

RESEARCH ARTICLE (ORIGINAL) 

# Translation and validation of the SABIS Scale for the Portuguese population

*Tradução e validação da escala SABIS para a população portuguesa*

*Traducción y validación de la escala SABIS para la población portuguesa*

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## Abstract

**Background:** The suffering caused by breast cancer treatments interferes with women's self-image and the couple's sexuality.

**Objective:** To translate, adapt and validate SABIS Scale for women with breast cancer.

**Methodology:** Psychometric study. Each scale was analyzed through face validity, content validity, internal consistency, exploratory factor analysis, confirmatory factor analysis, convergent validity, and discriminant validity.

**Results:** The Body Image Scale obtained a two-factor structure and the Sexual Adjustment Scale a three-factor solution, with a variance of 80.02% and 83.5%, respectively. The confirmatory factor analysis confirmed the two-factor structure of the first scale and revealed a one-factor structure for the second scale. Both scales showed good fit indices.

**Conclusion:** The psychometric properties of this version of the SABIS are similar to those of the original version. Therefore, it is a valid and reliable instrument for assessing the body image and sexual adjustment of Portuguese women with breast cancer.

**Keywords:** body image; breast neoplasms; sexuality; validation study; psychometrics

## Resumo

**Enquadramento:** O sofrimento causado pelos vários tratamentos do cancro de mama, interferem na autoimagem da mulher e na sexualidade do casal.

**Objetivo:** Traduzir, adaptar e validar a escala SABIS para as mulheres com cancro da mama.

**Metodologia:** Estudo psicométrico, onde as escalas foram analisadas através da validade aparente de conteúdo da consistência interna, da análise fatorial exploratória, confirmatória, validade convergente e validade discriminante.

**Resultados:** A escala de imagem corporal obteve uma estrutura bifatorial e a escala de ajustamento sexual uma solução trifatorial com variabilidades de 80,02% e 83,5% respetivamente. A análise fatorial confirmatória certificou a estrutura bifatorial da primeira escala, e revelou uma estrutura unifatorial da segunda. Ambas as escalas apresentam bons índices de ajustamento global.

**Conclusão:** As propriedades psicométricas desta versão da SABIS são semelhantes às da versão original. Por conseguinte, é um instrumento válido e confiável para avaliar a imagem corporal e o ajustamento sexual das mulheres portuguesas com cancro da mama.

**Palavras-chave:** imagem corporal; neoplasias da mama; sexualidade; estudo de validação; psicometria

## Resumen

**Marco contextual:** El sufrimiento provocado por los distintos tratamientos del cáncer de mama interfiere en la autoimagen de la mujer y en la sexualidad de la pareja.

**Objetivo:** Traducir, adaptar y validar la escala SABIS, para mujeres con cáncer de mama.

**Metodología:** Estudio psicométrico, cuyas escalas se analizaron teniendo en cuenta la validez aparente de contenido de la consistencia interna, el análisis factorial exploratorio y confirmatorio, y la validez convergente y discriminante.

**Resultados:** La escala de imagen corporal obtuvo una estructura bifactorial y la escala de ajuste sexual una solución trifactorial con variabilidades del 80,02% y el 83,5% respectivamente. El análisis factorial confirmatorio certificó la estructura bifactorial de la primera escala y mostró una estructura unifactorial de la segunda. Ambas escalas presentan buenos índices de ajuste global.

**Conclusión:** Las propiedades psicométricas de esta versión del SABIS son similares a las de la versión original. Por lo tanto, es un instrumento válido y fiable para evaluar la imagen corporal y la adaptación sexual de las mujeres portuguesas con cáncer de mama.

**Palabras clave:** imagen corporal; neoplasias de la mama; sexualidade; validación del estudio; psicometria



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## Introduction

Breast cancer has the highest mortality rate of any cancer worldwide, being diagnosed mostly in advanced stages. Its incidence is higher in developing countries (Prates et al., 2017). In Portugal, according to the Directorate-General of Health (2017, p. 10), the analysis of the “variations in the mortality rates of female breast cancer” show a “very slight increase in the number of deaths and standardized mortality ratios”, and “national rates are still one the lowest” in the European Union, with an increase in the number of survivors. However, treatment often has negative emotional effects, reducing women’s quality of life (Prates et al., 2017) and negatively influencing their body image and sexuality, leading to feelings of inferiority, anguish, fear of death, and rejection due to mutilation. Although these disturbances in sexuality and body image are common among women with breast cancer (Seara et al., 2012), there are few measurement instruments designed specifically to assess body image and sexual adjustment in women with breast cancer. Thus, this study aimed to translate, adapt, and validate the Sexual Adjustment and Body Image Scale (SABIS; Dalton et al., 2009) into European Portuguese based on semantic validity and construct validity through exploratory and confirmatory factor analyses.

