Body Change Stress for Women With Breast Cancer: The Breast-Impact of Treatment Scale

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ABSTRACT

Background: *Body change stress refers to subjective psychological stress that accompanies women's negative and distressing thoughts, emotions, and behaviors resultant from breast cancer and breast surgeries. Body change stress is manifest with traumatic stress-like symptoms.* ***Purpose:*** *The development of the Breast-Impact of Treatment Scale (BITS) is described. The construct is assessed with 13 items that comprise a one-factor solution.* ***Methods and Results:*** *Tests of convergent validity demonstrate the relationship, but not overlap, of the BITS with measures of stress, emotional distress, and sexuality. The BITS distinguishes between women receiving segmental mastectomy (lumpectomy) versus mastectomy. Incremental validity is shown with comparison to ratings of body satisfaction.* ***Conclusions:*** *An early psychometric foundation enables use of the BITS to assess a common and distressing quality of life outcome for women with breast cancer.*

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INTRODUCTION

Since the earliest of studies (1), adaptation to breast cancer treatment has been viewed as particularly difficult. Implicit was the view that breast loss or significant breast change would be a primary cause of distress or poor adjustment. Admittedly, the standard breast surgery of previous decades, that is, the Halstead radical mastectomy, is very disfiguring. It is an en bloc dissection of the entire breast with removal of the underlying pectorals major and minor muscles and the contents of the axilla, leaving a chest wall cavity. Although surgical options today are less disfiguring, primarily modified radical mastectomy (which leaves the underlying muscle) or segmental mastectomy (removal of the tumor [lump] only), they remain a challenge for women.

Historically, the concept of body image has been the framework for understanding breast cancer patients' stresses regarding body changes (2), and global measures, usually ratings of satisfaction with the body, have been commonly used (e.g., 3). Alternatively, investigators have used image measures embedded in other inventories, such as multicomponent measures of sexuality (e.g., 4). However, the latter strategy has the potential for confounding the assessment of body image with that of sexuality. Quality of life batteries usually do not include measures of body image (e.g., SF-36 [5]), although some do (e.g., EORTC QLQ-C30 [6]). Some investigators devise their own measures, with items including satisfaction with the scar (7) or concerns about body integrity (8), for example. Others collect qualitative data, recording women's own words (e.g., "feeling like half a woman," "feeling mutilated") to assess their distress (e.g., 9). In summary, there is no "gold standard" measure, and none have been used frequently enough for comparison across studies. In response, our intent was to devise a reliable and valid strategy to assess women's personal responses to breast surgeries. Rather than body image, we offer an alternative conceptualization, *body change stress.* We view women's responses to changes to the breast from surgery and other therapies as having responses similar to those accompanying traumatic stressors. In choosing this approach, we benefit from the considerable research in psychological stress, and traumatic stress in particular, and acknowledge the accumulating literature on posttraumatic stress disorder in cancer patients (10).

Body change stress refers to subjective psychological stress that accompanies women's negative and distressing feelings and emotions, thoughts, and behaviors resultant from breast cancer and/or breast surgeries. Body change stress manifests with traumatic-like stress symptoms. This includes reexperiencing (e.g., feeling upset with reminders of breast change), avoidance (e.g., attempts to limit exposure of the body to self or others), numbing (e.g., a loss of interest in activities or behaviors relevant to the body, such as sexual activity), and arousal symptoms (e.g.,

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irritability, anger, etc.). We suggest that the peak of body change stress occurs in the days or weeks following surgery and related treatments. A correlate of the magnitude of stress is the extent of objective change to the breast(s), with some surgeries, such as segmental mastectomy, resulting in lower levels of body change stress than others, for example, modified radical mastectomy. As there is considerable variability in cosmetic outcomes, body change stress may not necessarily change for a given patient following reconstructive surgery, and earlier work suggests that it does not (11). With this conceptual beginning, we have operationalized the construct of body change stress with the Breast-Impact of Treatment Scale (BITS) and present evidence supporting its reliability and construct validity.

METHOD

Participants and Procedures

Participants were consecutive cases of Stage II or III breast cancer patients recruited for a clinical trial of a psychosocial intervention; full descriptions are available (12). Briefly, women were accrued and assessed during postsurgery clinic visits prior to beginning adjuvant therapy. Although 227 patients were enrolled into the trial, accrual for this study began after the first 33 patients had been accrued, resulting in an effective sample size of 194. Following accrual, participants completed questionnaire items regarding body change stress along with other psychological and behavioral measures (discussed later).

