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The Portuguese version of the Body Image Scale (BIS) – psychometric properties in a sample of breast cancer patients

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A B S T R A C T

Purpose: The aim of this study was to analyse the psychometric properties of the Portuguese version of the body image scale (BIS; Hopwood, P., Fletcher, I., Lee, A., Al Ghazal, S., 2001. A body image scale for use with cancer patients. European Journal of Cancer, 37, 189–197). This is a brief and psychometric robust measure of body image for use with cancer patients, independently of age, cancer type, treatment or stage of the disease and it was developed in collaboration with the European Organization for Research and Treatment of Cancer (EORTC) Quality of Life Study Group.
Method: The sample is comprised of 173 Portuguese postoperative breast cancer patients that completed a battery of measures that included the BIS and other scales of body image and quality of life, in order to explore its construct validity.
Results: The Portuguese version of BIS confirmed the original unidimensional structure and demonstrated adequate internal consistency, both in the global sample ($\alpha = .93$) as in surgical subgroups (mastectomy = .92 and breast-conserving surgery = .93). Evidence for the construct validity was provided through moderate to largely sized correlations between the BIS and other related measures. In further support of its discriminant validity, significant differences in BIS scores were found between women who underwent mastectomy and those who underwent breast-conserving surgery, with the former presenting higher scores. Age and time since diagnosis were not associated with BIS scores.
Conclusions: The Portuguese BIS proved to be a reliable and valid measure of body image concerns in a sample of breast cancer patients, allowing a brief and comprehensive assessment, both on clinical and research settings.

Introduction

Cancer and cancer treatment can have a profound impact on a patient's physical appearance (Frith et al., 2007; Rumsey and Harcourt, 2005). For the majority of patients, appearance changes (e.g. hair loss, loss of a member through amputation) are very distressing and often even more difficult to cope with than other secondary symptoms such as nausea or vomiting (White, 2002).

Body image is an important component of a cancer patient's quality of life (QOL) (DeFrank et al., 2007; Hopwood et al., 2001), having a relevant role on their adjustment to the disease (Helms et al., 2008; Hormes et al., 2008). Although there is not yet a clear definition of body image in psycho-oncology (White, 2000), the most recent perspectives that have emerged in the mainstream body image literature consider this to be a multidimensional construct that encompasses cognitive, affective and behavioural components (Cash and Pruzinsky, 1990, 2002; Jakatdar et al., 2006).

A considerable amount of research has been focused on body image among cancer patients, particularly, on women with breast cancer (e.g. Carver et al., 1998; Moyer, 1997). For example, many studies have explored the impact of surgery on women's adjustment and QOL, reporting few or no difference between breast-conserving surgery (BCS; the surgery in which only the tumor and some surrounding tissue is removed, therefore preserving as much of the shape and size of the breast as possible) and mastectomy (i.e. the surgery in which the whole breast is removed) (e.g. Ganz et al., 1992a; Janz et al., 2005; Moyer, 1997; Poulsen et al., 1997). The only difference between surgeries appears to be on body image and sexual functioning, as patients treated with mastectomy report more concerns with appearance and more sexual difficulties than those treated with BCS (e.g. Bloom et al., 2007; Fallowfield et al., 1986).

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Although a large number of studies have been developed in this area, there are only a few measures available to assess body image among cancer patients. The majority of studies have been using instruments developed for use on the general population and even though some of them can be applied to cancer patients with a few minor modifications (White, 2002), such as the Appearance Schemas Inventory – Revised (Cash et al., 2004) which assesses appearance investment, the majority are not appropriate for measuring appearance issues among this specific population, lacking the sensitivity and specificity needed to cover important areas of concern among cancer patients.

Cancer-related appearance issues have also been assessed through body image subscales or items of cancer global measures of QOL (for a review see Victorson et al., 2007). These instruments, despite the advantage of being specifically designed for persons with cancer and thus being sensitive to difficulties related to surgery and cancer treatments, are too general and usually include only a few items to evaluate body image concerns. One example is the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Breast Cancer Module (EORTC QLQ-BR23), the module designed for breast cancer that is used in conjunction with the EORTC Quality of Life Questionnaire (QLQ-C30) (Aaronson et al., 1993), both developed by the Quality of Life Study Group from the EORTC. The subscale of body image is comprised of four items and covers topics such as body satisfaction or feelings of physical attractiveness. Another example is the Cancer Rehabilitation Evaluation System – CARES (Ganz et al., 1992c), which also has three items assessing embarrassment and discomfort with one's body and its changes.