## Background

Although all cancers can lead to disturbances in sexual adjustment and body image, women with breast cancer are particularly prone to them (Dalton et al., 2009; Seara et al., 2012) given that women’s sexuality encompasses not only the ability to engage in sexual activity, but also feelings about their own body and perceptions of body image and femininity (Dalton et al., 2009). Any disturbances in body image can lead to disturbances in sexual functioning (Seara et al., 2012, p. 105).

Treatment-related physical changes secondary to breast cancer can also lead to sexual maladjustment and have a negative impact on the quality of life of women/couples. Other potential factors may also lead to sexual maladjustment, such as fear of death, fear of recurrence of cancer, emotional investment in breasts, loss of self-esteem, disintegration of established patterns for achieving sexual satisfaction, and perception of the body as mutilated (Hirschle et al., 2018; Paterson et al., 2016; Rosenberg et al., 2013).

## Research question

What are the psychometric properties of the version of the Body Image and Sexual Adjustment Scale translated and adapted for the Portuguese population?  
Are the hypothesized models obtained from the exploratory factor analysis confirmed by the confirmatory factor analysis?

## Methodology

The body image and sexual adjustment scales were translated, cross-culturally adapted, and validated through exploratory and confirmatory factor analyses. The exploratory factor analysis aimed to confirm the structure of the construct and determine the number and nature of the variables representing it (Marôco, 2018). The confirmatory factor analysis was used to confirm the pre-established structural patterns (Marôco, 2018).

A psychometric study was conducted, given that it is the most appropriate study design to validate psychological measurement instruments. This method uses quantitative procedures to assess the validity, reliability, and standardization of the measurement instrument (Carlessi et al., 2018).

The psychometric properties of the scales were assessed to verify the validity, reliability, and standardization of the measurement instrument (Carlessi et al., 2018).

### Participants

This study was conducted with a non-probability convenience sample of 148 adult women, aged 30 to 70 years, diagnosed with breast cancer, and followed in an outpatient consultation at a Hospital Center. Data were collected between April 2019 and February 2020 after approval by the Ethics Committee and the Board of Directors of the hospital where data were collected. The inclusion criterion was women with breast cancer.

### Instrument

Dalton et al. (2009) developed a self-report questionnaire (SABIS) to assess body image and sexuality in women with breast cancer following surgery. They reviewed existing sexuality and body image scales, used observation, and conducted interviews with cancer patients and health professionals.

They built two sets of items: one set to measure sexual adjustment and another to measure body image. A total of 28 items were formulated. Ten of these items were related to body image: satisfaction with physical attractiveness and comfort with showing body to others before and after cancer. Eighteen of these items were related to sexual adjustment: confidence and sexual satisfaction pre-cancer, the quality sexual relationship following cancer, and the importance of the breasts to her overall sexual experience. The items were reviewed for face validity by psychotherapists, physicians, and women with breast cancer. All items were rated on a 5-point Likert-type scale, with the additional option of answering “not applicable”. The meaning of each anchor point on the Likert scale varied by item. Lower scores indicate worse body image and sexual adjustment.

The authors performed an exploratory factor analysis with orthogonal Varimax rotation on both scales. A two-factor solution emerged for the Body Image scale. The first subscale measured a woman’s comfort with her body prior to having breast cancer and was labeled “Prior Body Image”. The second subscale measured a woman’s comfort with

her body and was called “Post Body Image”.

The final version of the SABIS consisted of two separate scales: the Body Image Scale with six items distributed across two subscales – Prior Body Image (items 1, 2, and 6) and Post Body Image (items 3, 4, and 5); and the Sexual Adjustment Scale with three subscales – Prior Sexual Adjustment (items 1 and 2), Impact on Sexual Functioning (items 3, 4, 5, and 6), and Sexual Importance of Breasts (items 7 and 8).

Reliability studies revealed that the Body Image subscales showed good internal consistency, with Cronbach’s alphas of 0.80 for Prior Sexual Adjustment and 0.87 for Post Body Image.

