Body Image After Mastectomy Scale: A New Measure of Body Image Behaviors and Beliefs in Women Following Mastectomy

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Abstract

Background: Body image distress is frequently reported by women after mastectomy and is associated with negative health outcomes, such as reduced quality of life, elevated depression and anxiety symptoms, and impaired sexual functioning. To reduce body image distress after mastectomy, we must first understand the factors that contribute to its development and maintenance. We therefore developed a new measure, the Body Image after Mastectomy Scale (BIMS), to comprehensively assess maladaptive appearance-related beliefs and behaviors (*e.g.,* avoidance and rituals) that may trigger and maintain body image distress after mastectomy.

Materials and Methods: Forty-seven female patients undergoing mastectomy with breast reconstruction completed the BIMS and other measures 3 months after breast reconstruction.

Results: Evaluation of the BIMS' initial psychometric properties showed that the overall scale has good internal consistency and strong construct validity. Domain-specific subscales ranged in reliability from good to poor.

Conclusions: The BIMS can be used clinically to identify cognitive and behavioral psychotherapy targets to reduce body image distress resulting from mastectomy. It can also be used in research to identify factors that contribute to the development and maintenance of body image distress after mastectomy. ClinicalTrials.gov identifier: NCT03428399.

Keywords: body image, breast cancer, breast reconstruction, mastectomy, measurement

Introduction

MASTECTOMY IS A common and effective prophylactic prevention and treatment approach to breast cancer, yet mastectomy permanently alters the appearance, sensations, feel, and function of the breasts. Undergoing a permanent change to a body part that may be central to physical appearance, sexual functioning, and role functioning (*i.e.,* in the case of breast feeding) can have a profound impact on one's body image[1,2]—a complex construct that includes self-representations (*i.e.,* perceptions and beliefs),[3] emotions, and behaviors related to one's physical appearance and body functions.[1]

Not surprisingly, body image distress is one of the most frequently reported challenges among women with breast cancer,[2] and elevated body image distress in cancer patients is associated with additional complications including reduced quality of life, depression and anxiety symptoms, social isolation, and impairments in sexual functioning (*e.g.,* sexual activity and responsiveness).[2,4–6] For instance, when body image distress arises from a discrepancy between one's actual and ideal postmastectomy breast appearance, this may trigger depression[3,7] as well as associated social isolation and impairment.[4]

Given the negative impact of body image distress on one's broader mental health, functioning, and wellbeing, it is critical to understand the factors that may trigger or maintain body image distress after mastectomy. The broader psychological literature emphasizes a cognitive behavioral model of body image distress and disturbance, in which maladaptive appearance-related beliefs (*e.g.,* ''I believe others treat me differently because of

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my appearance'') and behaviors—particularly avoidance behaviors (*e.g.,* avoiding intimacy because of appearance concerns) and rituals or safety behaviors (*e.g.,* repeatedly checking or inspecting one's appearance concerns)—trigger and bidirectionally maintain body image distress.[8–10]

This cognitive behavioral model was initially generated from research on psychiatric body image disorders such as body dysmorphic disorder (BDD)[11,12] and eating disorders[13] and has subsequently been extended to medical populations including breast cancer patients.[14] Generalization to medical populations is based on the premise that the same cognitive and behavioral processes that impact body image in psychiatric patients occur to varying degrees across other body image-distressed individuals.[9,10,15]

Whereas the cognitive and behavioral processes that trigger and maintain body image distress may be universal, the particular maladaptive thoughts and behaviors involved are, to a large extent, disease specific.[9] For example, mastectomy patients may especially avoid sexual intimacy compared with other body image-distressed populations, given the potential role of breasts in sexual functioning. Avoidance of sexual intimacy not only impacts sexual functioning, but also reciprocally impacts one's body image.[16] Mastectomy patients may additionally grapple with issues of identity (*e.g.,* identifying oneself as a feminine person),[17] rendering beliefs about femininity particularly salient in this population and spurring avoidance of activities that may make an individual feel less feminine postmastectomy (*e.g.,* intimacy and wearing a bathing suit).

A number of well-validated measures exist for assessing body image in breast cancer and mastectomy patients.[18] Among the most widely used measures of body image are the Body Image Scale (BIS),[19] a measure of body image distress after cancer treatment, and the BREAST-Q,[20] which includes modules for mastectomy and reconstruction and scales focused on satisfaction with breasts. However, to the best of our knowledge, no assessment tools have been developed with the aim of comprehensively capturing the specific maladaptive behaviors and beliefs that *contribute* to body image distress among mastectomy patients.

