



Reliability and Validity of the Turkish Version of Body Attitude Test in Women with Breast Cancer

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Abstract

This study aims to examine the reliability and validity of the Turkish version of Body Attitude Test among women with breast cancer. The study included 101 voluntary women with breast cancer stage 1, 2 or 3 from different regions of Turkey. The Turkish versions of Body Attitude Test, Body Shape Questionnaire and Eating Attitudes Test were applied twice with a 7-day interval. The test demonstrated high test-retest reliability (Intra-class Correlation Coefficient = 0.95) with a good internal consistency (Cronbach's alpha = 0.82; McDonald's omega = 0.89) for all domains. The confirmatory factor analysis resulted in 4 factor structures and at an acceptable good fit-in with χ^2/df for BAT. The Body Attitude Test correlated strongly with the Body Shape Questionnaire and Eating Attitudes Test ($p < 0.05$). The results support the Turkish version of the test is a valid and reliable instrument that can be used to measure the body attitude of women with breast cancer. This test can be used as an appropriate measurement tool in assessing the subjective attitude towards the body in women with breast cancer.

Keywords Woman's health · Cancer · Validity · Body attitude · Reliability

Introduction

Breast cancer is one of the most common types of cancer among women worldwide (Ferlay et al. 2010). It is known that some side effects, such as loss of breast(s), tissue damage, decreased mobility, lymphedema, fatigue, pain and muscle loss/weakness, are commonly seen in individuals with breast cancer either because of the nature of the disease or because of various treatment methods, such as chemotherapy, radiation therapy, hormone therapy, etc. (Collins et al. 2011; Frith et al. 2007). These side effects may profoundly affect an individual's self-perception of the body in cases of cancer (Brunet et al. 2013).

The body image is all about one's perception, interpretation and beliefs regarding his/her physical appearance, structure

and functions, proficiency and inadequacy. It is a picture of one's own body in mind; in other words, it is how one perceives his/her own body (Eshkevari et al. 2014; Gillen 2015; Skrzypek et al. 2001). The Body image is entirely formed by individual thoughts concerning one's personality, values and his/her relation to other people. It has a multi-dimensional meaning, including perceptual, cognitive, affective and behavioral connotations, such as the estimation of body size, thoughts and beliefs related with the body, feelings about the body or body control behavior/habituation (Eshkevari et al. 2014; Probst et al. 1998). The body image consists of four dimensions: an overall subjective satisfaction or dissatisfaction with one's appearance; an affective distress concerning one's appearance (emotions about one's appearance); cognitive aspect of the body image (one's engagement with his/her appearance, thoughts and beliefs about one's own body and body image schemas) and behavioral avoidance reflective of body dissatisfaction. Body image attitudinal measures can be used to compare body image of the clinical and non-clinical population (Brytek-Matera and Probst 2014; Kashima et al. 2003).

Body Attitude Test (BAT) is a well-known attitudinal method of assessing body image (Brytek-Matera and Probst 2014; Kashima et al. 2003; Probst et al. 1995). The BAT is a widely used self-report questionnaire, which assesses subjective body experience and attitude toward one's own body (Gila et al.

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1999). It is suitable for cross-cultural studies and has been translated into English, French, German, Spanish, Italian and Czech. In Turkey and Turkish speaking countries, there is a lack of instruments measuring body image. It is known that chronic progressive diseases, such as breast cancer, can affect one's feelings about body image (Fobair et al. 2006). The aim of this study is to develop a Turkish version of the BAT and to examine its reliability and validity among women with breast cancer.

Methods

At the beginning of the study, the permission from the original version's author of the BAT was obtained to be able to translate it into Turkish and then validate the scale. The study was designed according to the principles of the Helsinki Declaration and all the participants signed the patient consent form. The study was approved by the Ethics Committee of University.

Subjects

The study was conducted in a University Oncology Hospital, which accepts cancer patients from all around Turkey for research as well as treatment. Patients were considered eligible if meeting the following participation criteria: (1) being women between the ages of 18 and 64 years; (2) having breast cancer in stage 1, 2, or 3; (3) being women without a current eating disorder recruitment, only having an index of weight-for-height (BMI) not greater than 30 kg/m²; (4) being literate and willing to participate the study. Patients were considered ineligible if they: (1) had relapsed or were in palliative care; (2) were detected to have psychological disorders.

During the study process, 110 women diagnosed with breast cancer were screened as potential participants. Nine of the women met the exclusion criteria, seven did not come for the retest, and two requested to be removed from the study. As a result, our study population included 101 voluntary women with breast cancer in stages 1, 2 or 3.

