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Chronic illness-related cognitive fusion explains the impact of body dissatisfaction and shame on depression symptoms in breast cancer patients

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Abstract

Breast cancer is linked to psychological distress and mood disorders that are in turn associated with higher psychological dysfunction and decreased breast cancer survival. It is considered that psychological health in breast cancer is considerably affected by body image impairment, which in turn seems to be highly associated with shame. However, the impact of these variables on mental health may not be direct.

The current study aimed to explore a comprehensive model regarding the role of chronic illness-related cognitive fusion in the relationship of body image dissatisfaction and chronic illness-related shame with depression symptoms. The sample was composed of 75 women with nonmetastatic breast cancer, recruited in a Radiotherapy Service in central Portugal.

The conducted path model presented an excellent fit and accounted for 59% of the variance of depressive symptomatology. Further, it demonstrated that body image dissatisfaction's impact on depressed mood is significantly explained by the mechanisms of chronic illness-related shame and chronic illness-related cognitive fusion. It was also revealed that chronic illness-related cognitive fusion additionally mediated the impact of chronic illness-related shame on depression.

These findings are suggestive of the importance of body image and chronic illness shame in the determination of breast cancer patients' depression symptoms and also the central role of chronic illness-related cognitive fusion in these relationships. Therefore, the implementation of acceptance and defusion-based psychotherapeutic interventions to improve mental health in cancer patients seems to be of great importance.

Keywords: body image, breast cancer, cognitive fusion, depression, shame.

Introduction

Breast cancer is a major health problem, considered to be the most predominant cancer in women, and the second most common cancer overall (e.g., Stewart & Wild, 2014). Although it is the principal cause of death in women under 55 years of age (Bower et al., 2015; Reich, Lesur, & Perdrizet-Chevallier, 2008), progresses in early detection and treatment have significantly increased life expectancy (Ferlay et al., 2015; Hortobagyi et al., 2005). Treatment modalities for women with cancer (such as surgery, radiotherapy, chemotherapy, and endocrine therapy) can be accompanied with various complications, for example, nausea, poor sexual function, weight gain or loss, and hair loss (Fobair et al., 2006; Moreira et al., 2011; Moreira & Canavarro, 2010). Further, women who underwent a mastectomy may present additional complications such as deformity, surgical scars, and a sense of loss of femininity (e.g., Izadi-Ajirlo, Bahman, & Ghanbari-Motlagh, 2013). In addition, breast cancer presents a number of significant psychological implications. Psychological distress and mood disorders, such as anxiety and depression, affect up to 40% of breast cancer patients (Von Ah & Kang, 2008) and are linked with higher levels of distress and dysfunction in this population (Reich et al., 2008) and decreased breast cancer survival (e.g., Hjerl et al., 2003; Watson, Haviland, Greer, Davidson, & Bliss, 1999).

It is considered that psychological health in breast cancer is considerably affected by body image difficulties, which are exacerbated after diagnosis and further treatments (Chua, DeSantis, Teo, & Fingeret, 2015). In a prospective study with breast cancer patients (Moreira & Canavarro, 2010), body image dissatisfaction predicted lower levels of psychosocial adjustment (quality of life and emotional distress). Further, body image dissatisfaction has been particularly associated with depressive symptomatology in breast cancer patients (e.g., Begovic-Juhant, Chmielewski, Iwuagwu, & Chapman, 2012; Von

Ah & Kang, 2008). Literature points out that alterations in self-perceived femininity and attractiveness are main factors that can precipitate psychological distress in breast cancer patients (Baucom, Porter, Kirby, Gremore, & Keefe, 2005; Spiegel, 1997). Society considers the breast a symbol of femininity (Fang, Lin, Chen, & Lin, 2015) and sexuality (Pikler & Winterowd, 2003a), and thus, any damage to it may implicate severe distress and harm women's body image (Pikler & Winterowd, 2003b). Other changes in physical appearance caused by breast cancer and its treatments (e.g., hair loss, weight changes, fatigue, and hormonal imbalances) are also detrimental to psychological health (e.g., stress and depression) and sexual functioning (Rezaei, Elyasi, Janbabai, Moosazadeh, & Hamzehgardeshi, 2016; Schover, 1991). Given that it may lead to the perception that one is failing to reach desirable sociocultural standards, physical appearance may thus be a source of shame (Duarte, Pinto-Gouveia, Ferreira, & Batista, 2015; Fingeret, 2010). Literature has in fact widely covered the link between this painful emotion and body image difficulties in both community and clinical samples (e.g., Ferreira, Pinto-Gouveia, & Duarte, 2013; Gee & Troop, 2003).

Within an evolutionary perspective, shame is considered a response that, by signalling the possibility of a loss of attractiveness and social rejection, enables the recognition and adjustment of personal aspects or attitudes (Gilbert & Procter, 2006). This socially focused and self-conscious emotion thus signals that one may not present a positive image to others (Gilbert & Procter, 2006; Mikulincer & Shaver, 2005). Due to this perception of self-unattractiveness, the experience of shame is often painful (Gilbert & Procter, 2006; Tangney & Fischer, 1995). This experience is frequently associated with nonadaptive defensive responses (such as avoidance, isolation, and submission) which increase the vulnerability to several mental health problems (e.g., Gilbert & Procter, 2006). Shame specifically associated with the experience of having a chronic illness and

its symptomatology has been increasingly studied, although predominantly in inflammatory bowel disease. This specific dimension of shame was found to be linked to depression symptoms in inflammatory bowel disease patients (Trindade, Ferreira, & Pinto-Gouveia, 2017b). This construct has also been suggested as a predictor of psychosocial functioning in a mixed sample of chronic patients (Trindade, Duarte, Ferreira, Coutinho, & Pinto-Gouveia, 2018) and in a sample of inflammatory bowel disease patients (Trindade, Ferreira, & Pinto-Gouveia, 2017c). Nevertheless, there is no existing data on the relationship between shame specifically related to chronic illness and mental health in breast cancer patients.