Similarly, the three subscales of the Sexual Adjustment Scale also had good internal consistency, with Cronbach’s alpha of 0.78 for Prior Sexual Adjustment, 0.91 for Impact on Sexual Functioning, and 0.66 for Sexual Importance of Breasts.

The authors did not consider total scores for either of the SABIS scales and instead generated a mean score for each subscale by dividing the total score by the number of items in the corresponding subscale.

### Procedures to adapt the SABIS to the Portuguese population

In the process of cultural adaptation and linguistic equivalence of the SABIS, independent experts in the area performed two translations. After analyzing the discrepancies, a new document was prepared, back-translated, and submitted to a committee of three linguistic experts who assessed the semantic, idiomatic, conceptual, and cultural equivalence.

The final document was pre-tested on a sample of 10 women with breast cancer who volunteered to participate in this preliminary study. They were asked to answer the questions and give suggestions to clarify misunderstandings. None of them gave any suggestions for improvement.

### Procedures for data analysis

After data cleansing, validity and reliability studies are conducted. Given that only one measure was used in this study, the internal consistency or homogeneity of the items was assessed. Cronbach’s alpha was used because it reflects the degree of covariance among the items of a scale, and the lower the sum of the items’ variance, the more consistent the instrument will be. Although its interpretation is not consensual, some authors consider values greater than 0.7 as desirable and below 0.70, but close to 0.60, as satisfactory (Pestana & Gageiro, 2014). Factor analysis was used to investigate construct validity. The exploratory factor analysis in IBM SPSS Statistics, version 26.0, used the principal components method with orthogonal Varimax rotation. Eigenvalues greater than 1 and the scree plot were considered for factor retention. The criterion for item loading was values of 0.40 or above. In the confirmatory factor analysis using IBM SPSS Amos

26 (Analysis of Moment Structures), the covariance matrix was considered and the maximum likelihood estimation (MLE) algorithm was used to estimate the parameters. Data analysis considered (i) item sensitivity as assessed through skewness ( $\leq 3$ ) and kurtosis ( $\leq 7$ ) analysis; (ii) construct validity as assessed through factor, convergent, and discriminant validity; (iii) global fit indices; and (iv) local fit indices.

The following global fit indices were used: the ratio of the chi-square statistic to the respective degrees of freedom ( $\chi^2/df$ ; good fit if below 2.0, acceptable if below 5; and unacceptable if above 5); Comparative Fit Index (CFI); Goodness of Fit Index (GFI; good fit if above 0.90); Root Mean Square Error of Approximation (RMSEA); Root Mean Square Residual (RMR); and Standardized Root Mean Square Residual (SRMR; good fit if below 0.08) (Marôco, 2018). The local fit of the model was assessed through individual item reliability ( $\lambda$ ).

### Ethical procedures

The research protocol was submitted to the National Commission for Data Protection and the Ethics Committee for Health, with reference number 02/18/03/2019. Participants were given the necessary information and asked to sign the informed consent form. They were informed that their participation was voluntary, they could withdraw at any time, they would not receive any benefits, and they would be safe from any loss/harm. Their anonymity, autonomy, and data confidentiality were ensured.

## Results

### Psychometric analysis of the Body Image Scale

First, item sensitivity was assessed through skewness and kurtosis analysis. The results showed absolute values of skewness between 0.032 and 0.489 and absolute values of kurtosis between 0.918 and 1.424, indicating a normal distribution. Mardia’s multivariate coefficient was 1.610, also compatible with a normal distribution.

Table 1 shows the statistics (means and standard deviations) and the correlations obtained between each item and the total scale.

The corrected item-total correlations indicated that all items had correlations above the reference value of 0.20 (Pestana & Gageiro, 2014), so they were kept in the scale. The lowest score ( $r = 0.346$ ) was found in item 3 “Prior to having breast cancer, how comfortable were you with the shape/proportion of your body?” and the highest ( $r = 0.630$ ) in item 5 “How comfortable are you with the changes in your body since having breast cancer?”. Concerning Cronbach’s alpha coefficients if item deleted, the first three items had adequate values and the last three items had poor values, with an overall good alpha value of 0.896.