To address this gap, this study describes the development and initial psychometric evaluation of the Body Image after Mastectomy Scale (BIMS), a comprehensive measure of behaviors and beliefs that may contribute to body image distress in women after mastectomy. We first describe key characteristics of the measure in 47 women who completed mastectomy with breast reconstruction at Massachusetts General Hospital, including the BIMS' descriptive statistics and the frequency with which each behavior and belief item was endorsed by our sample. Second, we evaluate the measure's internal consistency. Third, we assessed the BIMS' construct validity, hypothesizing that the BIMS would correlate more strongly with measures of related constructs (*i.e.,* body image) and less strongly with measures of broader constructs (*i.e.,* cancer worry and perceived social support).

The BIMS can be utilized in research aimed at characterizing the prevalence and scope of cognitive and behavioral risk factors for body image distress in mastectomy patients. In addition, it can be applied to developmental research aimed at testing etiological or maintenance hypotheses for body image distress in mastectomy patients. Finally, the BIMS can be used in the context of psychotherapy with breast cancer and mastectomy patients, to identify an individual's specific cognitive-behavioral treatment targets, and to track improvement on these targets over the course of psychotherapy.

Materials and Methods

Participants

Participants were 47 adult women who underwent mastectomy with breast reconstruction at Massachusetts General Hospital and who were participating in a broader prospective study on predictors of body image distress and depression following mastectomy with breast reconstruction. Individuals were excluded from participating if they had a current psychotic disorder, manic episode, serious neurological disorder, intellectual disability, developmental disorder, or active suicidal ideation. Given the aims of the broader study, eligibility criteria also excluded participants whose treatment plan at the time of enrollment involved radiation and/or ongoing chemotherapy, owing to the direct effects of these medical treatments on appearance and mood.

Procedures

This study was approved by the Massachusetts General Hospital Institutional Review Board. Following informed consent, participants completed two assessments. The first assessment occurred 1–6 weeks before mastectomy and involved completion of the Mini-International Neuropsychiatric Interview (M.I.N.I 7.02) over phone with the study Principal Investigator, a clinical psychologist with extensive experience administering the MINI. Participants then completed a set of self-report measures online, through Research Electronic Data Capture (REDCap).[21]

The second assessment took place ∼3 months after participants' breast reconstruction surgery and involved completion of postsurgery surveys through REDCap. Participants completed the BIMS and all measures used to examine construct validity during this postsurgery assessment. Participants were compensated $40 for the first assessment and $50 for the second assessment.

BIMS measure development. The BIMS was modeled after the Body Dysmorphic Disorder Symptom Scale (BDD-SS),[22] a widely used, validated self-report tool that assesses the presence and severity of maladaptive thoughts and behaviors common to BDD. The first author, a clinical psychologist with expertise in cognitive behavioral assessment and treatment of body image disorders, generated the initial set of BIMS items by adapting relevant items from the BDD-SS and generating new items that were specific to mastectomy patients. For example, some of the original domains assessed by the BDD-SS (*e.g.,* maladaptive repetitive body checking behaviors and maladaptive appearance-related avoidance behaviors) were retained, whereas specific items were adapted or added as needed to capture the particular experience of mastectomy patients [*e.g.,* ''checking or inspecting my breast(s)/chest or scars''].

The measure was subsequently reviewed, edited, and iteratively improved by three additional psychologists with expertise in body image (including the primary author of the BDD-SS measure), in addition to a reconstructive breast surgeon who treats mastectomy patients and a psychologist with expertise in psycho-oncology and breast cancer. These

five secondary expert reviewers paid particular attention to the comprehensiveness and relevance of the items for capturing the experiences of women after mastectomy, from their respective lenses. Following additions and edits from these experts, the primary author arrived at a final set of items.

Measures

Mini International Neuropsychiatric Interview (M.I.N.I. 7.0.2). The M.I.N.I. 7.0.2[23] is a reliable and valid semi-structured psychiatric diagnostic interview based on *Diagnostic and Statistical Manual of Mental Disorders*, *5th Edition* criteria. It was used in this study to assess diagnostic eligibility criteria at the pre-surgery assessment.