The association between chronic illness-related shame and mental health does not seem to be direct. A recent study showed that the effect of this dimension of shame on psychological health seems to be partially mediated by the mechanisms of chronic illness-related cognitive fusion (Trindade, Ferreira, & Pinto-Gouveia, 2018a). This study suggests that it is when patients get fused with thoughts related to having a chronic illness that illness-related shame mostly impacts on mental health. Cognitive fusion is a key process in the Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 2012) model of psychopathology, defined as the domination of verbal events over other sources of stimulus control (e.g., behavioural regulation). Cognitive fusion, when over-extended, leads to the establishment of a relationship with one's perceptions and thoughts as they were literally true rather than seeing them as subjective interpretations of reality (Luoma & Hayes, 2003). Cognitive fusion specific to chronic illness refers to entanglement with thoughts associated with the experience of having a chronic medical condition and chronic symptomatology (e.g., “I must conceal my illness from others”; “My scars are embarrassing”). When one is fused, behaviour becomes overly regulated by cognitions, leading to an increasingly narrower range of action. Cognitive fusion has been associated

with body image dissatisfaction (Trindade & Ferreira, 2014), avoidance behaviours, poor quality of life, as well as with several mental health conditions (e.g., Gillanders et al., 2014) including depression (Bardeen & Fergus, 2016; Dinis, Carvalho, Gouveia, & Estanqueiro, 2015). Prospective studies with inflammatory bowel disease samples have revealed the impact of cognitive fusion on depression symptoms (Trindade, Ferreira, & Pinto-Gouveia, 2017a) and on the evolution of reported psychological and physical health over a course of 18 months (Trindade, Ferreira, & Pinto-Gouveia, 2018b). Further, cognitive fusion seems to be a strong predictor of decreased quality of life in cancer patients (Gillanders, Sinclair, MacLean, & Jardine, 2015).

Given these data, we hypothesize that the impact of body image dissatisfaction (Begovic-Juhant et al., 2012; Von Ah & Kang, 2008) and chronic illness-related shame (Trindade, Duarte, et al., 2018) on depression symptoms is indeed not direct, being explained by the mechanisms of chronic illness-related cognitive fusion. This examination is the aim of the present study, conducted with a sample of women with nonmetastatic breast cancer. In accordance with previous literature (Duarte et al., 2015; Fingeret, 2010), we also expect that body image dissatisfaction will predict chronic illness-related shame.

Materials and Methods

Procedures

The current a study is part of a wider research project and clinical trial on breast cancer. The sample recruitment was conducted at the Radiotherapy Service of Coimbra University Hospital (Centro Hospitalar Universitário de Coimbra; CHUC), Portugal, during 10 months. Clinicians would refer nonmetastatic breast cancer patients to a screening interview (to invite patients to take part in the study and to assess eligibility).

The eligibility criteria was assessed in a screening interview with a psychologist (the first author). Patients with a nonmetastatic breast cancer diagnosis, willing to participate in the study, and with no psychotic or manic symptoms or suicide risk, no communication or cognitive problems, and not receiving formal psychological therapy were included in the study (N = 75).

All ethical and deontological guidelines inherent to research with humans were met. Patients were properly informed about the aims, procedures, and confidentiality nature of the research, and those who agreed to participate gave their written informed consent. This project has been approved by the Ethics Committees of the involved institutions (CHUC and University of Coimbra).

Measures

The research protocol that patients completed at home included demographic and the Portuguese versions of the following self-report measures:

Cognitive Fusion Questionnaire—Chronic Illness (CFQ-CI; Trindade, Duarte, et al., 2018) assesses the level of cognitive fusion specifically associated with the experience of having a chronic illness and its associated symptomatology (e.g., “I tend to get very entangled in my thoughts about my illness and/or symptoms”; “I over-analyse situations associated with my illness to the point where it's unhelpful to me (for example, conversations with my friends; school or work situations)”). The CFQCI's 7 items are measured on a 5-point Likert scale (from 0 = never true to 4 = always true), with higher scores revealing higher levels of chronic illness-related cognitive fusion. In its original, Portuguese study, this scale presented excellent psychometric properties with Cronbach's αs between 0.95 (breast cancer sample) and 0.97 (healthy sample).

Body Image Scale (BIS; Hopwood, Fletcher, Lee, & Al Ghazal, 2001; Portuguese version by Moreira, Silva, Marques, & Canavarro, 2010). The BIS is a 10-item self-report instrument that has been widely validated and used in cancer patients to measure three dimensions of body image: the affective (e.g., feeling self-conscious of the body), behavioural (e.g., difficulty at looking at the naked body), and cognitive (e.g., dissatisfaction with appearance) dimensions. Each item of the BIS is rated on a 4-point scale (0 = *not at all*; 3 = very much), with higher scores corresponding to higher levels of body image dissatisfaction. The scale presented good psychometric properties in its original (α = 0.93) and Portuguese versions (α = 0.93).

Chronic Illness-related Shame Scale (CISS; Trindade et al., 2017b). The CISS is a 7-item measure of shame specifically associated with a chronic illness and its symptomatology. This scale's items (e.g., "I feel that my illness is embarrassing," "I feel inadequate because of my illness and symptoms") are rated on a 5-point Likert scale comprised between 0 (*never true*) and 4 (*always true*). Higher scores reflect higher levels of chronic illness-related shame. The CISS has revealed very good psychometric properties (with Cronbach's αs between 0.91 and 0.93) in its original Portuguese study.