**Table 1***Statistics and internal consistency of the Body Image Scale*

		Mean	SD	r	r <sup>2</sup>	α if item deleted
1	Prior to having breast cancer, how satisfied were you with your physical attractiveness?	3.24	0.579	0.318	0.515	0.739
2	Prior to having breast cancer, how comfortable were you showing your body to others?	3.10	0.717	0.433	0.509	0.713
3	Prior to having breast cancer, how comfortable were you with the shape/proportion of your body?	3.15	0.664	0.346	0.623	0.734
4	How comfortable are you showing your body to others since having breast cancer?	2.34	0.877	0.624	0.682	0.654
5	How comfortable are you with the changes in your body since having breast cancer?	2.38	0.868	0.630	0.709	0.652
6	How comfortable are you showing your affected breast area to others since having breast cancer?	2.32	0.890	0.497	0.595	0.697

In the exploratory factor analysis, sampling adequacy was determined using the Kaiser-Meyer-Olkin (KMO) test. The reference values for decision-making ranged from 0.5 to 1. In this study, the KMO was 0.696, confirming sampling adequacy. As for Bartlett's test of sphericity, which determines the quality of the correlations among variables, the value obtained ( $\chi^2 = 667.000$ ;  $p = 0.000$ ) indicates a rejection of the null hypothesis. Combining these two tests made it possible to proceed with the exploratory factor analysis.

The factor solution allowed extracting two factors that accounted for 80.20% of the total variance. The anti-image correlation matrix revealed values above 0.600, with

the lowest correlation in item 3 (0.618) and the highest in item 6 (0.789).

The scree plot confirms the retention of the two factors as can be seen in the inflection point of the curve.

Factor 1 - Post Body Image - consisted of items 4, 5, and 6, with an eigenvalue of 2.615 and a percentage of variance explained after rotation of 41.68%. Factor 2 - Prior Body Image - included items 1, 2, and 3, with an eigenvalue of 2.186 and a percentage of variance explained of 38.33% (see Table 2).

Table 2 also includes the communalities. The values were higher than the reference value of 0.40, so none of the items were excluded.

**Table 2***Factor loadings and communalities of the Body Image Scale*

		Factor 1	Factor 2	h <sup>2</sup>
1	Prior to having breast cancer, how satisfied were you with your physical attractiveness?		0.860	0.741
2	Prior to having breast cancer, how comfortable were you showing your body to others?		0.846	0.737
3	Prior to having breast cancer, how comfortable were you with the shape/proportion of your body?		0.910	0.828
4	How comfortable are you showing your body to others since having breast cancer?	0.911		0.838
5	How comfortable are you with the changes in your body since having breast cancer?	0.922		0.856
6	How comfortable are you showing your affected breast area to others since having breast cancer?	0.894		0.802
	Percentage of variance explained	41.68	38.33	
	Eigenvalues	2.615	2.186	

**Confirmatory factor analysis**

The two-factor structure was subjected to a confirmatory factor analysis. All critical ratios resulting from the trajectories of the items to their corresponding factors were statistically significant and the factor loadings were above 0.50. Thus, all items were kept.

Figure 1 shows the model resulting from the confirmatory factor analysis. Concerning the factor loadings of the

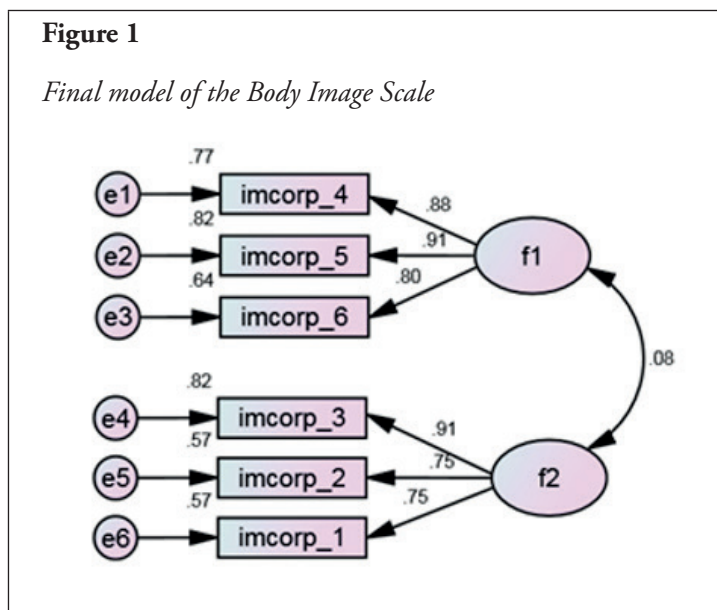
items on their corresponding factors, the lowest values were found in item 6 (0.80) of factor 1 and in items 1 and 2 (0.75) of factor 2. The individual reliability of the items was above 0.25. The correlation between the two subscales was very poor ( $r = 0.08$ ).

