RESEARCH ARTICLE

Reliability and Validity of the Malay Version of the Breast-Impact of Treatment Scale (MVBITS) in Breast Cancer Women undergoing Chemotherapy

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Abstract

__Background__: Body image dissatisfaction among breast cancer survivors has been associated with psychological stress resultant from breast cancer and resultant surgery. This study aimed to examine the psychometric properties of the Malay Version of the Breast-Impact of Treatment Scale (MVBITS) and to investigate the associations of retained factors with the Hospital Anxiety and Depression Scale (HADS) and the Rosenberg Self-Esteem Scale (RSES). __Materials and Methods__: The MVBITS was 'forward–backward' translated from English to Malay and then administered to 70 female breast cancer patients who came to the Oncology Clinic of University Malaya Medical Centre, Kuala Lumpur, Malaysia to undergo chemotherapy. Principal component analysis (PCA) with varimax rotation was performed to explore the factor structure of the MVBITS. Associations of retained factors were estimated with reference to Spearman correlation coefficients. __Results:__ The internal consistency reliability of MVBITS was good (Cronbach's alpha 0.945) and showed temporal stability over a 3-week period. Principal component analysis suggested two factors termed as 'Intrusion' and 'Avoidance' domains. These factors explained 70.3% of the variance. Factor 1 comprised the effects of breast cancer treatment on the emotion and thought, while Factor 2 informed attempts to limit exposure of the body to self or others. The Factor 1 of MVBITS was positively correlated with total, depression and anxiety sub-scores of HADS. Factor 2 was positively correlated with total and anxiety sub-scores of HADS. MVBITS was also positively correlated with the RSES scores. __Conclusions:__ The results showed that the Malay Version of Breast-Impact of Treatment Scale possesses satisfactory psychometric properties suggesting that this instrument is appropriate for assessment of body change stress among female breast cancer patients in Malaysia.

Keywords: Breast cancer - breast impact treatment scale - body image - reliability - validity

Introduction

Breast cancer is one of the commonest cancers seen in woman. About 1.38 million women were diagnosed with breast cancer worldwide. This had accounted for a tenth (10.9%) of all new cancers and nearly a quarter (23%) of all female cancer cases (Ferlay et al., 2010). In Malaysia, the lifetime risk for breast cancer is 1 in 20 women and it is number one cancer in women (Lim and Halimah, 2003). Following the diagnosis of breast cancer with subsequent treatment and even after adjuvant therapy, these women continue to experience stressful life event associated with distressing symptoms (Ogce and Ozkan, 2008). Local study conducted by Farooqui et al. (2011) who explored adult cancer patients' experiences, knowledge on cancer and their perceptions towards cancer therapies in Penang Hospital, Malaysia found significant fears associated with effects of surgery on the body and side effects due to chemotherapies. These concerns were associated with delays in seeking appropriate cancer treatment (Farooqui et al., 2011). Breast cancer surgeries such as mastectomy (with or without reconstruction) and lumpectomy have been associated with altered body image (Collins et al., 2011). Body image dissatisfaction among breast cancer survivors has been associated with distress (Falk et al., 2010). In addition, breast disfigurement following breast cancer can lead to marked psychological distress in women (Helms et al., 2008).

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The Breast-Impact of Treatment Scale (BITS) is an experimenter-derived measure developed to assess body image distress for female breast cancer patient following the traumatic stressor of breast cancer surgery (Frierson et al., 2006). A new conceptualization called body change stress was offered by the authors. The body change stress indicates the emotional distress, thoughts and behaviours experienced by the women following breast cancer and/ or breast surgeries. It is positively correlated to body dissatisfaction and the magnitude of body image. The 13-items generated in BITS were based on evaluation of more than 50 items from various scales used in previous research. It can be considered as a 'gold standard' measurement as it covers body image satisfaction, sexual behavior, sexual affects and cancer-related thoughts and behavior in respond to traumatic stress (Frierson et al., 2006).

BITS has been used in Egyptian post-menopause breast cancer women (Shoma et al., 2009). Malaysia has yet to develop a local psychometric instrument specifically to assess body image distress among female breast cancer patients. BITS can be an option but it has not been translated into Malay language which is the first language converse by most of Malaysian population. The validity and reliability of this scale is yet to be explored. Therefore, the objectives of this study were to determine its reliability and to validate the Malay-translated version of the BITS. The findings of the current study will enable the use of a reliable and valid Malay-translated BITS among female breast cancer population in future research.