The typical patient was 50 years old, was White (91%) and married (69%), had some college education (74%), was employed at least part time (70%), and had a family income of $50,000 or more per year (52%). Forty-four percent of the women (86 of 194) had been surgically treated with breast conserving therapy and the remainder received mastectomy (56%; 108 of 194) approximately 5 weeks (M = 36 days) previously. Regarding disease and prognostic characteristics, the majority had Stage II (90%) rather than Stage III (10%) disease, were estrogen receptor positive (62%), and premenopausal (58%).

For the factor analytic studies described later, two equivalent groups were needed. For this, the sample (N = 194) was roughly divided, using strata of age, disease, and treatment factors. The groups did not differ on demographic, disease, or treatment characteristics (ps > .35). They did differ on number of years of education (p = .047), although the magnitude of the difference was small (10 months), with Sample 1 having a mean of 14.51 years (SD = 2.71 years) and Sample 2 having a mean of 15.31 years (SD = 2.89 years). In the studies shown later, Sample 1 (n = 89) was used for calibration and Sample 2 (n = 105) for validation of the measure's factor structure.

MEASURES

Body Image

The 11-item version (short form) of the Body Satisfaction Scale (BSS) (13) was used. Factor analysis of the measure has yielded two factors: satisfaction with appearance (including facial and sexual parts) and with the lower body (14). In addition, a single item assesses satisfaction with overall appearance.

Sexuality

Sexual behavior. Two types of data were obtained. (a) Past sexual behavior was operationalized as the frequency of intercourse for the 2 months prior to diagnosis and rated using a 10-point frequency scale. (b) Current sexual behaviors were assessed with the same scale. Avoidance of intercourse and approach behaviors (i.e., affectionate kissing of partner, passionate ["deep"] kissing of partner, erotic embrace, and kissing of sensitive [nongenital] areas) were used. A score was obtained by subtracting the avoidance item from the sum of the four items of approach behaviors.

Sexual affects. Two measures were used. (a) A 27-item questionnaire assessed the phases of the sexual response cycle. Items were drawn from a structured interview (15) that was previously used successfully in a self-report format (16). Items for each phase of the response cycle—desire, excitement, orgasm, and resolution—were included along with general satisfaction items. (b) The 10-item Sexual Depression Scale of the Sexuality Scale (17) assessed depressive thoughts and feelings associated with one's sexual life (e.g., "I feel sad when I think of my current sexual experience"). Items were each rated on a 5-point scale and summed.

Cancer-Related Traumatic Stress and Distress

The 15-item Impact of Events Scale (IES) (18) examines cognitions involving the reexperiencing and denial of thoughts and avoidant behaviors related to traumatic stress. Items were slightly reworded to ensure that respondents focused on cancer-related thoughts and behaviors. Two distress measures were also used (1). The 65-item Profile of Mood States (POMS) (19) assesses negative mood. A Total Mood Disturbance score is the sum of five scales (Anxiety, Depression, Anger, Fatigue, and Confusion) minus the score of a Vigor scale (2). The 11-item Iowa short form (20) of the Center for Epidemiological Studies Depression Scale (CES-D) was used. Symptoms are rated on a 3-point Likert-type scale and summed.

RESULTS

Item Generation

Content for items was generated from prior breast cancer research, our previous research in the conceptualization and treatment of sexual dysfunction and related difficulties, and discussions with breast cancer patients. A literature search identified extensive clinical content. From these sources, the authors (DLT and BLA) independently generated more than 50 items that were then evaluated individually. For inclusion, the item content had to be consistent with traumatic stress responses, including avoidance or numbing, reexperiencing, or arousal from cognitions, emotions, and behaviors relevant to breast change. The pool was narrowed to 15 items.

Factor Analysis

Internal structure of the items was studied using exploratory factor analysis with Sample 1 data. One-, two-, and three-

TABLE 1
Items, Factor Loadings, and 90% Confidence Intervals for the One-Factor Solution of the Breast-Impact of Treatment Scale (BITS) for the Calibration and Validation Breast Cancer Patient Samples

BITS Items	*Calibration Sample*[a]	*Validation Sample*[b]
How my body has changed pops into my mind.	.87 (.81, .92)	.79 (.72, .86)
I have waves of strong feelings about the way my body looks.	.81 (.75, .88)	.84 (.78, .90)
I think about how my body used to look.	.81 (.75, .88)	.70 (.61, .79)
Things I see or hear remind me that my body is different now.	.80 (.73, .87)	.75 (.68, .83)
When I see other women, I think that my body appears different than theirs.	.66 (.56, .77)	.75 (.67, .83)
I feel uncomfortable about being seen naked.	.66 (.56, .77)	.57 (.45, .68)
I am bothered by feelings or thoughts of body disfigurement.	.66 (.55, .76)	.62 (.51, .73)
I am reminded of my breasts when I pick out clothes to wear.	.64 (.53, .75)	.67 (.57, .77)
I don't want to deal with how my body looks.	.63 (.52, .74)	.72 (.63, .80)
I avoid letting myself get emotional when I think of how my body has changed.	.62 (.51, .73)	.48 (.34, .61)
I try not to think about the size and shape of my breasts.	.57 (.44, .69)	.55 (.43, .67)
I avoid looking at and/or touching my breasts.	.54 (.40, .67)	.54 (.42, .66)
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.)	.50 (.36, .64)	.57 (.45, .69)