The global fit indices were adequate for ( $\chi^2/df = 2.644$ ; CFI = 0.972; NFI = 0.956; RMR = 0.031). They were poor for (GFI = 0.883; RMSEA = 0.106). However, as



Marôco (2014) mentions, these two fit indices tend to change with sample size. Amos did not suggest any modification indices, so the model was not refined. Both factors had good internal consistency and conver-

gent validity, with values above recommended. In factor 1, composite reliability (CR) was 0.897, with an average variance extracted (AVE) of 0.848. In factor 2, CR was 0.775 with an AVE of 0.652. The stratified reliability (0.932) and its AVE (0.699) had adequate values.



**Psychometric analysis of the Sexual Adjustment Scale**  
*Exploratory factor analysis*

Using the same procedures, internal consistency was estimated through an analysis of item sensitivity. The minimum and maximum scores for all items ranged from 1 to 5. The skewness and kurtosis values indicate a normal distribution, with absolute skewness values ranging from 0.018 in item 2 to 0.682 in item 8 and kurtosis values from 0.092 to 2.000, respectively. Mardia's multivariate

coefficient was 2.079. Table 3 shows the item-total correlation coefficients and Cronbach's alpha values. The mean scores are only higher than the expected mean in items 1, 2, 7, and 8. The item-total correlation coefficients indicate that these items, except for item 7, should be deleted in a more conservative analysis because their correlations were lower than 0.20. Alpha coefficients were poor, as well as the overall alpha coefficient ( $\alpha = 0.650$ ).

**Table 3**

*Statistics and internal consistency of the Sexual Adjustment Scale*

		Mean	SD	r	r <sup>2</sup>	α if item deleted
1	Prior to having breast cancer, how satisfied were you with your sex life?	3.28	0.670	0.127	0.675	0.666
2	Prior to having breast cancer, how confident did you feel about yourself as a sexual partner?	3.30	0.704	0.163	0.667	0.659
3	How has having breast cancer affected your desire for sexual contact?	2.20	0.830	0.564	0.621	0.553
4	How has having breast cancer affected your sexual relationship(s)?	2.42	0.738	0.573	0.731	0.559
5	How has having breast cancer affected the frequency with which you initiate sexual contact?	2.22	0.781	0.545	0.727	0.563
6	How has having breast cancer affected your sexual satisfaction when you have sex?	2.39	0.762	0.493	0.582	0.579
7	How important are your breasts to your sexual experience?	3.34	0.869	0.285	0.495	0.636
8	How important are your breasts to your sexual identity as a woman?	3.68	0.849	0.060	0.496	0.694

The results of the KMO test (KMO = 0.692) and Bartlett's test of sphericity ( $\chi^2 = 667.000$ ;  $p = 0.000$ ) indicated that the exploratory factor analysis could be performed.

The factor solution allowed extracting three factors similar to the original factor structure that accounted for 83.50% of the total variance.

However, the anti-image matrix showed that items 1, 2, 7, and 8 had lower correlations or were at the 0.50 threshold, such as item 2 ( $r = 0.501$ ). Although the correct decision was to delete them, they were kept because the intention was to subject this structure to a confirmatory factor analysis.

The scree plot confirmed the retention of three factors based on the inflection point of the curve.

Table 4 shows the factor loadings in each subscale and the communalities. Factor 1 corresponds to factor 2 of the ori-

ginal scale called "Impact on Sexual Functioning", includes the same items (3, 4, 5, and 6), and has an eigenvalue of 3.200 and a percentage of variance explained after rotation of 39.77%. Factor 2 (factor 1 of the original scale) includes items 1 and 2, has an eigenvalue of 1.828, accounts for 22.80% of variance, and was called "Sexual Adjustment". Factor 3 is similar to factor 3 of the original scale, includes the same items, has an eigenvalue of 1.652, and accounts for 20.93% of variance. The communalities found were higher than 0.700, so none of the items were deleted.