Body Image after Mastectomy Scale. The BIMS consists of 54 items, which collectively assess five behavioral and cognitive domains: (1) body *checking* behaviors, (2) behaviors to *hide* the appearance of one's breasts/chest, (3) *shape and weight*-related behaviors, (4) *avoidance* behaviors, and (5) maladaptive *beliefs* related to appearance. Each symptom domain includes a checklist, which asks participants to indicate whether they have experienced the behavior or belief in the past week. If a participant endorses one or more items within a symptom domain, they are then asked to rate the overall severity (*i.e.,* frequency and distress) of symptoms endorsed in that domain, on a 0–10 scale (0 = no problem; 10 = very severe). In addition to generating domain severity scores, two summary scores can be calculated from the BIMS: (1) overall severity, summed from the five domain severity scores (range: 0–50), and (2) overall symptoms, which is the total number of symptoms endorsed (range: 0–54). Higher summary scores indicate greater severity or symptoms, respectively. The BIMS takes ∼4–5 minutes to complete.

Body Image Scale. The BIS[19] is a 10-item self-report measure of body image changes after cancer treatment. Higher scores indicate greater body image distress (range: 0–30). Internal consistency (Cronbach's alpha = 0.93) is strong, with good clinical validity, measured through response prevalence, discriminant validity, sensitivity to change, and consistency of results.[19]

Body Image Disturbance Questionnaire. The Body Image Disturbance Questionnaire (BIDQ)[24] is a seven-item self-report measure of body image dissatisfaction, distress, and dysfunction that is not specific to cancer or mastectomy patients. Greater scores reflect greater body image disturbance (range: 0–5). Internal consistency among women was strong (Cronbach's alpha = 0.89), with strong concurrent, discriminant, construct, and incremental validity.[24]

Functional Assessment of Cancer Therapy—Breast Functional Wellbeing Subscale. The Functional Assessment of Cancer Therapy—Breast (FACT-B)[25] is a self-report measure designed to assess multidimensional quality of life in patients with breast cancer. For this study, the seven-item functional wellbeing subscale was administered. Functional wellbeing subscale scores range from 0 to 28, with higher scores indicating greater functional wellbeing-related quality of life. Internal consistency, convergent validity, and divergent validity of the FACT-B are strong.[25]

Cancer Worry Scale. The Cancer Worry Scale (CWS)[26] is an eight-item self-report measure that captures fear of getting cancer or cancer recurrence. Scores range from 8 to 30, with higher scores indicating a greater severity of cancer worries. Internal consistency is strong (Cronbach's alpha = 0.87) and there is good convergent and divergent validity.[26]

Multidimensional Scale of Perceived Social Support. The 12-item Multidimensional Scale of Perceived Social Support (MSPSS)[27] is a widely used self-report Likert-type measure that assesses perceived social support from family, friends, and a significant other. Higher scores are indicative of higher levels of perceived social support. Internal consistency is strong (Cronbach's alpha = 0.88 in a sample of women).[27]

Statistical analyses

Descriptive analyses. To characterize the severity of maladaptive appearance behaviors and beliefs in our sample, we examined the means and standard deviations (SDs) of the BIMS overall severity score, overall symptom score, and domain-specific severity scores. To understand the salience of symptom domains and individual items, we examined the frequency with which participants endorsed each domain, as well as each behavior and belief item.

Reliability. We evaluated internal consistency for the overall severity score using Cronbach's alpha, and for the checklist-based overall symptom score using Kuder Richardson-20 (KR-20). To evaluate internal consistency of domain-specific symptom scores, we examined both KR-20 and mean inter-item correlations, given that KR-20 is strongly influenced by the number of items in a scale. Finally, to assess the importance of individual items within the measure, we examined domain-corrected item–total correlations.

Construct validity. We evaluated convergent validity by examining the strength of correlations between the BIMS overall severity and symptom scores with two measures of body image (BIS and BIDQ). We hypothesized that we would observe moderate to strong correlations between the BIMS and measures of this conceptually related construct. Given that the maladaptive behaviors and beliefs assessed by the BIMS may also impact one's broader functioning, we hypothesized that we would observe a moderate correlation between the BIMS and a breast cancer-specific measure of functional impairment (FACT-B functional wellbeing subscale).