Materials and Methods

Study design and participants

In this study, the source population was female breast cancer patients who came to the Oncology Clinic of University Malaya Medical Centre to undergo chemotherapy. Purposive-selective sampling method was employed, woman diagnosed with breast cancer and had undergone breast surgery were invited to participate in this study. The participants must be able to understand Malay and English without help. The sample size for validity and reliability testing is five times of the total number of items in the instrument (Gorsuch, 1983). For this study, the minimum sample size is 65.

Translation

Back-translation technique was used to construct the Malay-translated version of the BITS.The original English version of the instrument was first translated into Malay by two authors who are bi-lingual (English and Malay). Then, the translation was checked thoroughly for accuracy of the meaning and appropriateness of the wording following which; back-translation was carried out. Two psychiatrists without prior knowledge of the original English version translated the Malay version back into English. The English translated version was then compared with the original English version. Then, the final Malay version was checked for any grammatical or language error. The translated version, MVBITS was then pilot tested to 20 Malay staff nurses in University Malaya

Medical Centre, Kuala Lumpur. Items in the translated version were revised and modified. The finalized version was reviewed further to ensure satisfactory face, semantic, criterion and conceptual equivalence.

Data collection

This is a cross-sectional design study took place in the Oncology Clinic of University Malaya Medical Centre, Kuala Lumpur. Prior to the process, an explanation regarding the purpose and procedure was given to the selected participants. The participants were allowed to ask questions for any inquiry regarding the study and were allowed to withdraw from the study at any time during the data collection process without any consequences. The participants were given patient information sheet and consent form to be read and signed. Data collection commenced upon their agreement to participate.

The socio-demographic data (age, ethnic, marital status, educational level, employment) of the subjects were collected using a pre-designed questionnaire. Their clinical information was obtained from the case notes.

BITS consists of 13 items, each item is weighed in 4 points scale (0=not at all, 1=rarely, 3=sometimes, and 5=often) which covers the issues of body image, sexual behaviour, sexual affects and cancer-related traumatic stress. The 13 items are summed for a total score ranging from 0 to 65, with higher scores indicating greater body change stress. The internal consistency was 0.84 - 0.91 and has good validity (Yurek et al., 2000; Frierson et al., 2006).

The Malay-translated version and the original English version of the BITS were given to the 70 participants for reliability and validity testing. Completed instruments were then returned to the researcher. A test-retest was conducted after a three-week interval, when the participants came back for their next chemotherapy appointment. The Malay-translated BITS with randomized sequence was given to test if the participants would provide the same answer as in the first phase.

To determine the concurrent validity, scales for assessing anxiety, depression and self-esteem were administered. A self-report Malay version of Hospital Anxiety and Depression Scale (HADS) (Lua and Wong, 2012) was given to the participants to rate their mood profiles. The Malay translated HADS has good internal consistency reliability when tested in cancer patients (Lua and Wong, 2012). HADS is a brief 14-item, self-administered questionnaire specifically designed for screening of anxiety and depressive symptoms. The HADS contains 14 items and consists of two subscales: anxiety (HADS-A) and depression (HADS-D). The anxiety and depression subscales are scored from 0-3 (four-point Likert scales), giving maximum scores of 21 for anxiety and depression respectively. Any subscale score ≥8 was considered as "case" (Bjelland et al., 2002).

The Malay version of Rosenberg Self-esteem Scale (RSES) (Mohd, 2006) was used to assess self-esteem. The scale is a ten item Likert scale with items answered on a 5- point scale ranging from1 (strongly agree) to 5 (strongly disagree) (Robins et al., 2001). The higher the total score, the higher the self-esteem. The Malay translated

Rosenberg Self-esteem Scale has been validated among high-school students that showed a valid and reliable tool to assess self-esteem with Cronbach's alpha of 0.8 (Mohd, 2006).