Among the existing body image assessing instruments in oncology, some were designed to measure only a particular domain of body image, such as the measure of body apperception (MBA), developed by Carver et al. (1998), to assess appearance investment, i.e. to what extent women with breast cancer base their self-esteem on their body image. Others, although more comprehensive, are lengthy, thus imposing limitations on their applicability. One example is the Body Image After Breast Cancer Questionnaire (BIBCQ), developed by Baxter et al. (2006), with the purpose of thoroughly measuring the long-term impact of breast cancer on several dimensions of body image. However, its extension (45 items) does not make its use easy in clinical and research contexts.

Considering this, it is clear that a brief and psychometric robust instrument, applicable to all cancer patients, independently of age, cancer type, treatment or stage of the disease is needed to assess body image, both in clinical and research settings. The body image scale (BIS), developed by Hopwood et al. (2001) fulfils these criteria, allowing a complete yet brief assessment of behavioural, affective and cognitive aspects of body image and is also sensitive to typical areas of concern for cancer patients. The development of this instrument followed similar guidelines to those recommended by the Quality of Life Study Group from the EORTC for questionnaire module development (Sprangers et al., 1993) and was designed to be used along with the QLQ-C30 or other QOL measure, complementing QOL assessment in clinical trials or psychosocial research. Four of its 10 items comprise the body image subscale of the QLQ-BR23 module. The scale was validated among breast cancer patients and has revealed good psychometric properties, proving to be an adequate and valid measure of body image among this population (Hopwood et al., 2001). According to the authors, it is also applicable across several types of cancer and treatment situations.

In Portugal, there is not any validated measure of body image that is specifically designed for cancer patients, thus limiting research in this area. Therefore, this study was conducted to analyse the psychometric properties of the Portuguese version of the BIS among a sample of breast cancer patients. In particular, it aims to: (1) examine the Portuguese BIS factor structure; (2) analyse its reliability; (3) explore its construct validity; and (4) analyse the relationship between the BIS, the patient's age and the length of time since diagnosis.

To demonstrate construct validity, hypotheses about the association between the BIS and related measures were formulated and tested. Particularly, a largely sized relationship was hypothesized between the BIS and other related measures of body image (such as the DAS24, the *body shame* subscale and the *body image* WHOQOL facet). Relationships of a medium effect were expected between the BIS and appearance investment and QOL.

It is also expected that patients treated with mastectomy present higher scores on BIS than those treated with BCS. Finally, we expect a moderate association between the BIS scores, age and time since diagnosis.

Methods

Participants and procedure

The sample is comprised of 173 postoperative breast cancer patients, participating in a broader study of psychosocial adjustment carried out by the Psychological Intervention Unit (UnIP) of Coimbra University Hospitals (CUH) in the Gynaecologic, Radiotherapy and Chemotherapy departments of this hospital. A group of participants were also recruited from the Reach to Recovery Association (specifically the one based in the central region of the country), a voluntary organization formed by breast cancer survivors who help other women confronting the same disease. Criteria for inclusion in this study consisted of having been diagnosed with non-metastatic breast cancer, having done breast surgery (BCS or mastectomy), having no other major disabling medical or psychiatric condition, being female, being able to read and write Portuguese and being at least 18 years old.

Ethical approval was obtained from the CUH Research Ethics Committee and from the board director of the Reach to Recovery organization. Detailed explanation of research objectives and of confidentiality requirements were given to all participants and informed consent was obtained from all, prior to the completion of the battery of questionnaires.

Patients recruited in the Radiotherapy and Chemotherapy departments of CUH were invited to participate in the study before or during their treatment ($n = 69$) and those recruited in the Gynaecologic department were hospitalized for breast reconstruction surgery or oophorectomy ($n = 48$). An envelope containing an explanatory letter and self-report measures was given to participants, who later returned it personally to the researcher. The clinical data was obtained from the patients' medical records. Participants from the Reach to Recovery association were volunteers collaborating with this organization or women who went to the association to acquire a prosthesis or related material ($n = 56$). The envelope containing the explanatory letter and the self-reported measures was handed to all participants who later returned the questionnaires in a postage-paid, pre-addressed envelope. The clinical data was self-reported by respondents.

