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My changed body: breast cancer, body image, distress and self-compassion

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Abstract

***Background*: Bodily changes after breast cancer treatment can lead to long-term distress. Self-compassion, the ability to be kind to oneself, is an internal resource that may enhance a woman's ability to adjust to cancer-related bodily changes. The aim of the present study was to test the hypothesis that self-compassion mediates the relationship between body image and distress, controlling for alternate plausible mediators.**

***Methods*: Members of a nationwide breast cancer consumer network were invited to participate. A total of 279 women who had finished active cancer treatment completed the online survey. Assessments included the Body Image Scale; Self-compassion Scale; Depression, Anxiety and Stress Scale and items measuring perceived normative pressure and comfort with one's weight. Possible mediating effects of proposed variables on the body image–distress relationship were assessed.**

***Results*: Tests using a bootstrapping approach with multiple mediators were significant for self-compassion on distress. Body image disturbance was indirectly associated with distress through low self-compassion.**

***Conclusions*: Body image disturbance and lower self-compassion were associated with increased psychological distress among these breast cancer survivors. This study provides preliminary evidence for a mediating role of self-compassion between body image disturbance and psychological distress, suggesting a potentially protective effect of higher levels of self-compassion for women at risk of experiencing body image disturbance.**

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Introduction

Breast cancer treatment typically involves several interventions over an extended duration, usually entailing initial surgery, followed by adjuvant therapy that may include a combination of chemotherapy, radiation therapy and hormonal treatments [1]. These treatments alone, and in combination, produce a number of different side effects. With regard to body image-specific outcomes, breast surgery involving partial or complete loss of one or both breasts may result in poorly aligned breasts and breast asymmetry, extensive scarring and alteration to breast and/or nipple sensation, need for a breast prosthesis, possible changes to limb mobility and lymphoedema [2–6]. Chemotherapy presents challenges including hair loss, weight fluctuation, skin and fingernail discolouration and hot flashes related to early-onset menopause [7]. Radiation treatment, which may be given alone or in combination with chemotherapy, can cause skin reactions and discolouration, as well as potential slow progressing long-term neurological changes [8]. For women undertaking a programme of chemoprevention using hormone treatments, further difficulties may arise including treatment-induced weight gain and hot flashes [9].

Such multi-factorial negative bodily changes are often not within the individuals' domain to control, particularly in terms of extent of adverse impact or severity [10], with further attempts to restore appearance possibly leading to prolonged feelings of regret [11]. These changes may also adversely impact a woman's sexuality [12,13]. Taken together, there is considerable evidence that breast cancer survivors may experience protracted psychological distress, particularly as this relates to negative changes in the individual's perception of her physical appearance or body image [14] despite the fact that the woman may be medically well.

Body image reflects a direct personal perception and self-appraisal of one's physical appearance, whereby negative thoughts and feelings related to one's body indicate a disturbance of body image and lead to dissatisfaction with one's self [15]. A high personal investment in one's body image can act as a source of self-worth [16]. Because women generally have a focus on body image-related evaluation and investment [17], a diagnosis of breast cancer is likely to further exacerbate this propensity [18]. Indeed, the loss of a breast is inherently linked to a woman's identity, sexuality and sense of self [19], with approximately one-third of breast cancer survivors expressing distress that is directly related to disturbed body image after successful cancer treatment [14], particularly younger women [20]. Furthermore, long-term patterns of weight gain after cancer treatment are common [21,22], creating additional bodily challenges.

A number of models can be applied to understanding the development of body image distress following cancer treatment. Fox and Corbin [23] propose that physical self-worth

can be divided into domains including body attractiveness, physical strength, physical conditioning and physical competence. Clearly, breast cancer and its treatment can affect all of these domains. Self-discrepancy theory [24] states that one's self concept is a relationship between the actual and ideal-state representations; breast cancer treatment can increase the discrepancy between how one would like to appear and how one actually is. A prolonged state of high discrepancy could manifest as ongoing tension and distress [24].