Breast cancer is one that develops from breast tissues and has 3 stages. Stage 1 means the tumor is well-defined, has not spread to the lymph glands and is smaller than 2 cm. In Stage 2, the tumor corresponds to any of the following conditions: (1) the tumor is less than 2 cm in diameter and has spread to the axillaries lymph nodes, (2) the tumor is 2–5 cm but has not spread to the axillaries lymph nodes, (3) the tumor is 2–5 cm in length and has spread to the axillaries lymph nodes, (4) there is no tumor in the breast but it has spread to the axillaries lymph nodes or (5) the tumor is larger than 5 cm but it has not spread to the axillaries lymph nodes. Stage 3 refers to one of the following status: (1) the tumor has spread to more than three axillaries lymph glands, regardless of its size, (2) the

tumor is larger than 5 cm and spread through the axillaries lymph nodes, (3) the tumor has spread to the chest wall or is an inflammatory type of cancer, (4) the tumor has spread to the lymph nodes beneath or above the collarbone or near the breastbone, or (5) the tumor has spread all over the body.

Instruments

Body Attitude Test (BAT) is intended to measure the subjective body experience and the attitude toward one's body (Probst et al. 1995). Although the scale was originally developed for female patients suffering from eating disorders, some studies have shown that it can be used for other clinical and non-clinical women and men (Cooper et al. 1987; Probst et al. 2008). The self-reporting questionnaire consists of 20 items, scored on a 6-point scale (0–5) and four factors: negative appreciation of body size (items 3,5,6,10,11,13 and 16); lack of familiarity with one's own body (items 2,4,9,12,14,17 and 19); general body dissatisfaction (items 1,7,8 and 18); and others (items 15 and 20). These factor structures were already confirmed in other studies (Brytek-Matera and Probst 2014; Kashima et al. 2003; Probst et al. 1995; Gila et al. 1999). The maximal total score is 100 and a high score indicates that the subject has a deviated body experience.

The internal consistency of the original version is determined by calculating the item-total correlation: Cronbach's alpha coefficient equals 0.93. The factor-total correlation amounts to 0.88 for negative appreciation of body size (BAT-1), 0.90 for lack of familiarity with one's own body (BAT-2), 0.88 for general body dissatisfaction (BAT-3), and 0.55 for rest (BAT-4) (Probst et al. 1995).

The Body Shape Questionnaire (BSQ) is a self-report questionnaire consisting of 34 questions measuring the extent of psychopathology of concerns about one's body shape, in particular the phenomenal experience of "feeling fat." An example item is: "Have you noticed the shape of other women and felt that your own body shape compared unfavorably?" The questions refer to the subjects' state over the past four weeks and are answered on a six-point scale, from 1 (never) to 6 (always). A high score indicates that the sensation of body shape is impaired (Anderson et al. 2017). BSQ validation of Turkish version was carried out by Akdemir (Akdemir et al. 2012).

The mean BSQ score was 70 ± 32.7 (min 35, max 182), test-retest $r = 0.81$, the Cronbach's $\alpha = 0.96$; and the split-half reliability coefficient calculated by using the Spearman–Brown formula was 0.89. The Cronbach's α for the retest was found to be 0.96, and the reliability coefficient for each split-half was 0.88 in the Turkish version study (Akdemir et al. 2012).

Eating Attitudes Test (EAT) was developed by Garner and Garfinkel in 1979 (Cuzzolaro 2014). It was developed with a view to screening and evaluating eating behaviors.

EAT-40 is a 40-item test, each of which is scored on a six-point Likert scales. The range of grades is between ‘always’ and ‘never’, with three points for ‘always’, two points for ‘very often’ and one point for ‘common’. The rest of the selections are rated as zero. The cut-off score is 30. Scores between 30 and 32 refer to subclinical eating problems. A score of 33 and higher indicates pathological eating disorder (Cuzzolaro 2014; Mintz and O'Halloran 2000). The Turkish version of EAT-40 was adapted by Savaşır and Erol (Savaşır 1989). EAT-40 had moderate to good internal consistency and test-retest reliability (Cronbach's alpha = 0.77; Intra-class correlation coefficients (ICCs) = 0.65) (Büyükgöze Kavas 2007).