Depression Anxiety Stress Scales (DASS-21; Lovibond & Lovibond, 1995; Portuguese version by Pais-Ribeiro, Honrado, & Leal, 2004). This questionnaire is composed of 21 items that aim to assess the frequency of negative emotional symptoms (related to depression, anxiety, and stress) during the preceding week. In the current study, only the depression subscale was used. Items are measured on a 4- point Likert scale (from 0 = "*Did not apply to me at all*" to 3 = "*Applied to me very much, or most of the time*"). The DASS-21 has presented good internal consistencies for the depression subscale in the original (α_{DEP} = 0.88) and Portuguese (α_{DEP} = 0.85) validation studies.

Regarding the current study, these measures showed good to excellent internal reliabilities (Table 1), in accordance to Kline's recommendations (2000). Medical data (e.g., cancer stage and treatment) was collected with the assistance of a clinician of the service.

Statistical analyses

Descriptive and Pearson correlation analyses were performed using the software SPSS (v. 22; IBM Corp, 2013) to analyse the correlations between study variables (Cohen, Cohen, West, & Aiken, 2003). A path analysis tested a theoretical model that examined whether chronic illness-related cognitive fusion (endogenous variable) would mediate the impact of body image dissatisfaction (independent, exogenous variable) and chronic illness-related shame on depressive symptomatology (endogenous variables), while controlling for the effect of age (due to the broad age range of the sample as well as to age's positive association with depressive symptomatology). This analysis was performed with the Amos software (Arbuckle, 2013) using maximum likelihood as estimation method. Path analysis is a type of structural equation modelling that analyses structural associations and the significance of direct and indirect paths (e.g., Schumacker & Lomax, 2004). This analysis was conducted using the bootstrap procedure (with 5000 samples) to create 95% bias-corrected confidence intervals around the standardized estimates of total, direct, and indirect effects. The adjustment of the model to the empirical data was analysed recurring to the chi-square goodness-of-fit (that reveals a good fit when non-significant; Hair, Anderson, Tatham, & Black, 1998), the relative chi-square (that demonstrates a good fit when < 3; Kline, 2005), the Root Mean Squared Error of Approximation (RMSEA; which reveals a good adjustment when values are < 0.06; Hu & Bentler, 1999), the Comparative Fit Index, and the Tucker and Lewis Index (TLI) which reveal a good model fit when values are >0.95 (Hooper, Coughlan, &

Mullen, 2008; Hu & Bentler, 1999), and the Goodness of Fit Index (GFI) which has acceptable values when > 0.90 and desirable values when > 0.95 (Jöreskog & Sörbom, 1996).

Results

Participants

This study's sample included 75 female patients with non-metastatic breast cancer, with ages between 36 and 85 years old (M = 57.60; SD = 10.18). Their educational level ranged between the fourth grade and PhD (completed years of education: M = 9.87; SD = 5.12). Regarding marital status, 77.3% of the participants were married or cohabitating, 9.3% were single, 5.4% divorced, and 8% widowed.

Concerning medical data, results showed that participants' cancer stage ranged from IA to IIIC, with the majority of the participants presenting IA (48%) or IIA (25.3%) stages of breast cancer. Further, 56% of the patients had previously undergone chemotherapy before the beginning of the radiotherapy treatment and 4% had undergone a mastectomy. Regarding treatment for breast cancer at the moment of the assessment, results demonstrated that the majority of the participants (64%) had finished radiotherapy treatments and were undergoing hormonal therapy for breast cancer. Please see Table 1 for a more detailed characterization of the sample.

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Correlations

Results from the conducted correlation analyses (Table 2) revealed that age was not associated with body image dissatisfaction (BIS), presenting only a significant and positive correlation with depressive symptomatology (DASS-21; $r = 0.32$; $p < 0.010$).

Body image dissatisfaction was significantly linked with chronic illness-related shame (CISS; $r = 0.53$; $p > 0.001$), chronic illness-related cognitive fusion (CFQ-CI; $r = 0.32$; $p < 0.001$), and depressed mood ($r = 0.38$; $p < .001$). Chronic illness-related shame was also positively and strongly correlated with chronic illness-related cognitive fusion ($r = -0.64$; $p < 0.001$) and depression symptoms ($r = 0.68$; $p < 0.001$). These last-mentioned variables were positively and highly correlated with each other ($r = 0.69$; $p < 0.001$).

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The impact of body image dissatisfaction, chronic illness-related shame, chronic illness-related cognitive fusion on depressed mood

Skewness and Kurtosis' values analysis demonstrated that the variables did not present a considerable bias to normal distribution (Sk = |0.79–1.40|; Ku = |0.34–2.00|). The assumption of normality was confirmed through the visual inspection of the distributions (Kline, 2005).

The model was firstly explored through a fully saturated model to analyse whether illness-related shame and illness-related cognitive fusion significantly mediate the effect of body image dissatisfaction on depression, while controlling for age.

This initial model had 23 parameters and was revealed to present the three following non-significant paths which were progressively removed: the effect of body image dissatisfaction on chronic illness-related cognitive fusion ($b_{BIS} = -0.03$; $SE = 0.15$;

$Z = -0.20$; $p = 0.842$); the effect of age on chronic illness-related cognitive fusion (b_{age} = 0.05; SE = 0.09; Z = 0.57; p = 0.568); the effect of body image dissatisfaction on depression symptoms (b_{age} = 0.05; SE = 0.06; Z = 0.78; p = 0.435). After the removal of these paths, the model was retested.