Measures

Body image

The body image scale [BIS] (Hopwood et al., 2001) is a 10 item measure developed to briefly and comprehensively assess affective (e.g. feeling self-conscious), behavioural (e.g. difficulty at looking at the naked body) and cognitive (e.g. satisfaction with appearance) dimensions of body image in cancer patients and has been designed to use with any cancer or the treatment thereof. It uses a 4-point response scale (0 = *not at all* to 3 = *very much*) and the final score is the sum of the 10 items, ranging from 0 to 30, with zero scores representing no symptom or distress and higher scores

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corresponding to increasing symptoms and distress or more body image concerns. Although in the preliminary version of the scale five questions were presented positively, after the initial field testing the authors decided to redraft the scale and present all items negatively in order to avoid some possible discomfort in responding to the positively phrased items (e.g. *Have you been feeling feminine/masculine?*). The original version revealed a single-factor solution and demonstrated good psychometric characteristics, with adequate reliability (Cronbach's alpha = .93) and adequate validity.

The Portuguese version of the BIS was developed through a forward–backward translation procedure, according to the recommendations for translating questionnaires of the Quality of Life Group of the EORTC (Cull et al., 2002). The authors of the Portuguese version, native speakers of Portuguese, with a high level of fluency in English, independently translated the 10 items of the English version of BIS. Both translated versions were then compared and, after discussing and analysing its similarities and differences, the first Portuguese version was obtained. An English native speaker subsequently translated the preliminary Portuguese version back to English, without reference to the original. Finally, the two versions (the original and the backtranslated) were compared and translation difficulties were analysed and resolved between translators, in order to attain a comprehensible instrument, conceptually consistent with the original.

When translating and adapting this instrument, the specific Portuguese culture and language was taken into account. Although always maintaining the consistency with the original scale, some expressions or phrases were slightly altered in order to be totally understood by the Portuguese patients.

The preliminary Portuguese version was administered to a pilot-group of 15 breast cancer patients in order to identify and solve any potential problem in translation. After completing the questionnaire, patients were asked about each item (e.g. if it was difficult to understand, confusing, upsetting or offensive in any way, and appropriate to their experience). In general, patients showed a good understanding of items and no major difficulties in responding to the questionnaire were reported. The final Portuguese version of BIS was then attained (See Appendix 1).

Measures of body image and quality of life

The following measures were used to analyse the construct validity (convergent and discriminant) of the Portuguese BIS:

Appearance investment

The Appearance Schemas Inventory – Revised [ASI-R] (Cash et al., 2004; Portuguese version: Nazaré et al., in press) was used to assess appearance investment, which is a central dimension of body image concerning the assumptions about the significance and effects of appearance in one's life. The Portuguese version followed translation requirements and revealed good internal consistency and appropriate construct validity (Nazaré et al., in press). As the original scale, it has 20 items, using a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*) and has two-factors: (1) the *self-evaluative salience* (SES) subscale assesses the individual's belief in how their appearance influences their self-worth and self-concept (12 items); and (2) the *motivational salience* (MS) subscale measures the individual's efforts to be or feel attractive (eight items). In this sample, Cronbach's alphas were .76 for the SES and .73 for the MS subscales.

Self-consciousness of appearance

To assess levels of self-consciousness of appearance or, in general, the discomfort and inhibition with appearance, we used the Derriford Appearance Scale 24 [DAS24] (Carr et al., 2005; Portuguese version adapted by Moreira and Canavarro, in preparation), the 24-item short form of the original DAS59 (Carr et al., 2000). The Portuguese version was developed through a back-translation technique and, as the original measure, it includes 10 items which are rated from 1 (*lowest distress*) to 4 (*highest distress)* and 14 items which are rated from 0 (*not applicable*) to 4 (*highest distress*). The final score can range from 10 to 96, with higher scores indicating more distress with appearance. Cronbach's alpha in this sample was .80.

Body shame

The body shame subscale of the Experience of Shame Scale [ESS] (Andrews et al., 2002; Portuguese version adapted by Moreira and Canavarro, 2008) was used. It has four items, rated on a 4-point scale ranging from 1 (*nothing*) to 4 (*very much*), and requires that the respondent selects the option that best express the intensity with which they experienced each item in the last 3 months (e.g. *Have you avoided looking at yourself in the mirror?; Have you worried about what other people think of your appearance?*). Cronbach's alpha in this sample was .84.