We evaluated discriminant validity by examining whether correlations were less strong with measures of constructs we anticipated to be less directly related to body image behaviors and beliefs. In particular, we hypothesized that we would observe weaker relationships between the BIMS and measures of cancer worry (CWS) and perceived social support (MSPSS).

Results

Sample characteristics

Forty-seven women provided informed consent and completed the BIMS measure at the postsurgery assessment. Participants ranged in age from 30 to 79 years, with a mean

(SD) age of 52.26 (11.58) years. Most participants were white ($n=42$, 89.4%) and non-Hispanic ($n=46$, 97.9%). The remaining participants identified their race as Asian ($n=2$, 4.3%), ''more than one race'' ($n=1$, 2.1%), or ''other'' ($n=2$, 4.3%). Most participants ($n=45$, 95.7%) identified as heterosexual, and two participants identified as a sexual orientation other than heterosexual, gay, or bisexual. The majority of participants were married ($n=29$, 61.7%), nine were divorced or separated (19.1%), and five (10.6%) were single/never married. Most participants reported having a postgraduate or professional degree ($n=20$, 42.6%), 12 reported having a college degree (25.5%), 5 had some college experience (10.6%), and 4 had some postgraduate training (8.5%).

Descriptive analyses

The BIMS' mean (SD) overall severity score was 7.47 (7.64) (range: 0–32), and its mean (SD) overall symptom score was 6.34 (4.90) (range: 0–19), indicating that on average, participants engaged in ∼6 behaviors and beliefs assessed by the scale in the past week. Means and SDs for the domain-specific severity scores are given in Table 1; on average, participants reported moderately severe hiding and avoiding behaviors and lower severity weight/shape behaviors, checking behaviors, and maladaptive appearance beliefs.

See Table 1 for the frequencies with which each domain was endorsed by the sample and Table 2 for the frequencies with which each behavior and belief item were endorsed by the sample. A majority of participants reported checking behaviors (83%) and maladaptive appearance beliefs (72.3%) over the past week, whereas the fewest participants (21.3%) reporting hiding behaviors over the past week. The most frequently endorsed individual items likewise came from the checking domain (i.e., ''checking or inspecting my breast(s)/chest or scars,'' and ''touching or feeling my breast(s)/chest repeatedly, to gauge how they look''), highlighting the likely relevance of these checking behaviors to women's body image after mastectomy.

Reliability

Internal consistency for the BIMS' overall severity score ($\alpha=0.81$) and overall symptom score (KR-20 = 0.83) were strong. KR-20s for domain-specific symptom scores are given in Table 1 and were good (0.72–0.74) for subscales with at least eight items and poor (0.32–0.36) for subscales with few items. Because KR-20 is heavily influenced by the

number of items, we also report mean inter-item correlation as a complementary metric of domain-specific reliability (Table 1). Mean inter-item correlations by domain were good for the checking and avoidance domains, slightly low for the weight/shape and beliefs domains, and poor for the hiding domain. Domain-corrected item–total correlations are given in Table 2, and ranged widely from –0.01 to 0.78, indicating that certain infrequently endorsed items may be less critical to retain in the measure.

Construct validity

See Table 3 for bivariate correlations between the BIMS overall severity and symptom scores with constructs hypothesized to be most (i.e., BIS and BIDQ), moderately (i.e., FACT-B), and least (i.e., CWS and MSPSS) conceptually related to the BIMS. As expected, BIMS severity and symptom scores were strongly related to measures of body image distress and disturbance, providing strong evidence for the BIMS' convergent validity. Results also provide strong support for the discriminant validity of the BIMS. As hypothesized, we found weak, nonsignificant correlations with measures of cancer worry and perceived social support. Finally, as expected, we observed a moderate association with a measure of cancer-specific functional impairment—a construct we anticipated to be indirectly related to maladaptive appearance-based behaviors and beliefs measured by the BIMS.

Discussion

The BIMS is the first measure that seeks to comprehensively capture the maladaptive appearance-related behaviors and beliefs experienced by women after mastectomy. We developed the BIMS to serve as a self-report scale that can be easily used in both research and clinical contexts, to measure factors likely to contribute to development and maintenance of body image distress in this population. This article evaluates the BIMS' initial psychometric properties.

On average, participants reported engaging in six of the maladaptive behaviors and beliefs assessed by the BIMS over the past week, with wide variation between individuals in the total number of items endorsed and the severity of those symptoms. The most salient domains included checking behaviors, maladaptive appearance-related beliefs, and avoidance behaviors.