Procedure

The BAT was translated from the original English version into Turkish in accordance with the standard methodology recommended by Beaton et al. (Beaton et al. 2000). In Stage 1, two independent professionals, who had graduated from the Department of English Language and Literature of a university, translated BAT into Turkish. After the translated versions were harmonized as the initial version (Stage 2), a different professional interpreter/translator performed a back-translation (Stage 3). In Stage 4, an expert committee, including experienced researchers (the authors SŞ, MH and BSA) who have at least 10 years of experience in the field of cancer rehabilitation, produced the pre-final Turkish version of the BAT. The comparison with the original version revealed no inconsistency (Stage 5). The aim of cross-cultural adaptation was to attain consistency in the content and face validity between the original and translated versions of the test. The test to evaluate the test-retest reliability was administered twice on 101 patients with breast cancer within a 7-day interval.

Statistical Analysis

The BAT was tested for reliability using the Turkish version administered to 101 women with breast cancer. The women filled out the questionnaires twice in 7-day intervals. Descriptive characteristics were identified as minimum, maximum, and mean \pm standard deviation ($X \pm SD$) for the quantitative data, while number (n) and percent (%) values were used for qualitative data. Reliability analysis of all 20 items of the BAT was carried out for all patients with IBM SPSS 23.0 to determine item-item, item-total, and Cronbach's alpha (α) score and McDonald's omega coefficient (ω) reliability. Test-retest reliability of the BAT was evaluated using Spearman correlation coefficients (>0.7 acceptable; >0.8 good; >0.9 excellent). The internal consistency was measured with Cronbach's alpha, which measures the degrees of items that make up the total score (values of ≥ 0.7 are acceptable, ≥ 0.8 are good and ≥ 0.9 are excellent) (Grabe et al. 2008). The

“lavaan” and “semTools” packages were used to calculate the McDonald's omega coefficient (Jorgensen et al. 2019; Rosseel 2012).

The factor structure of the Turkish version of BAT was analyzed via confirmatory factor analysis (CFA). CFA determines whether or not the new instrument presents similar factor solution with the original version of the test. Thus, to perform the analysis, root mean squared error of approximation (RMSEA), goodness-of-fit index (GFI), the chi-squared test ($\times 2$), comparative fit index (CFI), adjusted goodness-of-fit index (AGFI), and normed-fit index (NFI) were used. If the degrees of freedom ($\times 2/df$) are found <3.0 , the GFI, CFI, NFI, and AGFI values are found higher than 0.9, and RMSEA is determined as <0.1 ; the instrument is accepted to act in the same manner as the original instrument (Bentler and Bonett 1980). To determine criterion-related validity, Spearman correlation coefficients were calculated between the BAT total/subscale scores and BSQ and EAT scores.

Table 1 Demographic characteristics of the women

Measure	Total Sample n (%)
Age at baseline	
<30	30 (29.7)
>30	71 (70.3)
Education level	
Primary school	7 (6.9)
Secondary school	18 (17.8)
High school	37 (36.6)
University	39 (38.7)
Marital status	
Single	36 (35.7)
Married	65 (64.3)
Stage of disease	
Stage 1	15 (14.9)
Stage 2	47 (46.5)
Stage 3	39 (38.5)
Months since diagnosis	
5–11	57 (56.4)
12 or more	44 (43.6)
Type of surgical treatment	
Mastectomy	65 (64.3)
No reconstruction	16 (15.8)
Had/in process of reconstruction	18 (17.8)
Plans to have reconstruction	17 (16.8)
Hasn't decided on reconstruction	14 (13.9)
Lumpectomy	36 (35.7)
Adjuvant therapy	
Chemotherapy	66 (65.3)
Radiation therapy	36 (35.6)
Hormone therapy	21 (20.7)

Table 2 Mean Scores and Test–Retest Reliability of the BAT

	Before		After		Test-retest reliability (ICC)
	Mean	SD	Mean	SD	
BAT 1	12.73	8.27	12.42	7.78	0.94*
BAT 2	13.85	5.74	12.82	5.17	0.93*
BAT 3	10.43	7.06	10.72	7.26	0.94*
BAT 4	5.61	3.14	5.77	2.61	0.95*
BAT-T	42.64	21.18	42.53	20.78	0.95*

* $p < 0.001$

Results

Descriptive Statistics

The mean age of the women was 35.9 ± 12.5 years (min = 19; max = 57). The mean weight was 66.82 ± 5.90 kg, and the mean height was 1.64 ± 0.6 m. The mean body mass index

(BMI) which is accepted in normal range was 24.84 ± 2.50 . The other demographic characteristics are shown in Table 1.

Reliability of the BAT

The test–retest correlation coefficients of each item and the total score between the test and retest phases were found to be excellent with an intra-class correlation coefficient (ICC) value, which is above 0.9 ($P < .01$) (Table 2).