Quality of life

To measure the individual's subjective perception of QOL, we used the Portuguese version of the World Health Organization Quality of Life – bref [WHOQOL-Bref] (WHOQOL Group, 1998a,b; Portuguese version: Vaz Serra et al., 2006). This instrument was validated for the Portuguese population according to guidelines of the WHOQOL group and presented good reliability and validity (Vaz Serra et al., 2006). It is comprised of 26 items providing scores for four domains, each one including several specific facets: physical (e.g. pain/discomfort, sleep and rest), psychological (e.g. positive feelings, body image, self-esteem) social relationships (e.g. social support, sexual activity) and environment (e.g. physical environment, financial resources), including a facet of the overall QOL (general QOL and general health). It employs a 5-point scale, with higher scores indicating higher QOL. Cronbach's alpha ranged, in this sample, from .70 and .85 between domains.

Statistical analyses

Descriptives were obtained for all demographic and clinical characteristics, both for the global sample as for the surgical subgroups. Univariate analysis of variance (ANOVA) and Chi-square tests were used to explore differences between subgroups. According to the recommendations of Hopwood et al. (2001), missing scores in one or two items of the BIS were replaced by the mean of the items to which participants had responded. Missing data on sociodemographic and clinical variables were low-level and random and therefore not substituted. A principal component analysis was performed to test the factor structure of the scale. To explore its internal consistency, Cronbach's alphas were obtained, as well as corrected item-total correlations and alpha values when the item was deleted. To explore the construct validity, Pearson's correlations between the BIS and other measures were calculated. To guard against inflated Type I errors, a Bonferroni correction was calculated taking into consideration the 10 hypothesized correlations, which indicated a more stringent significance level of $\alpha = .005$. Cohen's (1988) guidelines were used for describing the effect sizes of reported correlations (i.e. *small* for correlations around .10, *medium* for those near .30, and *large* for correlations at .50 or higher). To further analyse the discriminant validity of BIS, differences between types of surgeries were analysed through ANOVA. Eta squared (η^2) was used as an estimate of the effect size. According to Cohen (1988, cit in Tabachnick and Fidell, 2007), values of .01, .09 and .25 were considered as small, medium and large effect sizes, respectively.

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Table 1
Demographic and clinical characteristics of the sample.

	Global sample $n = 173$	Mastectomy subgroup[a] $n = 122$	BCS subgroup[b] $n = 51$
	n (%)	*n* (%)	*n* (%)
Age (years)			
≤40	15 (9)	11 (9.3)	4 (8.2)
41–50	50 (29.9)	36 (30.5)	14 (28.6)
51–60	65 (38.9)	44 (37.3)	21 (42.9)
61–70	34 (20.4)	24 (20.3)	10 (20.4)
≥71	3 (1.8)	3 (2.5)	0 (0.0)
Mean (SD); range	53.44 (8.8); 32–81	53.25 (8.9); 33–81	53.90 (8.5); 32–68
Marital status			
Married or living with someone	130 (75.1)	91 (74.6)	39 (76.5)
Divorced/single/ widowed	43 (24.9)	31 (25.4)	12 (23.5)
Education			
Primary and basic school	99 (57.6)	72 (59.0)	27 (52.9)
High school	27 (15.7)	16 (13.1)	11 (21.6)
College	46 (26.7)	33 (27.0)	13 (25.5)
Socioeconomic status			
Low	53 (30.8)	39 (32.0)	14 (27.5)
Medium	109 (63.4)	77 (63.1)	32 (62.7)
High	10 (5.8)	5 (4.1)	5 (9.8)
Length of time since diagnosis[c] (months)			
Mean (SD); range	52.06 (69.9); 2–384	66.88 (71.2); 2–384	18.71 (54.1); 2–366
Type of cancer			
Invasive ductal carcinoma	92 (53.2)	54 (44.3)	38 (74.5)
Ductal carcinoma *in situ*	13 (7.5)	11 (9.0)	2 (3.9)
Invasive lobular carcinoma	5 (2.9)	4 (3.3)	1 (2.0)
Lobular carcinoma *in situ*	2 (1.2)	2 (1.6)	0 (0.0)
Inflammatory breast cancer	5 (2.9)	4 (3.3)	1 (2.0)
Unknown	56 (32.3)	47 (38.5)	9 (17.6)
Type of treatment[d]			
None	26 (15)	24 (19.7)	2 (3.9)
Only chemotherapy	49 (28.3)	42 (34.4)	7 (13.7)
Only radiotherapy	33 (19.1)	13 (10.7)	20 (39.2)
Chemotherapy and radiotherapy	57 (32.9)	35 (28.7)	22 (43.1)
Axillary node dissection			
Yes	66 (38.2)	45 (36.9)	21 (41.2)
No	101 (58.4)	74 (60.7)	27 (52.9)
Breast reconstruction			
Yes, already started the process	27 (22.1)	27 (22.1)	–
No	95 (77.9)	95 (77.9)	–