Results suggest that in treatment aimed at improving body image after mastectomy,[28,29] clinicians should particularly

TABLE 1. ENDORSEMENT RATES, DESCRIPTIVE STATISTICS, AND INTERNAL CONSISTENCY BY DOMAIN

Domain	No. items in subscale	Domain endorsement rate, n (%)	Severity score, Mean (SD)	Mean inter-item correlation	KR-20
Checking	8	39 (83.0)	2.31 (2.03)	0.24	0.72
Hiding	5[a]	10 (21.3)	4.20 (2.20)	0.04	0.32
Weight/shape	3	11 (23.4)	3.36 (2.50)	0.14	0.36
Avoiding	10[b]	20 (42.6)	3.60 (2.06)	0.21	0.73
Beliefs	28[c]	34 (72.3)	2.35 (1.91)	0.13	0.74

[a]KR-20 and mean inter-item correlation are based on four items, because one item was not endorsed by any participants.
[b]KR-20 and mean inter-item correlation are based on nine items, because one item was not endorsed by any participants.
[c]KR-20 and mean inter-item correlation are based on 23 items, because five items were not endorsed by any participants.
KR-20, Kuder Richardson-20; SD, standard deviation.

Symptom domain	Endorsement rate, n (%)	Domain corrected item–total correlation
Checking		
C1. Checking or inspecting my breast(s)/chest or scars	34 (72.3)	0.43
C2. Touching or feeling my breast(s)/chest repeatedly, to gauge how they look	25 (53.2)	0.61
C3. Asking questions about my appearance or asking for reassurance about my appearance (''Do I look okay?'')	13 (27.7)	0.56
C4. Mentally reviewing past events, conversations, and actions to find out how people reacted to my appearance	7 (14.9)	0.22
C5. Checking my breast(s)/chest in the mirror repeatedly	19 (40.4)	0.48
C6. Checking my breast(s)/chest by taking photos repeatedly	4 (8.5)	0.12
C7. Comparing the appearance of my breast(s)/chest to others' (in person, in pictures or in the media, on the internet)	7 (14.9)	0.48
C8. Scrutinizing the appearance of others' breasts	3 (6.4)	0.40
Hiding		
H1. Spending a lot of money (more than others think is necessary) to improve the appearance of my breast(s)/chest	1 (2.1)	−0.07
H2. Hiding appearance of my breast(s)/chest or scars by applying makeup[a]	0 (0.0)	-
H3. Wearing special outfits to hide appearance of my breast(s)/chest or scars (*e.g.,* loose fitting clothes)	5 (10.6)	0.40
H4. Hiding appearance of my breast(s)/chest or scars with my body position	1 (2.1)	−0.07
H5. Wearing special outfits (*e.g.,* loose fitting clothes) to hide my body shape or weight	6 (12.8)	0.38
Weight/shape behaviors		
W1. Lifting weights excessively	2 (4.3)	0.10
W2. Exercising excessively (<1 h/day)	3 (6.4)	0.24
W3. Counting calories or dieting to lose weight	9 (19.1)	0.36
Avoiding		
A1. Avoiding looking at my breast(s)/chest	5 (10.6)	0.35
A2. Avoiding mirrors or reflective surfaces	2 (4.3)	0.25
A3. Avoiding social situations because of appearance concerns	4 (8.5)	0.28
A4. Avoiding public areas because of appearance concerns (shopping, stores, busy streets, restaurants, public transportation, public restrooms)	1 (2.1)	0.36
A5. Avoiding close physical contact with others because of appearance concerns (hugging, dancing, talking closely)	4 (8.5)	0.39
A6. Avoiding intimate physical contact with another person because of appearance concerns (sexual activity, kissing)	13 (27.7)	0.78
A7. Avoiding physical activities like exercise, swimming, or recreation because of concerns about appearance	7 (14.9)	0.50
A8. Avoiding being seen nude or with few clothes	17 (36.2)	0.63
A9. Avoiding having pictures taken[a]	0 (0.0)	—
A10. Discounting compliments or becoming upset by compliments from others about my appearance	2 (4.3)	0.04
Beliefs		
B1. I believe others are judging the appearance of my breast(s)/chest/scars	4 (8.5)	0.19
B2. I believe my spouse/partner is judging the appearance of my breast(s)/chest/scars	5 (10.6)	0.08
B3. The first thing people notice about me is the appearance of my breast(s)/chest	2 (4.3)	0.22
B4. I think that others are staring at or talking about the appearance of my breast(s)/chest	6 (12.8)	0.28
B5. I believe others treat me differently because of the appearance of my breast(s)/chest	1 (2.1)	−0.01
B6. I believe my spouse/partner treats me differently because of the appearance of my breast(s)/chest	4 (8.5)	0.15
B7. I believe others are judging my weight gain from treatment	5 (10.6)	0.57
B8. I believe my spouse/partner is judging my weight gain from treatment	2 (4.3)	0.61
B9. The first thing people notice about me is my weight	5 (10.6)	0.50
B10. I think that others are staring at or talking about my weight	4 (8.5)	0.55