Table 3 shows mean scores of items, the item/scale correlations and the internal consistency. Internal consistency of the total BAT scale and the subscales were laid in acceptable range (Cronbach's alpha 0.70–0.91). The McDonald's omega score was found to be $\omega = 0.895$.

Construct Validity

Figure 1 presents the CFA results of the 4-factor model of the BAT. The assessment had an acceptable RMSEA and an acceptable good fit χ^2/df for BAT. In addition, NFI, NNFI, TLI,

Table 3 BAT: Item, Subscale, and Scale Descriptive and Reliability Measurements

	Mean	SD	α if item deleted	Item/scale correlation	Cronbach's α
BAT- Total	42.64	21.18	–	–	0.82
BAT 1	*	*	–	–	0.86
Item3	1.63	1.49	0.89	0.44	
Item5	1.85	1.64	0.89	0.65	
Item6	1.80	1.54	0.89	0.58	
Item10	1.78	1.67	0.89	0.59	
Item11	1.98	1.95	0.89	0.76	
Item13	1.91	1.74	0.89	0.75	
Item16	1.54	1.60	0.89	0.52	
BAT 2	*	*	–	–	0.77
Item2	1.47	1.55	0.90	0.41	
Item4	2.46	1.58	0.91	–0.18	
Item9	2.12	1.42	0.90	0.05	
Item12	2.16	1.88	0.89	0.53	
Item14	1.83	1.97	0.89	0.61	
Item17	1.91	1.84	0.89	0.45	
Item19	1.87	1.81	0.89	0.54	
BAT3	*	*	–	–	0.91
Item1	2.87	1.97	0.89	0.73	
Item7	2.82	1.96	0.88	0.78	
Item8	2.56	2.08	0.88	0.81	
Item18	2.15	2.28	0.88	0.83	
BAT4	*	*	–	–	0.70
Item15	2.76	1.77	–	0.53	
Item20	2.86	1.72	–	0.67	

*See Table 1 for mean scores; BAT-Total: Body Attitude Test-Total, BAT 1: Negative appreciation of body size, BAT 2: Lack of familiarity with one's own body, BAT 3: General body dissatisfaction, BAT 4: Rest

Table 4 Four factor model results of confirmatory factor analysis

	χ^2	df	χ^2/df	RMSEA	NFI	NNFI	TLI	CFI	IFI	GFI	AGFI
BAT	226.05	164	1.378	0.064	0.91	0.97	0.91	0.97	0.97	0.80	0.74

RMSEA- root mean squared error of approximation, NFI- normative fit index, NNFI- non-normed fit index, TLI-Tucker-Lewis index, CFI- comparative fit index, IFI- incremental fit index, GFI- Goodness of Fit Index, AGFI- Adjusted Goodness of Fit Index

CFI and IFI values are found higher than 0.9 and the instrument is accepted to act in the same way as the original version (Table 4).

Criterion-Related Validity

Spearman correlation coefficients were computed among all the subtests of the BAT, BSQ and EAT. Correlations were found to be in a range between weak and strong in tests, but not in between BAT1 and BSQ, but between BAT4 and BSQ. As far as the criterion validity of the BAT is concerned, all correlations were found to be significant ($P < .05$) (Table 5).