Self-compassion, the ability to kindly accept oneself or show self-directed kindness while suffering [25,26], is one internal resource that may impact on a woman's coping processes. Neff [27] has defined self-compassion as comprising three components: self-kindness (versus self-judgement), mindful awareness of one's emotions (versus over-identification) and understanding the universality of human suffering (versus isolation of self) using a six-subscale measure. Evidence from non-oncology populations suggests that self-compassion is associated with psychological well-being [28,26]; therefore, this internal resource may assist a woman to deal sensitively with the many bodily changes she has rapidly experienced following her cancer diagnosis. Such a rapid alteration in body image is likely to acutely test a woman's ability to cope with multiple losses and physical changes. Furthermore, any discrepancies regarding how she wishes to appear and how she actually appears are likely to be widened. In this situation, a woman with higher levels of compassion towards herself is more likely to have the capacity to counter any self-criticism and self-blame, responses which commonly arise among individuals experiencing psychological distress, particularly depression and anxiety [29,30]. Moreover, self-directed compassion may mitigate the frequency and automaticity of negative thoughts about one's appearance [31], as it has been shown to be negatively related to both social physique anxiety and self-evaluations [32]. Berry *et al*. [33] further extend this concept and propose a sub-domain of 'body self-compassion' in which individuals extend a kind, non-judgmental attitude to their body and perceived physical imperfections, limitations and setbacks. Individuals who are self-compassionate are theoretically more likely to react with tolerance to changes in their body and with awareness, understanding and kindness to themselves when in emotional distress. Thus, self-compassion may mediate the adverse effects of body image disturbance on distress in women undergoing rapid, multi-dimensional changes. Evidence for the self-compassion–body image link and the potential mediating role of self-compassion is emerging [34].

The aims of the current study were to investigate the relationship between body image disturbance, self-compassion and psychological distress and to determine whether body image difficulties are associated with more distress through low self-compassion amongst women who have survived breast cancer. In addition, the potential mediators of comfort with one's weight and perceived pressure from others regarding one's weight were examined. Research in other contexts demonstrates that body image difficulties and weight dissatisfaction in women are linked [35] and that personal measures of weight dissatisfaction are associated with increased psychological distress [36,37]. As such, a woman's lack of comfort with her own post-cancer treatment weight may potentially function as a mediator of her distress.

Accordingly, the following were hypothesised: (i) increased body image disturbance and low self-compassion would be associated with increased psychological distress, and (ii) self-compassion would mediate the body image disturbance–psychological distress relationship.

Method

Sample and procedures

Participants were 279 women recruited from an Australian community-based breast cancer consumer organisation. Contact persons within the organisation sent an emailed invitation to participate in the study regarding women's body image experiences in survivorship to 885 members, resulting in a 31% response rate. Participants were required to be over 18 years of age, previously diagnosed with breast cancer and to have completed active breast cancer treatment (surgery, chemotherapy, radiation). Participants completed the anonymous questionnaire online, which should have taken 20–25 min. This research was approved by the Macquarie University Human Research Ethics Committee.

Measures

Body image

The 10-item Body Image Scale was developed to measure body image distress, including aspects of affect, behaviour and cognition, as a unitary measure [38] and has been widely utilised in oncology contexts (e.g. [11,39,40]). Participants rated on a four-point Likert scale the extent to which they agreed with statements, such as 'Have you been feeling self-conscious about your appearance?' (0 'not at all' to 3 'very much'). Summed total scores have a possible range from 0 (no distress) to 30 (high body image distress). This scale shows high item reliability ($\alpha = 0.93$) and good clinical validity and sensitivity to change. Item reliability for this scale in the present study was high ($\alpha = 0.94$).

Self-compassion

The 26-item self-report Self-compassion Scale measured compassion towards the self. Likert scale items (1 = almost never, to 5 = almost always) assessed the extent to which participants treat themselves with self-compassion during times of difficulty. The instrument consists of six subscales: Self-kindness (e.g. 'When I'm going through a very hard time, I give myself the caring and tenderness I need'), Self-judgement (e.g. 'I'm disapproving and judgemental about my own flaws and inadequacies'), Mindfulness (e.g. 'When something upsets me, I try to keep my emotions in balance'), Over-identification (e.g. 'When I'm feeling down, I tend to obsess and fixate on everything that's wrong'), Common humanity (e.g. 'I try to see my failings as part of the human condition') and Isolation (e.g. 'When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world'). A total mean score was obtained (range 1–5) in accordance with recommendations from the scale developer. The Self-

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compassion Scale has good test–retest reliability ($\alpha = 0.93$) and validity [27]. In the current study, item reliability was excellent ($\alpha = 0.92$).