(continued)

TABLE 2. (CONTINUED)

Symptom domain	Endorsement rate, n (%)	Domain corrected item–total correlation
B11. I believe others treat me differently because of my weight gain from treatment	1 (2.1)	0.52
B12. I believe my spouse/partner treats me differently because of my weight gain from treatment	2 (4.3)	0.61
B13. If my appearance is defective, I am worthless[a]	0 (0.0)	—
B14. If my appearance is defective, I will end up alone and isolated	1 (2.1)	0.52
B15. If my appearance is defective, I am helpless[a]	0 (0.0)	—
B16. No one can like me as long as I look the way I do[a]	0 (0.0)	—
B17. I am less feminine or less of a woman now	6 (12.8)	0.24
B18. If my appearance is defective, I am unlovable	1 (2.1)	0.18
B19. I must look perfect	1 (2.1)	−0.08
B20. I look deformed or abnormal	5 (10.6)	0.12
B21. I am an unattractive person	2 (4.3)	0.46
B22. What I look like is an important part of who I am	28 (59.6)	0.17
B23. Outward appearance is a sign of the inner person	8 (17.0)	−0.04
B24. No one else my age looks as bad as I do[a]	0 (0.0)	—
B25. If I could look just the way I wish, I would be much happier	8 (17.0)	0.47
B26. People would like me less if they knew what I really looked like	1 (2.1)	0.18
B27. My appearance is more important than my personality, intelligence, values, skills, how I relate to others, and my performance at work or in other settings[a]	0 (0.0)	—
B28. If I learn to accept my appearance, I'll lose my motivation to look better	2 (4.3)	0.61

[a]Domain-corrected item–total correlation not calculated, because item was not endorsed by any participants.

target these behaviors and beliefs. For example, some initial research provides evidence for cognitive behavioral interventions focused on body image in breast cancer patients.[28,29] In cognitive behavioral treatment for body image after mastectomy,[28] clinicians can introduce ritual prevention strategies to reduce maladaptive checking behaviors, cognitive restructuring skills to challenge maladaptive appearance-related beliefs, and exposure exercises to reduce unhelpful avoidance behaviors.

Moreover, by administering the BIMS before the start of therapy, therapists can identify which *specific* maladaptive beliefs and behaviors to target with a given patient, allowing for personalization of interventions[29] and they can re-administer the BIMS over time to assess change in these domains across treatment. In research contexts, results suggest

that we should focus on studying checking behaviors, avoidance behaviors, and maladaptive beliefs to better understand the development and maintenance of body image distress after mastectomy. Hiding behaviors and shape- and weight-related behaviors may be less pertinent to focus on, both in treatment and in research of body image after mastectomy.

Variability in the number and severity of BIMS items endorsed by participants suggests that not all women become stuck engaging in maladaptive symptoms that fuel body image distress after mastectomy. To this end, the BIMS may be administered at postoperative appointments as a screening tool, to identify *who* is experiencing maladaptive symptoms and may be at risk for developing prolonged body image distress. Utilizing the BIMS in this way would provide a low-cost, accessible means of identifying early intervention opportunities.