[a]$n = 89$. [b]$n = 105$.

factor solutions were extracted using the Maximum Wishart Likelihood discrepancy function, with direct quartimin (oblique) rotation. Scree plots, item loadings and communalities, and judgments of factor interpretability were used to evaluate all solutions. Results indicated that a single factor solution with 13 items (2 items deleted) was most interpretable, and further, had acceptable fit (root mean square error of approximation [RMSEA] = .093).

Cross-validation of the factor model using Sample 2 suggested reasonable fit (RMSEA =. 10) again and a similar pattern of item loadings. The items, with their factor loadings for both samples, are provided in Table 1.[1] For administration, the BITS scale uses a 4-point rating scale (0 = *not at all,* 1 = *rarely,* 3 = *sometimes,* and 5 = *often*). The 13 items are summed for a total score ranging from 0 to 65, with higher scores indicating greater body change stress. In the combined sample ($N = 194$), scores ranged from 0 to 59 ($M = 23.38$, $SD = 14.44$).

Reliability

Cronbach's alpha (internal consistency) was .91 for both Sample 1 and 2 and the total ($N = 194$). To test the stability of the measure, Sample 1 was followed and reassessed 12 months following accrual. During that time interval, no psychological intervention was provided and patients had completed adjuvant cancer therapies. The correlation between testings was .70. A t test indicated a significant decline in BITS scores, $t(61) = 3.32$, $p = .002$, and the average within-person change was –4.76 in the total BITS score. However, this is a small change relative to the standard deviations for the measure (SDs = 14.74 at initial and 14.55 at 12 months).

[1]Interested readers can obtain information regarding item evaluation, factor analyses, and other details by contacting the corresponding author for an extended report.

Validity

Convergent and discriminant. Following the conceptualization discussed earlier, we were interested in the correlation of the BITS score with measures of stress, mood disturbance, and sexuality. For the latter, we anticipated that women reporting higher levels of body change stress would, in general, have more negative views of their current sexuality and lower rates of sexual behavior. More specifically, measures having an evaluative aspect and ones closely tied to the woman's own view of her sexual life (e.g., sexual depression and response cycle) would have stronger correlations with the BITS than those which were strictly behavioral (e.g., frequency of intercourse). The analyses confirmed these hypotheses. Women with higher levels of body change stress described themselves as having lower levels of sexual responding ($r = –.30$, $p = .004$) and greater feelings of discouragement, disappointment, and unhappiness with their sexual life ($r = .51$, $p < .001$), in addition to having lower levels of sexual activity ($r = –.21$, $p = .006$). Correlations with measures of cancer-specific stress (Impact of Events Scale), negative affect (Profile of Mood States), and depressive symptoms (CES-D) were also calculated. As expected, the BITS was moderately correlated with all, with correlations ranging from .43 to .50 (ps < .001). In contrast to these conceptual relationships, the BITS was unrelated to age, income, race, and employment status (rs = –.07–.01). The correlation with education was significant but of low magnitude ($r = –.16$, $p < .05$).

Concurrent. Hierarchical multiple regression analyses were conducted to test the ability of the BITS to uniquely predict these same sexual and psychological variables. Any sociodemographic, disease, or treatment variables significantly ($p <$ .05) correlated with each outcome variable were entered into the regressions first. To enhance the rigor of the analyses for the sexual outcomes, the women's reported frequency of inter-

course prior to cancer diagnosis was entered as a control step prior to the entry of the BITS.

All regression models were significant, and accounted for 21% to 26% of the total variance for the psychological outcomes and 18% to 44% of the total variance for the sexual outcomes. In all cases, the BITS step was significant (ps < .02), accounting for the following additional percentage of variance in the psychological variables: IES (24%), POMS (25%), and CES-D (18%); and the sexual variables: sexual behavior (3%), sexual response cycle (6%), and sexual depression (16%). These additional variances explained by the BITS for the sexual variables were above and beyond the notable variance in all sexual outcomes accounted for by the control variable of frequency of intercourse prior to cancer: sexual behavior (14%), sexual response cycle (4%), and sexual depression (11%). These analyses are, of course, consistent with the correlation data, but offer a stronger test of the relationships and a test of concurrent validity.