**Table 4**

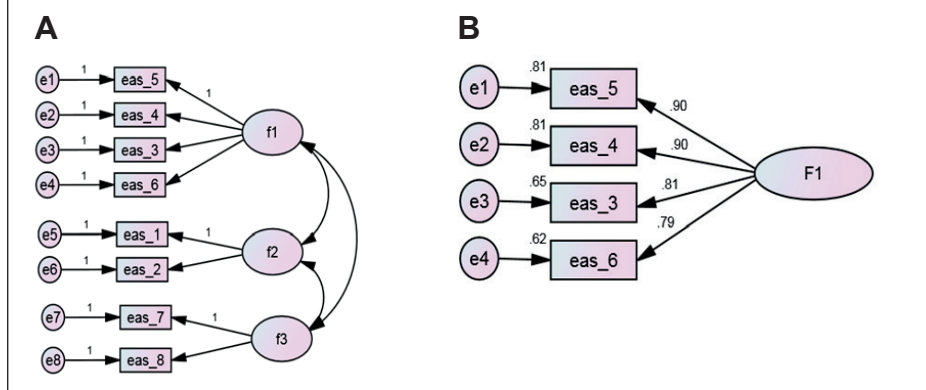
*Factor loadings and communalities of the Sexual Adjustment Scale*

		Factor 1	Factor 2	Factor 3	$h^2$	Factor loadings Original scale
1	Prior to having breast cancer, how satisfied were you with your sex life?		0.895		0.909	0.92
2	Prior to having breast cancer, how confident did you feel about yourself as a sexual partner?		0.907		0.904	0.92
3	How has having breast cancer affected your desire for sexual contact?	0.861			0.771	0.91
4	How has having breast cancer affected your sexual relationship(s)?	0.910			0.837	0.86
5	How has having breast cancer affected the frequency with which you initiate sexual contact?	0.916			0.841	0.83
6	How has having breast cancer affected your sexual satisfaction when you have sex?	0.851			0.739	0.83
7	How important are your breasts to your sexual experience?			0.845	0.841	0.88
8	How important are your breasts to your sexual identity as a woman?			0.865	0.839	0.89
Percentage of variance explained	Current scale	39.77	22.80	20.93		
	Original scale	41.00	22.00	17.00		
Eigenvalues		3.200	1.828	1.652		

**Confirmatory factor analysis**

Once the model was identified based on the initial exploration, the confirmatory factor analysis showed that the critical ratios of items 1, 2, 7, and 8 were not statistically significant, making it impossible for the model to have a three-factor structure. Therefore, they should be deleted. Figure 2 A confirms the unfeasibility of the three-factor structure resulting from the exploratory factor analysis given that it was impossible to obtain item loadings on the corresponding factors. These items were deleted, and the one-factor structure was subjected again to a

factor analysis. Figure 2 B shows factor loadings: the lowest factor loading was found in item 6 ( $r = 0.790$ ) and the highest in items 4 and 5 ( $r = 0.90$ ). Individual reliability was higher than 0.62. The global fit indices revealed optimal adequacy ( $\chi^2/df = 0.699$ , RMR = 0.05, GFI = 0.995), loading for the indices (CFI = 1.000) and (RMSEA = 0.000,  $p_{close} = 0.611$ ). These data showed that the model has an adequate fit and does not need to be respecified. On the other hand, the internal consistency (CR = 0.911), and the convergent validity (AVE = 0.721) were very good.

**Figure 2***Three-factor structure and three-factor structure*

## Discussion

The scientific literature recognizes the negative impact of breast cancer on the sexual life of a significant number of women due to the existence of sexual problems or changes. In a sample of 863 women with breast cancer, Meyerowitz et al. (1999), cited by Vázquez-Ortiz et al. (2010), reported that one in three women perceive negative changes in their sexual life, namely problems in the affective relationship with the partner, changes in the hormonal status, and problems in the sexual relationship. These changes in psychosexual adjustment may persist for several years after the treatments. Broeckel et al. (2002) reported that some problems still remain several years after the end of the treatments, such as the lack of sexual interest, inability to relax during sexual intercourse, and difficulty reaching an orgasm. They also identified changes in self-esteem, body image, and affective-sexual relationships.

The SABIS was developed by Dalton et al. (2009) in an attempt to design a reliable and valid self-report measure to assess body image and sexual adjustment disturbances in patients with breast cancer.

The European Portuguese version of this scale resulted from a process of translation with double checking (translations and back-translations) and linguistic validation, as suggested by the recommended international guidelines (Dalton et al., 2009), and complemented by expert participation.