The final model (Figure 1) presented an excellent adjustment to the empirical data, with a non-significant chi-square of $\chi 2_{(3)} = 0.97$, $p = 0.808$, the following goodness-of-fit indices: CFI = 1.00; TLI = 1.00; GFI = 1.00; RMSEA = 0.00 (95% CI [0.00, 0.12]; p = 0.847). The model accounted for 33% of the variance of chronic illness-related shame, 41% of the variance of chronic illness-related cognitive fusion, and 59% of the variance of depression symptoms.

Body image dissatisfaction presented a direct effect of 0.53 (b_{BIS} = 0.47; SE = 0.08; Z = 5.61; $p < .001$) on chronic illness-related shame, which in turn directly predicted chronic illness-related cognitive fusion and depression symptoms with effects of 0.64 (b_{CISS} = 1.02; SE = 0.14; Z = 7.17; $p < 0.001$) and 0.37 (b_{CISS} = 0.29; $S.E.$ = 0.08; Z = 3.78; $p < .001$), respectively. Depression symptoms were also directly predicted by chronic illness-related cognitive fusion with an effect of 0.43 ($b_{CFQ\text{-}CI}$ = 0.21; SE = 0.05; Z = 4.38; $p < 0.001$).

Concerning indirect effects, body image dissatisfaction presented an indirect effect of 0.34 (95% CI [0.22, 0.46]; $p < 0.001$) on chronic illness-related cognitive fusion which was significantly mediated by chronic illness-related shame. The total effect of body image dissatisfaction on chronic illness-related cognitive fusion was thus of 0.48. This process was a significant mediator of the effect of chronic illness-related shame on depression symptoms with an indirect effect of 0.27 (95% CI [0.10, 0.44]; $p < 0.01$). Chronic illness-related shame thus impacted on depressed mood with a total effect of 0.79.

Finally, results showed that body image dissatisfaction presented an indirect effect of 0.34 (95% CI [0.21, 0.47]; $p < 0.001$) on depression symptoms, which was totally mediated through the mechanisms of chronic illness-related shame and cognitive fusion. The total effect of body image dissatisfaction on depression symptoms was thus of 0.49. These results thus show that chronic illness-related cognitive fusion seems to be a mediator of the impact of both body image dissatisfaction and chronic illness-related shame on depression symptoms.

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Discussion

The current study aimed to explore a comprehensive model regarding the role chronic illness-related cognitive fusion has on the impact of body image dissatisfaction and chronic illness-related shame on depression symptoms, in a sample of 75 nonmetastatic breast cancer patients recruited in a Radiotherapy Service in central Portugal. Overall, the tested path model (which was controlled for age) presented excellent fit indices and explained a total of 59% of the variance of this outcome, suggesting that chronic illness-related cognitive fusion is a mediator of the tested relationships.

The first path of the model was the effect of body dissatisfaction on chronic illness-related shame, which was revealed to be positive and significant. Although this finding corroborates literature on the association between body image difficulties and shame (e.g., Ferreira et al., 2013; Gee & Troop, 2003), this is the first the study linking illness-related shame and body dissatisfaction in breast cancer patients. This study thus seems to show that, in this population, a sense of dissatisfaction with one's body may lead

to feelings of shame related to cancer. Symptoms and complications associated with breast cancer and its treatments (such as loss or significant physical alteration of a breast, pain, arm morbidity, fatigue, hair loss, and weight gain or loss), by altering patients' self-perceived femininity and attractiveness (Baucom et al., 2005; Spiegel, 1997), fertility (Fleischer, Vollenhoven, & Weston, 2011), and the ability to perform daily physical activities (e.g., parenting and working), may lead to decreased satisfaction with one's body and its functions and, consequently, to the perception of the self being diminished, unattractive, and inadequate in the eyes of others. This association may be further explained by the importance body image presents on Western women's self-perceived value and worth and by the pressure women feel to present an ideal body (Spade & Valentine, 2004). This importance given to women's body appearance by women themselves and by the general society and media may thus heighten negative feelings regarding body image when one is facing an illness such as breast cancer. Body image therefore seems to present a particular importance on the prediction of chronic illness shame in breast cancer, and through the effects of this painful emotion, on depression symptoms. Indeed, the present paper supports previous findings concerning the link between body image impairment (Chua et al., 2015; Von Ah & Kang, 2008) and chronic illness-related shame (Trindade et al., 2017b) on depression symptoms in breast cancer patients. The impact of these variables on depressed mood was nonetheless, as hypothesized, partially explained by chronic illness-related cognitive fusion.

Chronic illness-related cognitive fusion seemed to influence depression symptoms and partially mediated the effects of body dissatisfaction and chronic illness-related shame on this outcome. The result regarding the impact of cognitive fusion related to chronic illness on depression symptoms corroborates literature on inflammatory bowel disease (Trindade, Duarte, et al., 2018) and add to it by suggesting similar results in breast

cancer patients. A study by Gillanders et al. (2015) in a mixed sample of cancer patients also presented a link between cognitive fusion and decreased quality of life, although the measure of cognitive fusion regarded general cognitions. Several studies on general cognitive fusion's impact on psychopathology, in different populations, are also corroborated (e.g., Bardeen & Fergus, 2016; Dinis et al., 2015; Gillanders et al., 2014; Trindade et al., 2017a; Trindade, Ferreira, & Pinto-Gouveia, 2018b).