Note. The global sample is composed of two different surgical subgroups identified in the table as the "*Mastectomy*" subgroup and the "*BCS*" subgroup.

[a] Missing information on: education [1 (0.9%)], socioeconomic status [1 (0.8%)], type of treatment [7 (6.5%)] and axillary node dissection [3 (2.4%)].

[b] Missing information on: axillary node dissection [3 (5.9%)].

[c] A significant difference between the surgical subgroups was found in the length of time since diagnosis ($p < .001$).

[d] A significant difference between the surgical subgroups was found in the type of treatment ($p < .001$).

Results

Participant's characteristics

Participant's demographic/clinical characteristics are presented in Table 1. At the time they participated in the study, 124 patients (71.7%) were undergoing some sort of medical treatment (surgery or adjuvant treatment). The remaining 49 patients of the sample, although some treatment may have been done in the past, currently were not undergoing any kind of adjuvant treatment or surgery.

The surgical subgroups were similar in terms of the main demographic and clinical characteristics. Nevertheless, the ANOVA [$F(1, 154) = 17.45$, $p \leq .001$, $\eta^2 = .10$] revealed that patients treated with BCS presented a lower mean time (mean = 18.7 months, SD = 54.1 months) than those who had undergone mastectomy (mean = 66.9 months, SD = 71.2 months). Additionally, as the chi-square test indicated, subgroups were also significantly different depending on the type of treatment [$\chi^2(3, N = 165) = 28.11, p \leq .001$], with the majority of patients who had undergone mastectomy doing only chemotherapy and the majority of patients treated with BCS doing chemotherapy and radiotherapy (see Table 1).

Principal component analysis

To explore the factor structure of the Portuguese BIS, a principal component analysis (PCA) was performed on the entire sample. The appropriateness of factor analysis was verified by Keiser–Meyer–Olkin (KMO) measure of sampling adequacy (.93) and Bartlett's test ($p < .001$), both in favour of using this analysis. As on the original scale, the PCA revealed a single-factor solution with an eigenvalue of 6.12, explaining 61.18% of the variance. The factor loadings ranged from .73 (item 10) to .90 (item 9).

Reliability

Cronbach's alpha revealed that the Portuguese BIS has adequate internal consistency, both in the total sample ($\alpha = .93$), as in the subgroups of mastectomy ($\alpha = .92$) and BCS ($\alpha = .93$).

In the global sample, corrected item-total correlations ranged from .47 to .86. Most items did not increase the alpha value when deleted. The only exception was item 7, which slightly increased the alpha when excluded (see Table 2).

Convergent and discriminant validity

To assess the convergent and discriminant construct validity of the Portuguese BIS, Pearson's correlations between this scale and measures of body image and QOL were computed. All the WHOQOL domains were analysed, as well as the specific facet of body image, included in the psychological domain (see Table 3).

Support for the convergent validity of the scale was demonstrated by associations with a large effect size (>.50) between the BIS and the body shame subscale, the DAS24 and the body image facet of WHOQOL. Concerning appearance investment, a medium sized association was found between the BIS and the SES factor, but the association with the MS subscale was non-significant and very small. Moderate to large correlations were observed between the BIS and the WHOQOL domains.