TABLE 3. BIVARIATE CORRELATIONS BETWEEN BODY IMAGE AFTER MASTECTOMY SCALE SYMPTOM AND SEVERITY SCORES WITH MEASURES OF CONCEPTUALLY RELATED AND LESS RELATED CONSTRUCTS

	BIMS symptoms	BIS	BIDQ	FACT-B	CWS	MSPSS
BIMS symptom						
Pearson's r	—	0.51***	0.55**	−0.27	−0.05	−0.14
p		<0.001	0.002	0.07	0.74	0.37
BIMS severity						
Pearson's r	0.75***	0.49**	0.64***	−0.33*	0.18	−0.15
p	<0.001	0.001	<0.001	0.03	0.26	0.34

Due to missing data, *df*s vary from 26 to 45.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.
BIDQ, Body Image Disturbance Questionnaire; BIMS, Body Image after Mastectomy Scale; BIS, Body Image Scale; CWS, Cancer Worry Scale; FACT-B, Functional Assessment of Cancer Therapy—Breast, Functional Wellbeing subscale; MSPSS, Multidimensional Scale of Perceived Social Support.

Psychometric results showed strong internal consistency reliability for the overall BIMS scales and good internal consistency for the three domain subscales that were most salient for our sample (*i.e.,* checking behaviors, avoidance behaviors, and maladaptive beliefs). The hiding and shape/weight subscales demonstrated acceptable to poor internal consistency, depending on the metric examined. Lower internal consistency for these subscales was likely owing to the small number of items in the subscales, which were also less frequently endorsed. It is possible that either eliminating these two subscales, or eliminating select items from these subscales with low endorsement rates, may yield a briefer, optimized version of the BIMS. Further research can evaluate the utility of a briefer version of the BIMS, based on the current study's initial psychometric results.

Psychometric results provided very strong evidence of construct validity, based on a pattern of strong correlations with measures of related constructs (*i.e.,* body image distress and disturbance), a moderate relationship with an indirectly related construct (*i.e.,* cancer-related functional wellbeing), and weaker relationships with measures of less conceptually similar constructs (*i.e.,* cancer worry and perceived social support). Evidence of the BIMS' strong construct validity underscores its potential value across research and clinical contexts.

Alongside relatively strong initial psychometric results for the new BIMS measure, there are limitations to this study that should be considered. Although the creation of the BIMS items involved input from a variety of experts including psychologists specializing in body image, a psychologist specializing in oncology and breast cancer, and a breast reconstructive surgeon, item generation did not involve input from women who have undergone mastectomy, who could have provided additional rich insights. Our sample was primarily white and highly educated, which may limit the generalizability of findings. It is possible, for instance, that certain appearance-based behaviors and beliefs may be more or less relevant to women of different racial, ethnic, or socioeconomic backgrounds. Future testing in more diverse samples is needed.

Relatedly, our sample was drawn only from women who had undergone both mastectomy and breast reconstruction. Women who choose not to pursue breast reconstruction after mastectomy may endorse different appearance-based thoughts and behaviors from those who do choose to pursue breast reconstruction. On the contrary, results were combined across women who had undergone unilateral and bilateral mastectomies, and eligibility criteria excluded participants who needed radiation or ongoing chemotherapy. Women who underwent unilateral (vs. bilateral) mastectomy or whose cancer treatments also require radiation and/or chemotherapy likely experience differing or additional impact to their appearance (*e.g.,* hair loss and weight gain). For instance, it is possible that certain items and domains that were under-endorsed in the present sample—such as shape/weight behaviors—would be more frequently endorsed in a sample that included women undergoing chemotherapy or radiation.

In addition to testing the BIMS within these more diverse samples, replication and extension of this initial psychometric study in a larger treatment seeking sample will allow for tests of the BIMS' factor structure and sensitivity to change across body image treatment.

Conclusions

The new BIMS measure has good initial reliability and strong construct validity, and it serves as a quick (4–5 minute) and comprehensive tool to evaluate maladaptive appearance-related behaviors and beliefs after mastectomy. The BIMS fills a gap in existing breast cancer measures, which to-date have focused on measuring body image distress more specifically. The BIMS can be used by researchers, to better understand the development and maintenance of body image distress after mastectomy, as well by clinicians, to screen for those who may benefit from body image-focused treatment, identify cognitive-behavioral treatment targets, and track improvement in those targets across body image treatment.

For a copy of the BIMS, contact the first author (Hilary Weingarden, PhD). Please cite the BIMS by referencing this article.

Authors' Contributions

H.W. obtained the funding for the study, oversaw the conduct of the study, conducted the analyses, and drafted parts of the article. H.W., S.W., and W.G.A., Jr. contributed to the concept and design of the project. All authors were involved in the drafting or critical editing of the article.

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