Psychological distress

The 21-item short form of the valid and reliable Depression, Anxiety and Stress Scale (DASS21) assessed psychological distress [41,42]. The DASS21 comprises three subscales measuring depression, anxiety and stress (i.e. nervous tension and irritability, factorially distinct from depression and anxiety). Participants rated questions such as 'I felt that I wasn't worth much as a person' (0 'did not apply to me at all' to 3 'applied to me very much or most of the time'). A total score out of 21 was calculated for each subscale and then multiplied by 2, to be comparable with full-scale DASS scores. Scores of at least 10 (Depression), 8 (Anxiety), and 15 (Stress) indicate clinical levels of distress for each subscale, respectively [43]. In the current study, item reliability was high for all subscales ($\alpha = 0.92$ for Depression; $\alpha = 0.79$ for Anxiety; $\alpha = 0.89$ for Stress).

Comfort with weight

The mean of three items scored 1 to 5 ($\alpha = 0.80$) assessed the extent to which the individual feels comfort with her weight (impact of cancer treatment on weight, weight impact on body perception, worry about weight). High scores indicate greater comfort.

Pressure from others

Four Yes/No format items ('Have you experienced any pressure from family/friends/health professionals/media—with regard to your weight?') were summed to indicate the extent to which participants felt pressured from others regarding their current weight ($\alpha = 0.71$).

Demographics

Information was gathered on participants' age, country of birth, marital status, education level, type of breast cancer treatment and duration since breast cancer diagnosis.

Statistical analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS, version 18). Pearson's correlations were used to identify the association between all variables. A sequence of linear regression models were used to assess the extent to which body image, self-compassion, comfort with weight and pressure from others were associated with psychological distress. Mediation analyses were also conducted in which the total effect of body image on each of the three distress outcomes (depression, anxiety, stress) was partitioned into direct and indirect effects, which were tested for statistical significance. Following Baron and Kenny [44], the significance of the paths from body image to each of the mediating variables (self-compassion, comfort with weight, pressure from others; the *a* paths) and from the mediating variables to the distress outcomes (the *b* paths) was tested, along with the significance of the indirect effects. The significance of the indirect effects was tested with the bootstrapping method described by Preacher and Hayes [45].

Bootstrapping is a computationally intensive method that involves repeatedly sampling from a dataset and estimating the indirect effect in each resampled dataset. By repeating this process thousands of times, an empirical approximation of the sampling distribution of *ab* is built, and this is used to construct confidence intervals for the indirect effect. Bootstrapping is considered to be superior to other tests of indirect effects [46]. The Preacher and Hayes approach [45] allows simultaneous testing of multiple mediators (self-compassion, comfort with weight, pressure from others) while adjusting all paths for the potential influence of covariates not proposed to be mediators. Rather than providing a *p*-value for the obtained estimate of the indirect effect, the Preacher and Hayes approach gives confidence intervals based on the bootstrap distribution. If the confidence interval does not contain zero, the indirect effect is said to be significant at a level corresponding to the confidence interval specified (95% in this case). Especially with smaller samples, multiple mediators and non-normal distributions, the bootstrapping method is more likely to provide unbiased estimates of the standard error of the indirect effect than the asymptotic method described by Sobel [46,47].

Results

Demographic data on participants are provided in Table 1. The mean age of respondents was 53.4 years (range, 23–73 years, SD 9.40) with the majority being Australian born, married or partnered, having completed 12 years of education and diagnosed with breast cancer within the last 5 years. All participants had undergone breast cancer surgery, with

Table 1. Sample demographic characteristics

Categorical variable	Percentage %	Number (*n*)
Marital status		
No partner	28	78
Married or partnership	72	201
Country of birth		
Australia and New Zealand	81	226
Britain/Ireland	11	31
Asia	1	3
Europe	1	2
America (North and South)	4	11
Africa	2	6
Education		
Less than 12 years	22	62
12 years	10	28
Vocational training	25	70
Some university	8	22
Bachelor's degree or above	35	97
Type of treatment		
Surgery	100	279
Chemotherapy	74	206
Radiation	72	201
Hormonal treatment	60	167
Other	12	33
Current use of hormones		
Yes	49	137
No	51	142
Time since diagnosis		
Less than 1 year	1	3
1–2 years	11	30
2–3 years	27	76
3–4 years	24	67
5 or more years	37	103

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74% receiving chemotherapy, 72% undergoing radiation treatment and approximately half currently receiving hormone treatment.

The DASS21 distress mean scores were Depression 7.13 (SD 8.57), Anxiety 5.71 (SD 6.08) and Stress 10.52 (SD 8.32), respectively; these scores fall within normal ranges [43].