Analyses

The results were analyzed using the Statistical Package for Social Sciences version 20.0. The descriptive statistics were used to examine the baseline characteristic data. The internal consistency of the MVBITS was assessed using the Cronbach's alpha coefficient. The test-retest reliability was examined by using intra-class correlation (ICC). Principal component analysis (PCA) with varimax rotation method was used to explore the factorial construct of the scale. The number of factors or constructs to obtain was decided using Kaiser's criteria (To be factorizable, the Bartlett's test of sphericity must be significant and large, and the Kaiser-Meyer-Olkin (KMO) measure of Sampling Adequacy must be more than 0.6. A new factor or component is obtained if the eigenvalue of the factor is more than one). Items were assigned to the factor that produced the highest factor loading. The internal consistency of each factor was confirmed by calculating Cronbach's alpha. Concurrent validity was examined between MVBITS, Rosenberg self-esteem scale, HADS and original version of BITS using Spearman's correlation. Independent t-test was used to examine the MVBITS total and each factor between subjects with and without depression or anxiety based on HADS (scores 8 and above in the depression or anxiety subscales) (Bjelland et al., 2002). Multiple linear regression analysis was used to calculate adjusted mean difference by including age, ethnic, marital status and duration of illness use as covariates.

Results

Demographic and clinical data

A total of 70 patients agreed to participate in the study. The mean age was 49.5±8.8 years. Table 1 shows the socio-demographic and clinical profiles of the participants. Most of them (76%) were married women, 14% single and 10% divorcee/widow. About half were Chinese and one-third was Malays. Slightly more than half were

Table 1. The Socio-demographic and Clinical Profiles of the Participants

Variables		N (%)
Marital status	Married	53 (76%)
	Single	10 (14%)
	Divorcee/widow	7 (10%)
Ethnic	Chinese	39 (56%)
	Malays	24 (34%)
	Indians and others	7 (10%)
Occupation	Working	29 (41%)
	Not working	41 (59%)
Breast surgery	Mastectomy without reconstruction	42 (60%)
	Mastectomy with reconstruction	7 (10%)
	Lumpectomy	21 (30%)
Hair loss	Yes	18 (25%)
	No	52 (75%)

not working (58.6%). Ten percent of the women had mastectomy with reconstruction, 60% had mastectomy without reconstruction and 30% had lumpectomy. The mean duration of post-surgery was 22.0±33.4 months. Three quarter of the women had already experiencing hair loss during the chemotherapy. The mean score for MVBITS was 22.4±17.1. The mean score for HADS-Anxiety was 5.26±3.99 and mean score for HADS-Depression was 3.51±2.59.

Reliability

MVBITS exhibits good internal consistency, with overall Cronbach's alpha coefficient of 0.945 and Cronbach's alpha if item deleted, ranged from 0.938-0.944 (Table 2). Test re-test reliability (Intraclass Correlation Coefficient) for MVBITS was 0.840 (95%CI: 0.741, 0.901).

Table 2. Corrected Item-total Correlations and Cronbach's Alpha if Item Deleted for the MVBITS

MVBITS Items	Corrected item-total correction	Cronbach's alpha if item deleted
1	0.730	0.941
2	0.758	0.940
3	0.869	0.937
4	0.814	0.939
5	0.753	0.941
6	0.669	0.943
7	0.852	0.938
8	0.712	0.942
9	0.748	0.941
10	0.724	0.941
11	0.647	0.944
12	0.632	0.944
13	0.648	0.944

Table 3. Factor Loadings for Malay Version Breast Impact Treatment Scale (MVBITS)

MVBITS Items	Factor 1	Factor 2
1. How my body has changed pops into my mind	0.778	
2. I have waves of strong feelings about the way my body looks.	0.788	
3. I think about how my body used to look.	0.802	0.438
4. Things I see or hear remind me that my body is different now.	0.825	0.329
5. When I see other women, I think that my body appears different than theirs.	0.809	
6. I feel uncomfortable about being seen naked.	0.738	
7. I am bothered by feelings or thoughts of body disfigurement.	0.775	0.444
8. I am reminded of my breasts when I pick out clothes to wear.	0.616	0.442
9. I don't want to deal with how my body looks.	0.357	0.814
10. I avoid letting myself get emotional when I think of how my body has changed.	0.414	0.708
11. I try not to think about the size and shape of my breasts.	0.312	0.726
12. I avoid looking at and/or touching my breasts.		0.883
13. I feel self-conscious about letting my partner (person with whom I am sexually intimate) see my breasts. (Even if you do not have a partner now, rate how you believe you would feel.)	0.406	0.613
Cronbach's alpha	0.939	0.877
Eigenvalue	7.93	1.21
Explained variance	61.00%	9.32%

Table 4. Correlation (Spearman's Rho) between MVBITS, BITS, HADS (Total, Subscale for Anxiety and Depression) and RSES