Incremental. A measure needs to demonstrate some increment in predictive efficiency over information that is otherwise available or obtained with alternative measures. Measures of body satisfaction have been a frequent choice (e.g., 21) when studying body image following breast cancer, and so the BSS (13) was used. The correlation with the BITS was .23, suggesting that although the women's ratings of body dissatisfaction and body change stress were related, the measures did not substantially overlap.

For the test, the regression analyses described earlier were conducted in the same manner but with the BSS entered as an additional control step prior to the BITS entry. The findings were conceptually identical to those reported earlier. All models were again significant, accounting for 24% to 27% of the total variance for the psychological outcomes and 19% to 44% of the total variance for the sexual outcomes. Interestingly, in the final models, body satisfaction was a significant covariate only for the CES-D, accounting for 5% of the variance. In contrast, the BITS accounted for significant (ps < .001) added variance for all outcomes: IES (21%), POMS (21%), CES-D (14%), sexual behavior (3%), sexual response cycle (7%), and sexual depression (14%).

Group differences. As noted earlier, it was hypothesized that body change stress would, in general, relate to the magnitude of body change. To test this, comparison was made between women who received breast-conserving surgery (BCT; n = 86) versus women receiving a modified radical mastectomy (MRM; n = 108). The analysis of variance contrast was significant, $F(1, 192) = 49.06$, $p < .001$, with women who received a MRM reporting significantly higher levels (in fact, one standard deviation higher) of body change stress ($M = 29.18$, $SD = 13.14$) than women who received BCT ($M = 16.09$, $SD = 12.65$). Inspection of the data indicated that BITS scores for the patients who received BCT were positively skewed, with zero being the modal response. In contrast, scores for the patients who received MRM resembled a normal distribution, with the modal response being a score of 39. A further analysis contrasted women receiving a MRM, with (n = 35) or without (n = 73) immediate breast reconstruction. The groups were not significantly different (p > .40), with the means being 30.69 (SD = 12.87) and 28.45 (SD = 13.29), respectively.

DISCUSSION

> "I am frustrated that the mastectomy site feels different than the other side. I am always going to have this sensation that it is not normal; this isn't going to go away."

This spontaneous comment was provided by one of the study participants during an assessment. Such reactions typify the difficult, personal responses women can have to breast cancer surgery. Women's responses to their breast changes are conceptualized as a stress reaction. Rather than body image, this model offers the advantage of capturing many common, clinical phenomena, such as women's concerns about being seen naked, intrusive thoughts ("how my body has changed pops into my mind"), avoidance ("I don't want to deal … "), unhappiness with how their body has changed (e.g., "I am bothered … " "I try not to think about how my body used to look"), and permanency of the changes ("I am reminded of my breasts when I pick out clothes to wear"), among others. The relatedness of these items, evidenced by the single factor structure and internal consistency, might suggest that when it occurs, women's body change stress may be pervasive and syndromal. That is, when present and significant, body change stress can manifest when a woman is alone as well as with a significant (sexual) other; it includes conscious as well as intrusive thoughts; social comparisons can be made (i.e., images of previous self in comparison to the bodies of others); and it is, of course, linked to women's overall negative affect.

Although a statistically significant reduction in body change stress was observed over 1 year, the magnitude of this reduction (20%) was small relative to the sample standard deviation. Further, the .70 correlation of BITS scores over such a long interval suggests that the relative ordering of patients on this dimension was preserved. The data thus suggest a degree of stability in body change stress. This is consistent with the robust documentation of body change distress, occurring when breast cancer patients are young or old (22), White or African American (23), American or Chinese (24), with or without a choice of treatment (25), or having had or not had reconstruction (11), for example. It appears that it is not the cancer that is the cause, but it is the treatment, as the body change distress found among women surgically treated for benign breast disease has many of the same negative sequelae (26).

The predictive validity of the BITS remains to be documented, but the concurrent validity data is encouraging. As hypothesized, the BITS was a significant correlate of traumatic stress, psychological distress, and, of course, sexuality. This is consistent with other studies showing significant concurrent relationships between body image and women's judgments of their sexual interest and satisfaction (e.g., 27) and longitudinal research showing early body image distress as a predictor of

poor quality of life (28). Our successful test of incremental validity used a measure of body satisfaction, which has been the central component of many body image measures.

In summary, the BITS is offered as a face valid, brief, and sensitive measure of body change stress following breast surgery. Our tests of construct validity provide an early psychometric foundation for the measure. We anticipate that the BITS may prove useful in documenting the effectiveness of psychological interventions offered to assist women with significant distress about their body changes. The measure might be particularly appropriate to evaluate cognitive behavioral therapies, as it assesses thoughts and behaviors common to women's stress reactions. That women have such stress is not new, however, a standard measure has not emerged. Although additional validation is necessary, the BITS is offered as a promising option.

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