The mean body image score was 10.59, (SD 8.20), which indicated significantly greater body image dissatisfaction compared with scores reported by breast cancer patients in the initial validation of the scale [38] (mean = 8.07, SD = 5.02, 1 year post operatively, and mean = 9.00, SD = 4.70, 2 years post operatively) ($t(437) = 3.53$, $p < 0.005$). Moderate levels of self-compassion ($M = 3.27$; SD = 0.64) and discomfort with weight ($M = 2.4$; SD = 0.81) were demonstrated, along with relatively low levels of pressure from others ($M = 0.71$; SD = 1.31).

Correlations and regression analyses

Self-compassion was positively correlated with age, with older respondents more compassionate towards themselves. Age was also negatively correlated with body image difficulties, with younger women expressing more body image disturbance. As hypothesised, body image disturbance scores were positively correlated with the measures of psychological distress and pressure from others and negatively correlated with self-compassion and comfort with own weight. Self-compassion was also negatively correlated with the three distress measures, with greater levels of self-compassion associated with decreased psychological distress. Comfort with one's weight was negatively correlated, and pressure from others positively correlated, with psychological distress (Table 2).

Mediation analyses

Linear regression analyses were used to assess the relationship between body image, self-compassion and distress. The significance of the indirect effect was then tested using the bootstrapping method described by Preacher and Hayes [45].

The model for the regression analysis is shown in Figure 1. Results of the analyses and tests of potential mediating variables are shown in Table 3, with age, marital status, time since diagnosis, time since treatment completion and use of hormonal treatment as covariates. If paths *a*, *b* and *c* are significant, and *c′* is reduced compared with *c* (*the total effect*), then the Baron and Kenny [44] criteria for mediation are met. Table 3 shows that all *a* and *b* paths for self-compassion were significant. The bootstrapping test showed that the overall indirect effect and, equivalently, the overall reduction in the total effect (*c*) to the direct effect (*c′*), was significant for all three dependent variables (95% CI: Depression 0.19 to 0.46; Anxiety 0.10 to 0.27; Stress 0.15 to 0.38). For depression, anxiety and stress, the indirect

Table 2. Correlations between variables of interest

Variables	1	2	3	4	5	6	7	8	9	10
1. Age										
2. Time since diagnosis	0.29**	–								
3. Time since treatment	0.28**	0.86**	–							
4. Body image	−0.20**	−0.19**	−0.21**	–						
5. Self-compassion	0.18**	0.07	0.08	−0.46**	–					
6. Comfort with weight	0.18**	0.16**	0.16**	−0.49**	0.31**	–				
7. Pressure from others	−0.04	−0.05	−0.009	0.32**	−0.24**	−0.35**	–			
8. Depression	−0.06	−0.10	−0.10	0.39**	−0.57**	−0.30**	0.26**	–		
9. Anxiety	−0.03	−0.07	−0.10	0.26**	−0.39**	−0.24**	0.29**	0.65**	–	
10. Stress	−0.04	−0.05	−0.06	0.30**	−0.51**	−0.19**	0.24**	0.69**	0.69**	–

N = 225–279.
**Correlation is significant at the 0.01 level (two-tailed).
*Correlation is significant at the 0.05 level (two-tailed).

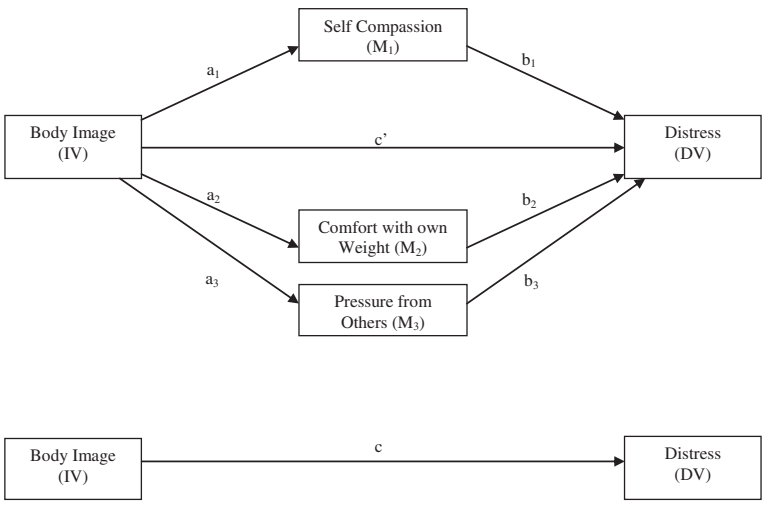

Figure 1. Graphic representation of the mediation model

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Table 3. Tests of the potential mediating variables