	MVBITS			BITS	HADS			RSES
	Factor 1	Factor 2	Total		Anxiety	Depression	Total	
MVBITS Factor 1	1.000	0.784#	0.968#	0.911#	0.603#	0.358**	0.549#	-0.228
MVBITS Factor 2	0.784#	1.000	0.904#	0.824#	0.477#	0.221	0.401**	-0.184
MVBITS Total	0.968#	0.904#	1.000	0.933#	0.584#	0.341**	0.527#	-0.226
BITS	0.911#	0.824#	0.933#	1.00	0.594#	0.378#	0.559#	-0.215
HADS Anxiety	0.603#	0.477#	0.584#	0.594#	1.000	0.604#	0.913#	-0.247*
HADS Depression	0.358**	0.221	0.341**	0.378#	0.604#	1.000	0.858**	-0.526#
HADS Total	0.549#	0.401**	0.527#	0.559#	0.913#	0.858#	1.000	-0.419#
RSES	-0.228	-0.184	-0.226	-0.215	-0.247*	-0.526#	-0.419#	1.000

*$p<0.05$. **$p<0.01$. #$p<0.001$. MVBITS=Malay version Breast Impact Treatment Scale; BITS=Breast Impact Treatment Scale; HADS=Hospital Anxiety and Depression Scale; RSES=Rosenberg Self-esteem Scale

Table 5. Comparison of MVBITS Total and Each Factor between Subjects with and without Depression or Anxiety Based on HADS#

MVBITS	MVBITS Mean Scores		Mean Difference	Adjusted Mean*	95%CI	p value
	Yes	No		Difference (B)		
Depression						
Total	36.20	21.32	14.88	14.97	-1.20, 31.13	0.069
Factor 1	24.80	14.03	10.77	10.17	-0.78,21.11	0.068
Factor 2	11.40	7.45	3.95	4.60	-1.78,10.93	0.154
Anxiety						
Total	40.73	17.38	23.35	23.30	14.76, 31.83	<0.001
Factor 1	26.93	11.44	15.49	15.81	10.02,21.59	<0.001
Factor 2	13.93	6.04	7.90	7.56	3.99,11.12	<0.001

*adjusted for age, ethnic, duration of illness and marital status
Depression or anxiety cases were those who scored 8 and above in the HADS depression or anxiety subscales

Construct validity

From the preliminary analysis, the Bartlett's test of sphericity was significant and large (p=0.000). The KMO measure of Sampling Adequacy was 0.891. Therefore, it was appropriate to proceed to factor analysis. Two factors were extracted (eigenvalue >1.00). The factors combined to account for 70.32% of the variance. All items loaded 0.30 or above; there were multiple cross-loading. Cronbach's alpha for the factor 1 was 0.94 and factor 2 was 0.88 (Table 3). Factor 1 accounted for 61.0% of the variance, and comprised of eight questions. We labelled this factor as "Intrusion". Factor 2 accounted for 9.3% of the variance. It consisted of 5 questions. We labelled this factor as "Avoidance".

Concurrent validity

The Spearman's correlation between the Malay-translated version (MVBITS) and the original English Breast-Impact of Treatment Scale (BITS), patients' self-reported score on Hospital Anxiety and Depression Scale (HADS) and Rosenberg Self-Esteem Scale (RSES) are shown in Table 4. Parallel reliability of MVBITS and BITS was good as shown by Spearman's correlation of 0.933 (p<0.001). The total and Factor 1 of MVBITS was positively correlated with total, depression and anxiety sub-scores of HADS score. Factor 2 was positively correlated with total and anxiety sub-scores of HADS. However MVBITS was not significantly correlated with the Rosenberg Self-Esteem scores.

Out of the 70 respondents, 5 (7%) were found to have depression and 15 (21%) were having anxiety based on HADS. The MVBITS scores for the subjects with depression were higher than those without depression but not statistically significant. However, the score for the total or each factor of MVBITS was significantly higher in subjects with anxiety even after adjusted for age, ethnic, duration of illness and marital status (Table 5). There was no significant correlation between MVBITS score with types of breast surgery and hair loss.

Discussion

The populations in our study were post-surgery breast cancer women undergoing chemotherapy. Both post-surgery and chemotherapy are known to precipitate psychological distress, anxiety or depression. Post-surgery breast cancer may lead to body image distress and chemotherapy agents may cause toxic side effects such as vomiting, fatigue, hair loss, etc (Zainal, 2012). Breast-Impact Treatment Scale (BITS) is a self-report questionnaire to measure the body image distress experienced by breast cancer patients after breast surgery. The present study aimed to determine the reliability and to validate the Malay version of the questionnaire.