The discriminant validity of the BIS was further assessed by comparing the BIS scores of patients who underwent mastectomy ($n = 95$) and those who underwent BCS ($n = 51$). Patients who had already started the process of reconstructive surgery were excluded from the analysis ($n = 27$). The ANOVA [$F(1, 144) = 21.02$, $p \leq .001$, $\eta^2 = .13$] revealed that patients who underwent a mastectomy presented significantly more body image concerns ($M = 10.70$; SD = 8.07) than those treated with BCS ($M = 4.90$; SD = 5.83). The effect size was considered medium (Cohen, 1988).

BIS scores, age and time since diagnosis

The association between age and BIS scores were non-significant and represented a small effect size ($r = .01$, $p = .93$). Similarly,

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Table 2
Descriptives and item analysis.

Item	*M* (SD)	Range	Corrected item-total correlations	Alpha if item deleted
1. Have you been feeling self-conscious about your appearance?				
Global sample	0.82 (0.91)	0–3	.76	.919
Mastectomy subgroup	0.93 (0.91)	0–3	.74	.909
BCS subgroup	0.57 (0.85)	0–3	.83	.921
2. Have you felt less physically attractive as a result of your disease or treatment?				
Global sample	1.06 (1.03)	0–3	.75	.919
Mastectomy subgroup	1.22 (1.07)	0–3	.71	.910
BCS subgroup	0.69 (0.81)	0–3	.86	.919
3. Have you been dissatisfied with your appearance when dressed?				
Global sample	0.76 (0.89)	0–3	.71	.922
Mastectomy subgroup	0.85 (0.92)	0–3	.70	.911
BCS subgroup	0.55 (0.78)	0–3	.75	.925
4. Have you been feeling less feminine/masculine as a result of your disease or treatment?				
Global sample	0.59 (0.87)	0–3	.70	.922
Mastectomy subgroup	0.70 (0.95)	0–3	.69	.911
BCS subgroup	0.31 (0.55)	0–3	.73	.928
5. Did you find it difficult to look at yourself naked?				
Global sample	0.85 (1.06)	0–3	.77	.918
Mastectomy subgroup	1.06 (1.12)	0–3	.75	.908
BCS subgroup	0.35 (0.69)	0–3	.73	.926
6. Have you been feeling less sexually attractive as a result of your disease or treatment?				
Global sample	1.07 (1.11)	0–3	.72	.922
Mastectomy subgroup	1.28 (1.15)	0–3	.71	.910
BCS subgroup	0.57 (0.83)	0–3	.58	.935
7. Did you avoid people because of the way you felt about your appearance?				
Global sample	0.40 (0.78)	0–3	.47	.932
Mastectomy subgroup	0.48 (0.83)	0–3	.40	.924
BCS subgroup	0.22 (0.61)	0–3	.66	.929
8. Have you been feeling the treatment has left your body less whole?				
Global sample	1.10 (1.08)	0–3	.80	.917
Mastectomy subgroup	1.30 (1.13)	0–3	.77	.906
BCS subgroup	0.65 (0.80)	0–3	.73	.921
9. Have you felt dissatisfied with your body?				
Global sample	1.09 (1.06)	0–3	.86	.913
Mastectomy subgroup	1.32 (1.08)	0–3	.83	.902
BCS subgroup	0.53 (0.79)	0–3	.89	.918
10. Have you been dissatisfied with the appearance of your scar?				
Global sample	0.97 (1.00)	0–3	.67	.924
Mastectomy subgroup	1.18 (1.06)	0–3	.66	.913
BCS subgroup	0.47 (0.61)	0–3	.54	.940
Overall BIS				
Global sample	8.72 (7.67)	0–29	–	–
Mastectomy subgroup	10.3 (7.81)	0–29	–	–
BCS subgroup	4.90 (5.83)	0–21	–	–

a non-significant and weak association was found between the length of time since diagnosis and the BIS scores, ($r = .02$, $p = .78$).

Discussion

The aim of this study was to investigate the psychometric properties of the Portuguese version of the body image scale on a sample of breast cancer patients. It replicated and extended previous findings to the original scale, demonstrating that the Portuguese BIS, like the original, is a psychometrically sound measure for the assessment of body image concerns of breast cancer patients and that it is appropriate for use in clinical and research settings.

