used to find whether the inventory is reliable and whether it measured similar characteristics of three samples, were 0.84, 0.84, and 0.88 for each sample, respectively.[3] In our study, Cronbach alpha coefficient was 0.87. This result

Table 5
Exploratory Factor Analysis and Mean and SD of Items of Cancer Behavior Inventory-Brief Version ($n = 143$)

Items	Mean	SD	Factors of CBI-B			
			1	2	3	4
5. Maintaining activities (work, home, hobbies, social)	6.46	1.96	0.859			
1. Maintaining independence	6.74	1.94	0.850			
3. Maintaining a sense of humor	6.58	2.14	0.792			
2. Maintaining a positive attitude	6.53	2.08	0.701			
12. Coping with physical challenges	5.12	2.58	0.618			
10. Sharing my worries or concerns with others	6.39	2.21			0.844	
11. Managing nausea and vomiting	6.16	2.20			0.635	
4. Expressing feelings about cancer	6.53	2.08			0.590	
7. Actively participating in treatment decisions	7.00	1.97		0.885		
6. Trying to be calm throughout treatments and not allowing scary thoughts to upset me	5.83	2.37		0.543		
8. Asking physicians questions	6.30	2.28		0.515		
9. Seeking social support	7.44	1.80				0.972
Total percentage and cumulative addition			50.2%	10.6%	7.3%	6.6%
Total percentage of the model				74.7%		

demonstrates that the Turkish version of the CBI-B is reliable for use with Turkish cancer patients both in outpatient and inpatient settings. Our study also found positive and statistically significant correlation between the test and the retest scores. This result indicates that the Turkish version of the CBI-B inventory has test-retest reliability, and the results are consistent over time.

Another result of our study is the positive and statistically significant correlation between the CBI-B and the SWLS, suggesting that the patients with higher self-efficacy to cope with cancer are also more satisfied with their lives. Similar to our results, the original study also found a positive correlation between the CBI-B and the SWLS.[3] Functional Assessment of Cancer Therapy Scale was used to measure the life quality of the patients in the original CBI-B study. According to the original study, a positive correlation between the CBI-B and Functional Assessment of Cancer Therapy Scale was found.[3] However, our study used the EORTC QLQ-30 to measure life quality of the patients. Positive and statistically significant correlation between the CBI-B and general well-being suggests that patients with higher self-efficacy have also higher quality of life. We also found negative and significant correlation between the CBI-B and physical function, emotional function, social function, and cognitive function, whereas the correlation between the CBI-B and the role function was positive and statistically significant. This result implies that with the exception of the role function, the functions of the patients with high self-efficacy to do their routine activities (physical, emotional, social, and cognitive) are less influenced and that these patients' quality of life is higher. Additionally, we found negative and statistically significant correlations among the CBI-B and single-item headings of EORTC QLQ-C30, fatigue, nausea/vomiting, pain, dyspnea, insomnia, appetite loss, diarrhea, and financial problems. Therefore, the patients with high self-efficacy suffer less from the symptoms and have better life qualities.

In the original study on the CBI-B, exploratory factor analysis was used for the first-sample group, whereas Confirmatory Factor Analysis was used for the second and the third groups. Factor analysis yielded four factors, namely 1) Maintaining Independence and Positive Attitude, 2) Participating in Medical Care, 3) Coping and Stress Management, and 4) Managing Affect.[3] Similar to the original study, we used exploratory factor analysis for construct validity and found that items loaded on four factors. However, some of the items (5, 6, 11, and 12) loaded highly on factors differing from than the original study. Items 5 and 12 loaded highly on Maintaining Independence and Positive Attitude factor, rather than the Coping and Stress Management factor; 11th item loaded highly on Coping and Stress Management in place of on Managing Affect factor. Finally, sixth item loaded highly on Participating in Medical Care factor rather than Coping and Stress Management. We assume these differences to be at acceptable levels not necessitating make changes on the original inventory.

Conclusion

This study was the first study to assess the psychometric properties of the CBI-B in Turkish cancer patients. The CBI-B was found to be a valid and reliable inventory that may be used in clinical oncology nursing practice and research settings and in the evaluation of the self-efficacy of the Turkish cancer patients. Therefore, additional studies are needed to examine the validity and reliability of the current scale in different populations and clinical oncology settings.

Implication for Practice and Research

The CBI-B is a brief, an easy to administer, a nonburdensome measure for cancer patients. This scale may be easily used in clinical oncology and research settings and in ambulatory and screening patients in Turkey, as well.

Disclosures and Acknowledgments

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