Reliability

From the study, at face value, it appeared to be acceptable and understandable among a group of female staffs. Based on the consensus of the two consultant psychiatrists, the content of the questionnaire was adequate in assessing the areas of body distress among the post-surgery breast cancer patients. The analysis of the present study showed that MVBITS was a reliable and valid instrument to be used among a group of breast cancer patients in University Malaya Medical Centre. The psychometric performance of the instrument is impressive both in terms of reliability and validity. In this study, the MVBITS has shown to have good reliability with internal consistency, Cronbach's alpha of 0.945. After 3-weeks interval the test-retest reliability was still high and stable. This is consistent with the previous study where the Cronbach's alpha was 0.91 (Frierson et al., 2006).

Validity

Using the principle component analysis with varimax rotation, we identified a two-factor model for MVBITS

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labelled as Intrusion and Avoidance. These factors together accounted for 70.3% of the variance. Frierson et al. (2006) reported a single factor solution of the 13-items scale when they found all the items were related to each other (Frierson et al., 2006). However our findings were similar with the first development of 15-item BITS (Yurek et al., 2000) also yielded a two-factor (Intrusion and Avoidance) structure.

For the first factor (Intrusion), high loading was found on items such as 'How my body has changed pops into my mind' (0.778), 'I have waves of strong feelings about the way my body looks' (0.788), 'I think about how my body used to look' (0.802), 'Things I see or hear remind me that my body is different now' (0.825), 'When I see other women, I think that my body appears different than theirs' (0.809), 'I feel uncomfortable about being seen naked' (0.738), 'I am bothered by feelings or thoughts of body disfigurement' (0.775) and 'I am reminded of my breasts when I pick out clothes to wear' (0.616). For the Avoidance factor, high loading was found on items such as 'I don't want to deal with how my body looks' (0.814), 'I avoid letting myself get emotional when I think of how my body has changed' (0.708), 'I try not to think about the size and shape of my breasts' (0.726), 'I avoid looking at and/or touching my breasts' (0.883) and 'I feel self-conscious about letting my partner see my breast'(0.613). Frierson et al. (2006) yielded a single factor structure that suggested the body change stress could manifest as women's overall negative affect. The author also described that the finding on the BITS might suggest that the women's response to body change stress can manifest either alone as well as with significant others (Frierson et al., 2006). Our study, the first to be conducted in Asian country demonstrated cultural variance whereby the Malaysian women experienced intrusive thoughts and avoidance behavior as separate responses towards body change stress.

The MVBITS also showed good concurrent validity as evidenced by significant correlation result between MVBITS with depression and anxiety as measured with HADS (Lua and Wong, 2012). To identify cases with depression or anxiety, MVBITS was compared with HADS depression and anxiety subscales scores. In general, our findings showed that the total mean score of MVBITS was significantly higher among the patients with anxiety. The two factors which we labelled as Intrusion and Avoidance also significantly discriminate between the subjects with and without anxiety. There was no significant difference in the MVBITS scores between the depressed and non-depressed cases. In contrast Frierson et al. (2006) found a moderate correlation between BITS score and depressive symptoms among the post-surgery breast cancer women prior to adjuvant therapy (Frierson et al., 2006). On the other hand the breast cancer women in our study were undergoing chemotherapy following their post-surgery. A comprehensive systematic review reported that breast cancer women who were undergoing chemotherapy showed significant association with higher level of anxiety as compared to other treatments (Lim et al., 2011).

Surprisingly MVBITS was not contaminated by the Rosenberg Self-Esteem scores. Similarly MVBITS score was not significantly correlated to hair loss. One would expect their self-esteem to be lower when they experienced body disfigurement. Perhaps the small number of subjects could have affected the power of the study.

There are two other limitations in this study which should be highlighted. Firstly, the sample that we used was from a single teaching hospital in Malaysia. The sample population was homogenous which was not necessarily representative of the general population. Secondly, HADS was used to identify anxiety and depression cases in this study. Structured interview using diagnostic criteria will improve the validity of the cases.

In conclusion, despite the above limitations, the results of this study indicated that MVBITS could be used for assessment of body change stress among breast cancer women after breast surgery in Malaysia.

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