Our factor analysis confirmed the original single-factor structure, also explaining a great amount of variance (57.55% in the original study). Due to our lower number of participants and contrary to the original study, in which a factor analysis was performed both on the total sample and on surgical subgroups, we chose to conduct a factor analysis only on the global group of women with breast cancer. Although the authors have found a two-factor solution in the subsample of patients treated with mastectomy, they considered this result irreproducible, adopting the single solution, found in all the other groups, as the final one (Hopwood et al., 2001).

The Portuguese version of the BIS demonstrated a good internal consistency. The reliability coefficients, both for the global sample as for the surgical subgroups, were quite similar to those reported for the original BIS (i.e. .91 for both patients treated with mastectomy and BCS and .93 for the global sample). The internal consistency of the scale was also confirmed by the item-total correlations, all above the usual criteria of .30 (Field, 2005), which indicates that all items correlate well with the total scale score and measure the same construct. Moreover, almost all alpha values for each item (when they are deleted) were lower than the overall alpha, indicating that its deletion would not contribute to an increase of the overall reliability. The only exception was item 7 (*Did you avoid people because of the way you felt about your appearance?*), although its deletion only slightly improved the scale's overall reliability. This item was retained, not only because it had an adequate item-total correlation but also to

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Table 3
Correlations between BIS and other measures of body image and QOL.

Measures	BIS
Body Shame subscale	.68*
DAS24	.75*
ASI-R	
SES	.40*
MS	−.12
WHOQOL	
Physical	−.42*
Psychological	−.49*
Social relationships	−.34*
Environment	−.40*
General facet	−.52*
Body image facet	−.66*
Age	.01
Length of time since diagnosis	.02

*$p < .001$

ensure the maximum compatibility between the Portuguese and English versions and to maximize the content validity of the scale.

Considering the possible range of scores, both for each item (0–3) as for the global scale (0–30), the results obtained were, in general, low, although comparable to those presented in the original study. These results could be a reflection of social desirability, as some patients could be embarrassed and have difficulty in admitting their concerns about their physical appearance when facing a disease such as breast cancer. Also, the use of double-negative questions could be confusing in some way, thus preventing the use of the fully possible range of response values.

Evidence for the construct validity of the Portuguese BIS was provided. As it was hypothesized, a strong relationship between the BIS and other measures of body image was found. Particularly, the BIS strongly correlated with the body shame subscale, the overall DAS24 and the body image facet of psychological QOL domain, which suggests that this measure covers issues such as body shame, self-consciousness of appearance or global satisfaction with physical appearance, as originally intended. Also as expected, the association with SES factor of ASI-R was moderate in magnitude since these two instruments actually measure different (yet related) aspects of body image. This finding is consistent with other studies that have demonstrated that women who tend to base their self-worth and self-esteem on their appearance (i.e. those who invest more), also tend to be more concerned with their body image (Cash et al., 2004; Jakatdar et al., 2006). However, contrary to our expectations, the association with the MS factor was non-significant and small in magnitude. Concerning the pattern of associations between the BIS scores and the WHOQOL domains and general facet, our initial hypothesis was partially confirmed as our findings showed medium to large correlations between them. This calls our attention to the importance that body image has on a patient's QOL and is consistent with previous findings showing that more concerns with appearance are related to lower levels of QOL (e.g. DeFrank et al., 2007). This pattern of associations supports the construct validity of the Portuguese BIS.

In further support of the discriminant validity of this instrument, women who underwent mastectomy scored significantly higher on the scale than those who underwent BCS. This supports the utility of the BIS for differentiating surgery groups characterized by different appearance changes. This finding is in line with previous research (Bloom et al., 1998; Fallowfield et al., 1986; Kiebert et al., 1991; Yilmazer et al., 1994) and also with the results of Hopwood et al. (2001).

Contrary to the results obtained in the original study (Hopwood et al., 2001), which demonstrated that younger women had more body image concerns, our findings did not show an association between age and BIS scores, as we expected. Although the effect of age on a patients' body image has been addressed in a number of studies, the results are inconsistent, with some data demonstrating more body image concerns among younger breast cancer patients (e.g. Hopwood et al., 2001; Moyer, 1997; Levy et al., 1992; Romanek et al., 2005) and others not finding any effect of age on body image (e.g. Manos et al., 2005). Similarly, time since diagnosis did not correlate significantly with body image concerns, also contrary to the results of Hopwood et al. (2001), which found higher scores after 6 months from the time of first surgery. Research on this matter is not consistent, as some studies indicate a better body image soon after diagnosis and a worsening with time (Bloom et al., 1998; Hartl et al., 2003), others report a significant improvement in body image over time (Arora et al., 2001; Ganz et al., 1992b) and others demonstrate a stability on body image through the disease (DeFrank et al., 2007). This inconsistency may be due to the different measures of body image that were used and not to the real effect of time. It is also important to note that the cross-sectional design of the present study limits conclusions about the influence of this variable.