This is the first study to examine the relationship between chronic illness-related cognitive fusion and body image. Body image dissatisfaction did not present a direct effect on chronic illness-related cognitive fusion but rather an indirect effect totally mediated by chronic illness-related shame. This suggests that body image dissatisfaction may only have an impact on the way patients get fused with their illness if this dissatisfaction leads to illness shame. This result, together with the finding that the effect of body image dissatisfaction on depression symptoms was totally mediated by chronic illness shame and cognitive fusion may indicate that the sole experience of body dissatisfaction on the face of an illness might not directly affect mental health. It seems that it is only when this experience leads to shame and fusion related to the illness that it impacts on patients' mental health.

In addition, results showed that chronic illness-related shame's effect on depression was partially explained by chronic illness-related cognitive fusion, which means that this verbal process may amplify the impact of illness shame on mental health in breast cancer patients. This is a novel finding that goes in line with a previous study on inflammatory bowel disease (Trindade, Duarte, et al., 2018). These findings suggest that the experience of chronic illness-related shame may generate entanglement and fusion with painful cognitions regarding one's illness and physical symptomatology (e.g., “People think I'm defective/unattractive”; “I'm useless”; “My body will never be the same

again"; "I'm incomplete without the breast"), considering these thoughts as trustworthy "facts" instead of subjective and transitory perceptions of reality. This process may increase rumination and avoidance behaviours (for example, a person who believes the thought "I'm unattractive" or "Others think I'm defective" may avoid going out, interact in social situations, and engage in sexual intercourse to avoid being negatively evaluated by others), which may subsequently lead to isolation, decreased quality of interpersonal relationships, reduced investment in pleasurable activities, decreased self-care, and thus, higher levels of depression symptomatology.

It is important to take into consideration some limitations while interpreting these findings. The cross-sectional nature of the study may be the main limitation of the study—the conducted analyses do not imply causation; future research should thus attempt to replicate the present findings using longitudinal designs. Because this study's small sample size may not allow the generalization of results, future research should also try to replicate present findings in a larger sample of breast cancer patients. It should also be acknowledged that the tested model may be circular. Although the model was intentionally tested to analyse the role of chronic illness-related shame and chronic illness-related cognitive fusion in the known association between body image difficulties and depression symptoms, it does not discard that body image difficulties can be influenced by depression symptoms (Rhoten, Deng, Dietrich, Murphy, & Ridner, 2014) or that shame and cognitive fusion can also impact on body image dissatisfaction. Furthermore, other emotion regulation processes (e.g., experiential avoidance and uncommitted action) not explored in the conducted model may be (and possible are) involved in the studied relationships. Future studies should thus further explore the impact of other mechanisms on the relationship of body image and shame on depression symptomatology in breast cancer. Moreover, the self-report nature of the measure used

to assess depression symptoms did not allow the evaluation of clinical depression per se; future research should use a clinical interview to assess these symptoms.

The present study seems to be a relevant contribution for research and clinical practice in breast cancer. Findings highlight the influence of body image dissatisfaction and chronic illness-related shame in breast cancer patients' depression symptoms and the central role of chronic illness-related cognitive fusion in these relationships. Patients with poor body image, high shame, and cognitive fusion levels should thus be early identified and referred to psychological assessment and possible intervention. Indeed, the implementation of psychotherapeutic interventions to prevent and treat depression symptomatology in cancer patients seems to be of crucial importance. According to the present data, these interventions should include components of compassion, cognitive defusion, and acceptance to diminish the impact of shame and to tackle cognitive fusion. Acceptance and commitment therapy and compassion-based interventions could potentially be useful in this population.

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Conflict of interest

The authors declare no conflict of interest.

Ethical approval statement

All procedures performed in this study were in accordance with the 1964 Helsinki declaration and its later amendments. The Ethics Committees of the involved institutions approved the study (CHUC [CES/152] and FPCE-UC [CEDI 3/11/2016]).

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References

Arbuckle, J. L. (2013). *Amos 22.0 User's Guide*. Chicago: IBM SPSS.

Bardeen, J. R., & Fergus, T. A. (2016). The interactive effect of cognitive fusion and experiential avoidance on anxiety, depression, stress and posttraumatic stress symptoms. *Journal of Contextual Behavioral Science*, *5*(1), 1–6. https://doi.org/10.1016/j.jcbs.2016.02.002

Baucom, D. H., Porter, L. S., Kirby, J. S., Gremore, T. M., & Keefe, F. J. (2005). Psychosocial issues confronting young women with breast cancer. *Breast Disease*, *23*, 103–113.

Begovic-Juhant, A., Chmielewski, A., Iwuagwu, S., & Chapman, L. A. (2012). Impact of body image on depression and quality of life among women with breast cancer. *Journal of Psychosocial Oncology*, *30*(4), 446–460. https://doi.org/10.1080/07347332.2012.684856

Bower, J. E., Crosswell, A. D., Stanton, A. L., Crespi, C. M., Winston, D., Arevalo, J., … Ganz, P. A. (2015). Mindfulness meditation for younger breast cancer

survivors: A randomized controlled trial. *Cancer*, *121*(8), 1231–1240. https://doi.org/10.1002/cncr.29194

Chua, A. S., DeSantis, S. M., Teo, I., & Fingeret, M. C. (2015). Body image investment in breast cancer patients undergoing reconstruction: Taking a closer look at the Appearance Schemas Inventory-Revised. *Body Image*, *13*, 33–37. https://doi.org/10.1016/j.bodyim.2014.12.003

Cohen, J., Cohen, P., West, S., & Aiken, L. (2003). *Applied multiple regression/correlation analysis for the behavioural sciences* (3th ed.). New Jersey: Lawrence Erlbaum Associates.