Given the simplicity of the majority of the scale's statements, no substantial difficulties were identified in the translation process, with only minor changes in the back-translations to improve the final version.

The pre-test was carried out with a sample of 10 women with breast cancer who volunteered to participate. The low number of participants may be a limitation of this study, but all indications are that the selected group was representative of the target population.

The psychometric study and the exploratory and confirmatory factor analyses were carried out separately on both scales of the SABIS to determine their reliability and validity.

Concerning the Body Image Scale, the factor solution allowed extracting two factors that were confirmed by the confirmatory factor analysis with an overall percentage of variance explained of 80.20%. After rotation, Factor 1 explained 41.68% of variance and factor 2 38.33%. A comparison between the results obtained here and those of the original version revealed the same number of items. The only difference was that item 6 from the original scale was moved to factor 2 in this study and item 3 to factor 1. Therefore, the factors kept the same designation: factor 1 Prior Body Image and factor 2 Post Body Image. The migration of these two items may be explained by the linguistic validation process or existing cultural differences. Both items had good internal consistency and convergent validity, with a CR of 0.897 and validity of 0.848 for factor 1 and 0.775 and 0.652 for factor 2, respectively, a stratified CR of 0.932 and a convergent validity of 0.699 for the total sample.

The global fit indices were adequate, except for GFI = 0.883 and RMSEA = 0.106. According to Marôco (2014), these fit indices depend on sample size, among other aspects. For example, the GFI tends to increase with sample size and the RMSEA depends on model specification, degrees of freedom, and sample size. However, the size of the sample used to validate the scale, namely in the confirmatory factor analysis, is a limitation that should be considered in this study.

Summing up, the psychometric characteristics of this scale are similar to those of the original version; thus, it is a valid and reliable instrument for the context under analysis.

As for the Sexual Adjustment Scale, the factor solution through the exploratory factor analysis allowed extracting three factors, similar to the original factor structure, which accounted for 83.50% of the total variance. However, the anti-image matrix showed that items 1, 2, 7, and 8 should be deleted because their correlations were below the recommended ones. The confirmatory analysis confirmed the deletion of these items because they were not statistically significant, which made it impossible to build the model with a three-factor structure as in the original version. Once again, the size of the sample and the lack

of response heterogeneity may explain this result, which is considered a limitation of this study.

After testing the one-factor structure, the results showed that the four items had factor loadings greater than 0.70 and the global fit indices showed a very good fit ( $\chi^2/df = 0.699$ , RMR = 0.05, GFI = 0.995), loading for the indices (CFI = 1.000) and (RMSEA = 0.000,  $pclose = 0.611$ ). These results suggest that the model has a good fit, very good internal consistency due to its CR (0.911) and convergent validity (AVE = 0.721), and does not require re-specification (Marôco, 2014).

Future studies should consider these limitations and interpret the results with some caution. The concurrent validity and the predictive validity of the Body Image Scale and the Sexual Adjustment Scale should be analyzed and compared with other scales for measuring the same constructs.

As expected, an association was found between the SABIS subscales that measure body image and sexual adjustment. This finding is consistent with the literature supporting an association of these constructs (Fobair et al., 2006). Similar to the results found by Dalton et al. (2009), these findings indicate that the SABIS can be used as a diagnostic support tool to assess body image and sexual adjustment disturbances in women with breast cancer and identify women who require an intervention.

## Conclusion

The experience of living with a stigmatizing disease, such as breast cancer, and its treatment generate feelings and attitudes that reflect some degree of uncertainty and concern about the future.

This study aimed to validate the SABIS Scale for women with breast cancer. Overall, these results are consistent with those obtained by the original authors. In the Body Image Scale, only one item was altered. In the Sexual Adjustment Scale, although the exploratory factor analysis initially revealed a three-factor structure similar to the original study, a one-factor structure was chosen after refinement with the confirmatory factor analysis.

This study concluded that the SABIS version translated, adapted, and validated for European Portuguese seems a valid, reliable, and useful instrument for assessing body image and sexual adjustment of women with breast cancer. This version had satisfactory validity and reliability and measured the constructs adequately. Studies should further explore the SABIS to confirm the structure found in this study and examine test-retest reliability and convergent validity with other measures.

## Author contributions

Conceptualization: Paulo, F., Ferreira, M., Koch, C., Filho, R.

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