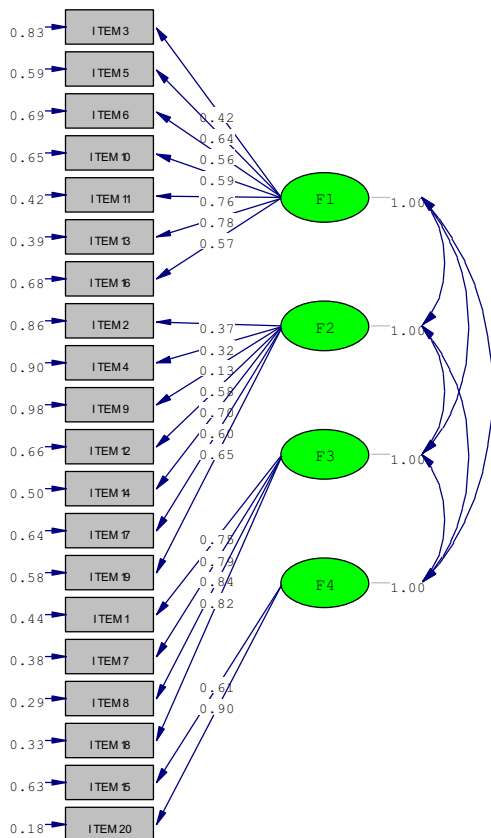
Discussion

This study describes the translation and psychometric testing in terms of reliability and validity (construct and criterion-related) of the 4-factor and 20-item Turkish version of the BAT among women with breast cancer. For all the dimensions of the Turkish version, the internal consistency of the BAT was found to be acceptable (coefficient alpha and McDonald’s omega values were ≥ 0.7). These results were similar to those of the BAT validation studies in other languages (Brytek-Matera and Probst 2014; Gila et al. 1999; Santonastoso et al. 1995; Peter 2010). The degree of internal consistency observed in the present study ($\alpha = 0.82$) was lower than that of the original validation study ($\alpha = 0.93$) (Probst et al. 1995). The fact that only breast cancer patients diagnosed with eating disorder were included in this study may be the reason for the low scores obtained in our study. Although Cronbach’s α values of all subscales of the BAT were similar to the original study, values of the BAT 3 were higher than those of the original study, which is thought to be due to the result of including patients with cancer, which is considered to affect the general body dissatisfaction.

In terms of validity with other studies (Gila et al. 1999; Brytek-Matera and Probst 2014; Santonastoso et al. 1995; Peter 2010; Probst et al. 1999), the results of this study have shown that the Turkish version of BAT has had good construct validity. The Turkish version of BAT has been observed to have the same construct validity with all its components as the original version.

There was a significant and positive correlation between the Turkish version of BAT and BSQ and EAT. The criterion validity was found to be acceptable. According to Spearman’s correlation coefficients, all subscales were found to be acceptable; this is comparable with other validation studies. Despite the difference in methodology, such as including patients with breast cancer, the results indicate that the Turkish version of BAT is consistent with the consistency of the positive results of previous BAT version studies (Brytek-Matera and Probst 2014; Kashima et al. 2003; Gila et al. 1999).

Measurements assessing subjective attitudes towards one’s own body test in women with breast cancer are limited. All the previous validation studies were limited with patients who had eating disorders, not particularly patients with cancer. In fact, to our knowledge, this is the first study showing the use of BAT on cancer patients. In this regard, our study can be considered to be an important and major contribution to the literature. The results indicated that women with breast cancer



Chi-Square=224.40, df=164, P-value=0.00122, RMSEA=0.064
 *F1:BAT 1; F2:BAT 2; F3:BAT 3; F4:BAT 4;

Fig. 1 Confirmatory Factor Analysis of the BAT

Table 5 Criterion-Related Validity of the BAT

	BSQ	EAT
BAT-Total	0.43**	0.62**
BAT 1	0.27**	0.54**
BAT 2	0.57**	0.48**
BAT 3	0.43**	0.57**
BAT 4	0.25*	0.54**

Spearman rank correlation: * $P < 0.05$; ** $P < 0.001$

had problems regarding their body shape and eating attitudes related with body image compared to non-cancer individuals. These results are in agreement with the literature concerning women with breast cancer (Kashima et al. 2003; Paterson et al. 2016; Przedziecki et al. 2013).

As in the previous validation studies, the sample size is big enough to generalize Cronbach's α score. Regarding the limitations of our study, the number of patients could have been kept higher for both the psychometric properties of the BAT to be discussed in more detail in patients with breast cancer and to obtain a higher score. The other limitation is that the study could have been designed with a control group to clarify in-depth results.

In conclusion, the Turkish version of the BAT was found to be a reliable and valid body attitude test in patients with breast cancer. According to limited available knowledge about body shape and eating attitudes among cancer patients, the results of this study provide not only evidence about the Turkish version of the BAT, a questionnaire specially developed to evaluate the body image especially for patients with eating disorders, but it also has excellent reliability and validity among women with breast cancer. This is an important and major contribution to the literature, as it provides evidence of the reliability and validity of the Turkish BAT in women with breast cancer. Additionally, with its good internal consistency, the Turkish BAT can also be useful for other types of cancer patients.

In the literature, it can be seen that the number of body image tests in women is inadequate. As body image is a common concern in women with breast cancer, we suggest using BAT, which might inform clinicians or practitioners of both essential evaluations and interventions with a broader perspective.

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Compliance with Ethical Standards

Conflict of Interest The authors have no funding or conflicts of interest to disclose.

Ethical Statement All the procedures performed were in accordance with the ethical standards of the national research standards and with the 1964 Helsinki declaration and its later amendments. Informed consent was obtained from all the individual participants included in the study.

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