Dinis, A., Carvalho, S., Gouveia, J. P., & Estanqueiro, C. (2015). Shame memories and depression symptoms: The role of cognitive fusion and experiential avoidance. *International Journal of Psychology and Psychological Therapy*, *15*(1), 63–86.

Duarte, C., Pinto-Gouveia, J., Ferreira, C., & Batista, D. (2015). Body image as a source of shame: A new measure for the assessment of the multifaceted nature of body image shame. *Clinical Psychology and Psychotherapy*, *22*(6), 656–666. https://doi.org/10.1002/cpp.1925

Fang, S. Y., Lin, Y. C., Chen, T. C., & Lin, C. Y. (2015). Impact of marital coping on the relationship between body image and sexuality among breast cancer survivors. *Supportive Care in Cancer*, *23*(9), 2551–2559. https://doi.org/10.1007/s00520-015-2612-1

Ferlay, J., Soerjomataram, I., Dikshit, R., Eser, S., Mathers, C., Rebelo, M., … Bray, F. (2015). Cancer incidence and mortality worldwide: Sources, methods and major patterns in GLOBOCAN 2012. *International Journal of Cancer*, *136*(5), E359–E386. https://doi.org/10.1002/ijc.29210

Ferreira, C., Pinto-Gouveia, J., & Duarte, C. (2013). Self-compassion in the face of shame and body image dissatisfaction: Implications for eating disorders. *Eating Behaviors, 14*(2), 207–210. https://doi.org/10.1016/j.eatbeh.2013.01.005

Fingeret, M. C. (2010). Body image and disfigurement. In J. Duffy, & A. Valentine (Eds.), *MD Anderson Manual of Psychosocial Oncology*. (pp. 271–288). Columbus: McGraw-Hill.

Fleischer, R. T., Vollenhoven, B. J., & Weston, G. C. (2011). The effects of chemotherapy and radiotherapy on fertility in premenopausal women. *Obstetrical & Gynecological Survey*, *66*(4), 248–254. https://doi.org/10.1097/OGX.0b013e318224e97b

Fobair, P., Stewart, S. L., Chang, S. B., D'Onofrio, C., Banks, P. J., & Bloom, J. R. (2006). Body image and sexual problems in young women with breast cancer. *Psychooncology*, *15*(7), 579–594. https://doi.org/10.1002/pon.991

Gee, A., & Troop, N. A. (2003). Shame, depressive symptoms and eating, weight and shape concerns in a non-clinical sample. *Eating and Weight Disorders*, *8*(1), 72–75. https://doi.org/10.1007/BF03324992

Gilbert, P., & Procter, S. (2006). Compassionate mind training for people with high shame and self-criticism: Overview and pilot study of a group therapy approach. *Clinical Psychology and Psychotherapy*, *13*, 353–379. https://doi.org/10.1002/cpp.507

Gillanders, D. T., Bolderston, H., Bond, F. W., Dempster, M., Flaxman, P. E., Campbell, L., … Remington, B. (2014). The development and initial validation of the cognitive fusion questionnaire. *Behavior Therapy*, *45*(1), 83–101. https://doi.org/10.1016/j.beth.2013.09.001

Gillanders, D. T., Sinclair, A. K., MacLean, M., & Jardine, K. (2015). Illness cognitions, cognitive fusion, avoidance and self-compassion as predictors of distress and

quality of life in a heterogeneous sample of adults, after cancer. *Journal of Contextual Behavioral Science*, *4*(4), 300–311. https://doi.org/10.1016/j.jcbs.2015.07.003

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis*. New Jersey: Prentice-Hall International.

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2012). *Acceptance and commitment therapy: The process and practice of mindful change* (2nd ed.). New York, NY: The Guilford Press.

Hjerl, K., Andersen, E. W., Keiding, N., Mouridsen, H. T., Mortensen, P. B., & Jørgensen, T. (2003). Depression as a prognostic factor for breast cancer mortality. *Psychosomatics*, *44*(1), 24–30. https://doi.org/10.1176/appi.psy.44.1.24

Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, *6*(1), 53–60.

Hopwood, P., Fletcher, I., Lee, A., & Al Ghazal, S. (2001). A body image scale for use with cancer patients. *European Journal of Cancer*, *37*(2), 189–197. https://doi.org/10.1016/S0959-8049(00)00353-1

Hortobagyi, G. N., de la Garza Salazar, J., Pritchard, K., Amadori, D., Haidinger, R., & Hudis, C. a, … Albain, K. S. (2005). The global breast cancer burden: Variations in epidemiology and survival. *Clinical Breast Cancer*, *6*(5), 391–401. https://doi.org/10.3816/CBC.2005.n.043

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

IBM Corp (2013). *IBM SPSS Statistics for Windows, Version 22.0.* Armonk, NY: IBM Corp.

Izadi-Ajirlo, A., Bahman, B., & Ghanbari-Motlagh, A. (2013). Effectiveness of cognitive behavioral group intervention on body image improving and increasing self-esteem in women with breast cancer after mastectomy. *Archives of Rehabilitation*, *13*(4), 72–83.

Jöreskog, K. G., & Sörbom, D. (1996). *LISREL 8 User's reference guide*. Chicago: Scientific Software.

Kline, R. B. (2005). *Principle and practice of structural equation modeling*. New York: Guilford.

Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the depression anxiety stress scales* (2nd ed.). Sydney: Psychology Foundation.

Luoma, J. B., & Hayes, S. C. (2003). Cognitive Defusion. In W. O'Donahue, J. E. Fisher, & S. C. Hayes (Eds.), *Empirically supported techniques of cognitive behavioral therapy: A step-by-step guide for clinicians* (2nd ed.). (pp. 71–78). New York: Wiley.