	Effect of IV on MV (*a* path)		Effect of MV on DV (*b* path)		Direct effect (*c*′ path)[a]		Total effect (*c* path)[a]		Indirect effect (*a* × b)		Indirect effect (*a* × *b*)	
	β	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*β*	SE	95% CI	
											Lower	Upper
Depression												
Self-compassion	−0.04	<0.0001	−6.17	<0.0001	0.10	0.16	0.41	<0.0001	0.22	0.05	0.14	0.33
Comfort with weight	−0.02	<0.0001	0.04	0.97	0.10	0.16	0.41	<0.0001	0.07	0.03	0.00	0.14
Pressure from others	0.02	<0.0001	1.55	0.19	0.10	0.16	0.41	<0.0001	0.03	0.03	−0.02	0.09
Anxiety												
Self-compassion	−0.04	<0.0001	−3.00	<0.0001	0.007	0.89	0.18	0.0003	0.11	0.03	0.06	0.18
Comfort with weight	−0.04	<0.0001	−0.59	0.27	0.007	0.89	0.18	0.0003	0.03	0.02	−0.03	0.08
Pressure from others	0.05	<0.0001	0.68	0.03	0.007	0.89	0.18	0.0003	0.04	0.03	−0.01	0.11
Stress												
Self-compassion	−0.04	<0.0001	−6.12	<0.0001	0.06	0.42	0.32	<0.0001	0.22	0.04	0.15	0.32
Comfort with weight	−0.04	<0.0001	−0.11	0.89	0.06	0.42	0.32	<0.0001	0.00	0.04	−0.07	0.08
Pressure from others	0.05	<0.0001	0.57	0.19	0.06	0.42	0.32	<0.0001	0.03	0.03	−0.02	0.10

IV, body image; MV, mediating variable; DV, distress; CI, confidence interval.
[a]The total and direct effects were for the single IV in each model.

effect of self-compassion was positive and significantly different from zero, indicating mediation according to the bootstrapping method [45]. For anxiety and stress, the other candidates (pressure from others, comfort with weight) did not meet the criteria for mediators when analysed simultaneously, as their confidence intervals included a zero value. However, for depression, comfort with weight met the criteria for mediation, along with self-compassion. In summary, body image disturbance was found to exert an indirect effect on distress through all of the proposed mediators, but for anxiety and stress, only self-compassion uniquely contributed to this effect.

Discussion

This is the first study to investigate the association between body image disturbance and self-compassion and its relationship to psychological distress in an oncology context, specifically among breast cancer survivors. These investigations have also allowed initial exploration of a potential mediating role of self-compassion on the body image–distress relationship.

Consistent with prior research among breast cancer survivors [48–50], the present study reports minimal psychological distress for the majority of women. Given that more than half of the sample were diagnosed with breast cancer at least 3 years prior to study participation, the low level of distress reported is unsurprising and is consistent with the view that by 12 months post-diagnosis most women will have returned to pre-diagnosis levels of distress (e.g. [50,51]). Many factors can contribute to psychological distress and its alleviation; however, in this sample, distress was associated with greater body image disturbance and lower levels of self-compassion, less comfort with weight and greater perceived pressure from others.

A considerable number of women reported experiencing body image disturbance related to their breast cancer diagnosis and treatment, consistent with other studies reporting sustained body image difficulties at 12 months post-diagnosis and beyond [52–54]. Indeed, levels of body image disturbance in this sample exceeded those reported by Hopwood [38] in the validation of the Body Image Scale. The women in the present study also had a longer time since diagnosis than the Hopwood sample [38], suggesting sustained body image disturbance. Hence, it cannot be assumed that body image disturbance experienced by breast cancer survivors will necessarily diminish with the passage of time, as has been suggested (e.g. [55,56]). Moreover, not surprisingly, greater body image disturbance was evident in women reporting lower comfort with weight and greater pressure from others regarding current weight. As hypothesised, body image disturbance was associated with increased psychological distress in breast cancer survivors, consistent with findings from other studies of cancer and breast cancer survivors (e.g. [57]), highlighting the importance of body image to overall psychological well-being [50,11,38]. These ongoing difficulties with body image in breast cancer survivors suggest that the needs of these women are not always being adequately addressed [58].