Some limitations of this study should be considered when interpreting the results. Firstly, the absence of longitudinal data made the examination of the temporal stability of the scale impossible, which would add support for its reliability. Future longitudinal research is needed to examine the test–retest reliability of the Portuguese BIS and also to further explore the influence of time since diagnosis on body image. Secondly, the majority of patients had undergone a mastectomy, therefore not allowing for the examination of the BIS's factor structure among different surgery groups, i.e. the examination of the factor structure both for patients that had undergone mastectomy and those that had received BCS, as analysed by Hopwood et al. (2001). Future studies should include a larger sample, comprised of an equivalent number of patients treated with mastectomy and BCS, in order to provide further information about the factor structure of the BIS in these two different surgical groups. Thirdly, the impossibility of consulting the medical records of the participants recruited from the Reach to Recovery Association made it difficult to assess demographic/clinical data, which resulted in some missing information. Future research is also needed to confirm the unidimensionality and the psychometric performance of the BIS in other cancer populations.

In summary, the Portuguese version of BIS proved to be a psychometrically robust self-report measure of body image concerns on a sample of breast cancer patients. Its brevity and comprehensibility allow a rapid and clear assessment, both on clinical and research settings, complementing the QOL measurement of cancer patients, when body image is an important outcome. This could be an important assessment tool for nurses that work with cancer patients, as it provides a brief and clear assessment of body image issues of cancer patients. Nurses, who are one of health care's professional groups that have closer and more regular contact with patients in all stages of the disease, play an important role in helping patients deal with present or anticipated appearance changes. With a comprehensive assessment they can more easily identify areas of concern and help patients to deal with several aspects such as feelings of shame and loss of self-worth and self-esteem, problems in the decision making process about surgery, difficulties in adjusting to appearance change, among many others. Their role can be particularly relevant, for instance, in the preparation of surgical or medical interventions and also in the prevention of psychological difficulties following an anticipated threat of body image, such as mastectomy or chemotherapy-induced alopecia.

Conflict of interest statement

No conflicts of interest exist for any of the authors of this study.

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Appendix 1

Relações, Desenvolvimento & Saúde
Relationships, Development & Health

Escala de Imagem Corporal - BIS

Versão original: P. Hopwood (2000);

Versão Portuguesa: H. Moreira & M.C. Canavarro (2007)

Neste questionário ser-lhe-ão colocadas algumas questões acerca da forma como se sente em relação ao seu corpo e acerca de algumas mudanças que podem ter ocorrido como resultado da sua doença e dos tratamentos a que foi submetido(a).

Por favor, leia cada questão cuidadosamente e assinale a resposta que considerar mais adequada e que melhor corresponder à forma como se tem sentido na **última semana**.

		Nada	Um Pouco	Moderamente	Muito
1	Tem-se sentido constrangido(a) ou inibido(a) com a sua aparência?	0	1	2	3
2	Sentiu-se menos atraente fisicamente devido à doença e ao tratamento?	0	1	2	3
3	Tem-se sentido insatisfeito(a) com a sua aparência quando está vestido(a)?	0	1	2	3
4	Tem-se sentido menos masculino/feminina por causa da doença ou do tratamento?	0	1	2	3
5	Teve dificuldade em olhar para o seu corpo, nu(a)?	0	1	2	3
6	Tem-se sentido menos atraente sexualmente como resultado da sua doença ou tratamento?	0	1	2	3
7	Evitou encontrar-se com pessoas devido à forma como se sentia em relação à sua aparência?	0	1	2	3
8	Tem sentido que o tratamento deixou o seu corpo "menos completo"?	0	1	2	3
9	Sentiu-se insatisfeito(a) com o seu corpo?	0	1	2	3
10	Tem-se sentido insatisfeito(a) com a aparência da sua cicatriz? (se aplicável)	0	1	2	3

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BIS

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