Mikulincer, M., & Shaver, P. (2005). Mental representations of attachment security: Theoretical foundations for a positive social psychology. In M. W. Baldwin (Ed.), *Interpersonal cognition*. (pp. 233–266). New York: Guilford.

Moreira, H., & Canavarro, M. C. (2010). A longitudinal study about the body image and psychosocial adjustment of breast cancer patients during the course of the disease. *European Journal of Oncology Nursing*, *14*(4), 263–270. https://doi.org/10.1016/j.ejon.2010.04.001

Moreira, H., Crespo, C., Paredes, T., Silva, S., Canavarro, M. C., & Dattilio, F. M. (2011). Marital relationship, body image and psychological quality of life among breast

cancer patients: The moderating role of the disease's phases. *Contemporary Family Therapy*, *33*(2), 161–178. https://doi.org/10.1007/s10591-011-9149-3

Moreira, H., Silva, S., Marques, A., & Canavarro, M. C. (2010). The Portuguese version of the Body Image Scale (BIS)—Psychometric properties in a sample of breast cancer patients. *European Journal of Oncology Nursing*, *14*(2), 111–118. https://doi.org/10.1016/j.ejon.2009.09.007

Pais-Ribeiro, J. L., Honrado, A., & Leal, I. (2004). Contribuição Para O Estudo Da Adaptação Portuguesa Das Escalas De Ansiedade, Depressão E Stress (EADS) De 21 Itens De Lovibond E Lovibond [Contribution for the study of the Portuguese adaptation of Lovibond and Lovibond's Depression Anxiety Stress Scales (DASS)]. *Psicologia, Saúde & Doenças*, *5*(2), 229–239. https://doi.org/10.1080/13548500500524088

Pikler, V., & Winterowd, C. (2003a). Racial and body image differences in coping for women diagnosed with breast cancer. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, *22*(6), 632–637. https://doi.org/10.1037/0278-6133.22.6.632

Pikler, V., & Winterowd, C. (2003b). Racial and body image differences in coping for women diagnosed with breast cancer. *Health Psychology*, *22*(6), 632–637. https://doi.org/10.1037/0278-6133.22.6.632

Reich, M., Lesur, A., & Perdrizet-Chevallier, C. (2008). Depression, quality of life and breast cancer: A review of the literature. *Breast Cancer Research and Treatment*, *110*, 9–17. https://doi.org/10.1007/s10549-007-9706-5

Rezaei, M., Elyasi, F., Janbabai, G., Moosazadeh, M., & Hamzehgardeshi, Z. (2016). Factors influencing body image in women with breast cancer: A comprehensive literature review. *Iranian Red Crescent Medical Journal*, *18*(10), e39465.

Rhoten, B. A., Deng, J., Dietrich, M. S., Murphy, B., & Ridner, S. H. (2014). Body image and depressive symptoms in patients with head and neck cancer: An important relationship. *Supportive Care in Cancer*, *22*(11), 3053–3060. https://doi.org/10.1007/s00520-014-2312-2

Schover, L. R. (1991). The impact of breast cancer on sexuality, body image, and intimate relationships. *CA: A Cancer Journal for Clinicians*, *41*(2), 112–120.

Schumacker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Spade, J. Z., & Valentine, C. G. (2004). *The kaleidoscope of gender: Prisms, patterns, and possibilities*. Thousand Oaks, CA: Pine Forge Press.

Spiegel, D. (1997). Psychosocial aspects of breast cancer treatment. *Seminars in Oncology*, *24*(Suppl 1), S1.36–S1.47.

Stewart, B. W., & Wild, C. P. (2014). World cancer report 2014. *World Health Organization*, 1–2. 9283204298

Tangney, J. P., & Fischer, K. W. (1995). *The self-conscious emotions: Shame, guilt, embarrassment, and pride*. New York: Guilford Press.

Trindade, I. A., Duarte, J., Ferreira, C., Coutinho, M., & Pinto-Gouveia, J. (2018). The impact of illness-related shame on psychological health and social relationships: Testing a mediational model in students with chronic illness. *Clinical Psychology and Psychotherapy. Advance Online Publication*, *25*, 408–414. https://doi.org/10.1002/cpp.2175

Trindade, I. A., & Ferreira, C. (2014). The impact of body image-related cognitive fusion on eating psychopathology. *Eating Behaviors*, *15*(1), 72–75. https://doi.org/10.1016/j.eatbeh.2013.10.014

Trindade, I. A., Ferreira, C., & Pinto-Gouveia, J. (2017a). An 18-month study of the effects of IBD symptomatology and emotion regulation on depressed mood. *International Journal of Colorectal Disease*, *32*(5), 651–660. https://doi.org/10.1007/s00384-017-2774-z

Trindade, I. A., Ferreira, C., & Pinto-Gouveia, J. (2017b). Chronic illness-related shame: Development of a new scale and novel approach for IBD patients' depressive symptomatology. *Clinical Psychology and Psychotherapy*, *24*(1), 255–263. https://doi.org/10.1002/cpp.2035

Trindade, I. A., Ferreira, C., & Pinto-Gouveia, J. (2017c). Shame and emotion regulation in inflammatory bowel disease: Effects on psychosocial functioning. *Journal of Health Psychology. Advance Online Publication*. https://doi.org/10.1177/1359105317718925

Trindade, I. A., Ferreira, C., & Pinto-Gouveia, J. (2018a). Assessment of chronic illness-related cognitive fusion: Preliminary development and validation of a new scale with an IBD sample. *Journal of Clinical Psychology in Medical Settings. Advance Online Publication*. https://doi.org/10.1007/s10880-017-9536-5