Self-compassion was inversely associated with distress, so that women experiencing greater self-compassion also experienced lower distress. This is consistent with emerging evidence from non-oncology populations that self-compassion is a robust predictor of lower depressive and anxious symptomatology, improved quality of life [59] and mental health in general [60]. Furthermore, some of those who are in poorer physical health or have greater challenges to their well-being might require higher levels of self-compassion [60]. It may be possible that on occasion of rapid multi-factorial body image disturbance, additional demands are placed on the individual's self-compassion resources. Although these cross-sectional data preclude any causal inferences, these findings suggest that women who are experiencing distress and who are unable to view themselves in a self-compassionate manner may be creating a self-perpetuating cycle that exacerbates and prolongs their distress.

As predicted, the results obtained confirmed the association between body image disturbance, self-compassion and psychological distress, demonstrating a significant indirect effect through all mediating variables investigated. Key to this finding, however, was that only self-compassion contributed to the indirect effect uniquely for anxiety and stress measures of psychological distress. Hence, the unique

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circumstances of the breast cancer survivor's body image changes may prove to be a salient context in which self-compassion needs to be considered. With reference to the mediation model, it can be seen that the negative link between body image disturbance and self-compassion may result in a reduction of a resource that assists in alleviating psychological distress. Although the present study data preclude examination of causal mechanisms, it can be surmised that breast cancer survivors who have poor body image may be more likely to be depressed, anxious or stressed because of their lower levels of self-compassion, given the negative relationship between self-compassion and distress. Therefore, it may be argued that especially at the post-treatment phase, a woman's self-compassion may need to be reinforced or enhanced to lessen the impact of body image disturbance.

Although this research provides evidence for the potential mediating role of self-compassion on body image, the mediating effects of the other potential factors of comfort with one's own weight and perceived pressure from others did not contribute uniquely to this effect for anxiety and stress. As such, prior body image-related research findings generated from non-oncology populations, such as eating disorder contexts or studies on adolescents [35–37], may not necessarily be applicable to breast cancer survivors. Differences in age, the type of bodily changes, presence of treatment side effects and overall general health may be possible influencing factors accounting for the lack of unique contribution of these variables to the mediating effect.

The level of self-compassion that the woman is able to display becomes a crucial factor and, it can be argued, an essential point of intervention to address body image dissatisfaction following breast cancer treatment. In other words, simply attempting to address body image difficulties without considering the role of self-compassion is likely to have limited benefits. For women with low levels of self-compassion, survivor programmes that focus solely on cosmetic improvements or physical exercise, although informative, may not produce the desired outcomes in terms of distress reduction. Self-compassion enhancement may be one of the 'active ingredients' that need to be included in effective body image intervention. Because of its likely impact in the area of rapid multi-factorial bodily change, it can be argued that if a woman's self-compassion is low, then psychological distress is likely to be problematic. This finding is consistent with emerging evidence that self-compassion can buffer against rumination, which can make people vulnerable to anxiety and depression [26]. In non-oncology populations, interventions designed to promote self-compassion [61–63] have proven effective in reducing depression, anxiety, self-criticism, shame and negative emotions in general while increasing self-soothing. Hence, this approach may potentially be applied to the needs of breast cancer survivors.

There are a number of limitations to the current research that need to be considered. Information was only collected via self-report measures. These data were based on a self-selected group of women who were previously diagnosed with breast cancer. It is possible that women who were experiencing ongoing distress and body image concerns may have been more likely to participate in such a study. Information was not collected on the women's sexual orientation, and this issue may limit the generalisability of the results obtained. In addition, the participants were all English speaking, had access to computers and were mostly Australian born; thus, they were not necessarily representative of all women diagnosed with breast cancer. The generalisability of these findings is limited but is nevertheless similar in composition to prior research among similar cancer populations (e.g. [11]). Finally, the present study is limited by the cross-sectional nature of the data, and more research is needed utilising a prospective design to further investigate the potential mediating role of self-compassion upon distress.

As the first study to investigate and confirm relationships between body image disturbance, self-compassion and psychological distress in an oncology population, our results suggest that a substantial proportion of women do not readily adjust to life after breast cancer and that ongoing distress may be associated with residual concerns resulting from changes to their physical appearance and how they perceive their bodies. The presence of low self-compassion may produce particularly negative consequences. The question of whether the observed levels of low self-compassion were pre-existing or developed post-treatment needs further exploration. In any case, it appears that self-compassion is an important factor to monitor in the breast cancer population. Further research is needed to determine a causal mediation link between body image and self-compassion and to establish whether these findings are robust across age, gender and disease types. Despite the limitations discussed above, our research provides evidence as to the importance of self-compassion with regard to post-treatment physical changes and provides a sound grounding for further exploration of appropriate clinical interventions targeting breast cancer survivors.

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Conflict of interest

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