Trindade, I. A., Ferreira, C., & Pinto-Gouveia, J. (2018b). The longitudinal effects of emotion regulation on physical and psychological health: A latent growth analysis exploring the role of cognitive fusion in IBD. *British Journal of Health Psychology*, *23*(1), 171–185. https://doi.org/10.1111/bjhp.12280

Von Ah, D., & Kang, D. H. (2008). Correlates of mood disturbance in women with breast cancer: Patterns over time. *Journal of Advanced Nursing*, *61*(6), 676–689. https://doi.org/10.1111/j.1365-2648.2007.04563.x

Watson, M., Haviland, J. S., Greer, S., Davidson, J., & Bliss, J. M. (1999). Influence of psychological response on survival in breast cancer: A population-based cohort study. *Lancet*, *354*(9187), 1331–1336. https://doi.org/10.1016/S0140-6736(98)11392-2

Table 1. *Sample's demographic and medical characteristics at the time of the assessment (N = 75)*

		n	%
Age	36- 50	19	25.3
	51 - 65	39	52.03
	66 - 86	17	22.67
Education	Left school before 16	27	36
	9th grade	16	21.3
	Secondary education	14	18.7
	Bachelor's degree	15	20
	Master's degree	2	2.7
	PhD	1	1.3
Marital status	Married or cohabitating	58	77.3
	Single	7	9.3
	Widowed	6	8
	Divorced	4	5.4
Breast cancer stage	IA	37	49.3
	IB	1	1.3
	IIA	20	26.7
	IIB	8	10.7
	IIIA	6	8
	IIIB	1	1.3
	IIIC	2	2.7
Current treatment	Hormonal therapy	48	64
	Radiotherapy	14	18.7
	Monoclonal antibody therapy	7	9.2
	Hormonal treatment + chemical castration	2	2.7
	Radiotherapy + hormonal therapy	2	2.7

	None	2	2.7
Underwent chemotherapy?	Yes	42	56
	No	33	44

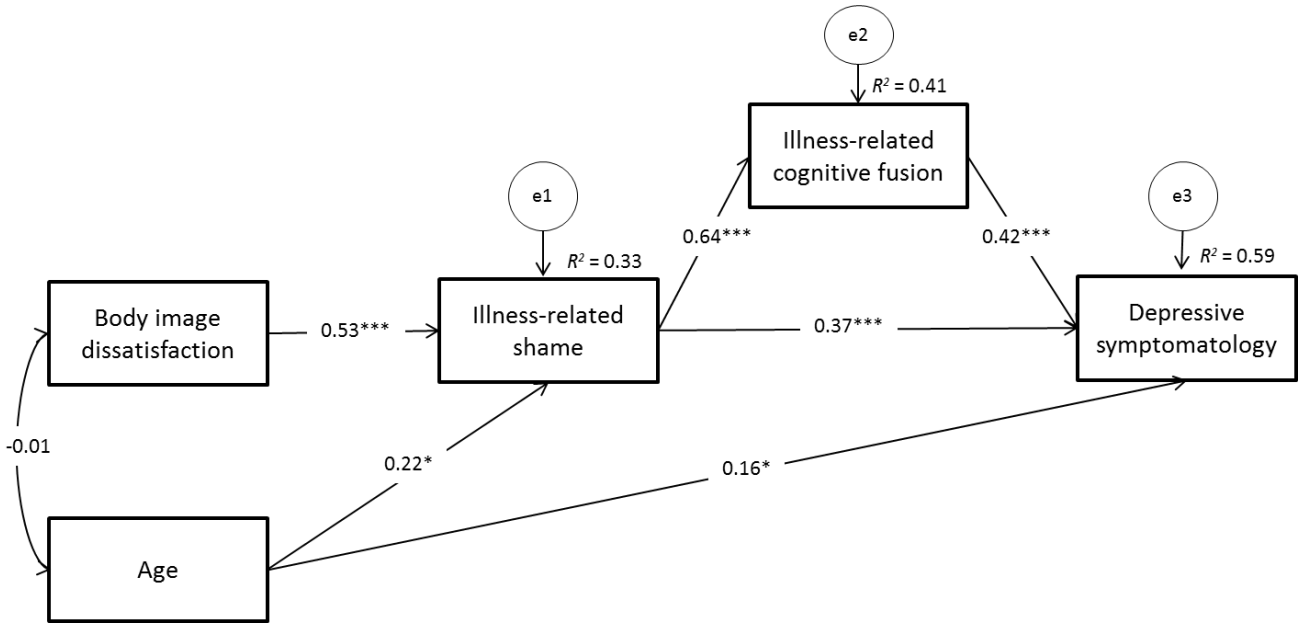
Table 2

Means (M), Standard Deviations (SD), Cronbach's alphas (α) and intercorrelation scores of the study variables (N = 75)

	M	*SD*	α	1	2	3	4
1. Age	57.60	10.18	-	-			
2. Body image dissatisfaction	7.04	7.03	0.92	-0.01	-		
3. Chronic illness-related shame	6.75	6.13	0.90	0.21	0.53***	-	
4. Chronic illness-related cognitive fusion	19.23	9.77	0.93	0.19	0.32***	-.64***	-
5. Depressive symptomatology	3.79	4.73	0.91	0.32**	0.38***	0.68***	0.69***

Note: $^{**}p < 0.01$; $^{***}p < 0.001$.

Figure 1. Final Path Model



Note. Standardized path coefficients among variables are presented.

$^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.