



# Breast cancer survivors' satisfying marriages predict better psychological and physical health: A longitudinal comparison of satisfied, dissatisfied, and unmarried women

M. Rosie Shrout<sup>1</sup> | Megan E. Renna<sup>1,2</sup> | Annelise A. Madison<sup>1,3</sup> | Catherine M. Alfano<sup>4</sup> | Stephen P. Povoski<sup>2,5</sup> | Adele M. Lipari<sup>2,5</sup> | Doreen M. Agnese<sup>2,5</sup> | William B. Farrar<sup>2,5</sup> | William E. Carson III<sup>2,5</sup> | Janice K. Kiecolt-Glaser<sup>1,6</sup>

<sup>1</sup>Institute for Behavioral Medicine Research, The Ohio State University College of Medicine, Columbus, Ohio, USA

<sup>2</sup>Comprehensive Cancer Center, The Ohio State University College of Medicine, Columbus, Ohio, USA

<sup>3</sup>Department of Psychology, The Ohio State University, Columbus, Ohio, USA

<sup>4</sup>Northwell Health Cancer Institute, New York, New York, USA

<sup>5</sup>Department of Surgery, The Ohio State University College of Medicine, Columbus, Ohio, USA

<sup>6</sup>Department of Psychiatry and Behavioral Health, The Ohio State University College of Medicine, Columbus, Ohio, USA

## Correspondence

M. Rosie Shrout, Institute for Behavioral Medicine Research, The Ohio State University College of Medicine, Columbus, OH, USA.  
Email: [Rosie.Shrout@osumc.edu](mailto:Rosie.Shrout@osumc.edu)

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## Abstract

**Objective:** Breast cancer survivors who experience psychological and physical symptoms after treatment have an increased risk for comorbid disease development, reduced quality of life, and premature mortality. Identifying factors that reduce or exacerbate their symptoms may enhance their long-term health and physical functioning. This study examined how survivors' marital status and marital satisfaction—key health determinants—impacted their psychological and physical health trajectories to understand when, and for whom, marriage offers health benefits.

**Methods:** Breast cancer survivors ( $n = 209$ , stages 0–IIIC) completed a baseline visit before treatment and two follow-up visits 6 and 18 months after treatment ended. Women completed questionnaires assessing their marital status and satisfaction when applicable, as well as their psychological (depressive symptoms, stress) and physical (fatigue, pain) health at each visit.

**Results:** Married women—both those in satisfying and dissatisfying marriages—experienced improvements in their depressive symptoms, stress, and fatigue from pretreatment to 6- and 18-month posttreatment. Unmarried (i.e., single, divorced/separated, or widowed) women's depressive symptoms, stress, fatigue, and pain did not change over time, instead remaining elevated 6 and 18 months after treatment ended. Women in satisfying marriages also had fewer psychological and physical symptoms after treatment than those who were unmarried or in dissatisfying marriages.

**Conclusions:** Although marriage was associated with improved psychological and physical health, the gains were most notable when survivors' marriages were satisfying. Thus, the quality of survivors' marriages, rather than the marriage itself, provided the most benefits to their psychological and physical health.

**KEYWORDS**

breast cancer, cancer, longitudinal studies, marriage, oncology, physical health, psycho-oncology, psychological health, relationship quality, survivorship

## 1 | BACKGROUND

Breast cancer survivors face psychological and physical health problems throughout cancer treatment.<sup>1,2</sup> Common symptoms, including depression, stress, fatigue, and pain, can reduce survivors' quality of life.<sup>3-5</sup> Survivors can also experience these symptoms simultaneously, posing additional burdens to their daily functioning and activities.<sup>3,6-9</sup> Although treatment-related problems may subside, some survivors' psychological and physical symptoms persist beyond treatment. Indeed, a significant portion of breast cancer survivors experience depressive symptoms, stress, pain, and fatigue years after treatment and at higher rates than those without a cancer history.<sup>3,10,11</sup> Prolonged psychological and physical symptoms can increase the risk for developing serious health conditions that threaten survivors' longevity, health, and quality of life.<sup>4,12,13</sup> Understanding why some survivors continue to experience psychological and physical symptoms after treatment, as well as identifying factors that reduce or exacerbate their symptoms, would inform interventions to enhance survivors' long-term health and physical functioning.

Marriage is a key factor in predicting psychological and physical health. Married people live longer than those who are single, divorced/separated, and widowed.<sup>14,15</sup> Marriage's health-enhancing effects are even stronger among those in high quality relationships; satisfied spouses live longer and healthier lives than those who are unsatisfied.<sup>16,17</sup> These health benefits of marriage are equivalent to or greater than well-known factors such as BMI.<sup>14</sup> In the cancer realm, married breast cancer survivors reported better quality of life after surgery than their never married, divorced/separated, and widowed counterparts.<sup>18</sup> After treatment, married survivors also had fewer treatment-related symptoms<sup>19</sup> and lower fatigue compared to unmarried women.<sup>20</sup> Among married survivors, having a spouse who listened to survivors' concerns, was supportive, and made survivors feel cared for, understood, and accepted helped decrease survivors' stress levels and increase their intimacy.<sup>21,22</sup> However, breast cancer survivors in distressed marriages reported higher stress and poorer physical functioning relative to those in nondistressed marriages,<sup>23</sup> suggesting that the quality of survivors' marriages may help or hinder their health and well-being.

Although research in healthy populations has shown that dissatisfied spouses are no better off than those who are single, divorced/separated, or widowed,<sup>24,25</sup> studies have yet to address whether all marriages promote survivors' health, or if dissatisfied survivors have similar or worse health than their unmarried counterparts. Understanding whose psychological and physical symptoms remain elevated after treatment is important because prolonged

depression, stress, fatigue, and pain increase the risk for comorbid disease development, cancer recurrence, and premature mortality.<sup>11,26-28</sup> Thus, research addressing survivors' health trajectories based on their marital status and satisfaction may help identify survivors whose health is most at risk.

Accordingly, this study examined the effects of both marital status and satisfaction on breast cancer survivors' psychological and physical health trajectories, providing novel insight into when, and for whom, marriage enhances health. We assessed breast cancer survivors' psychological (depressive symptoms, stress) and physical (fatigue, pain) symptoms, marital status, and marital satisfaction before treatment began, and then 6 and 18 months after primary treatment completion, allowing us to test marriage's health impact across several important psychological and physical dimensions of health. Additionally, the longitudinal design allowed for comparison of survivors' psychological and physical symptoms at each visit, as well as how survivors' symptoms changed across visits, revealing how women's marriages alter their health in early survivorship. We expected that all women's psychological and physical symptoms would be higher before treatment than after treatment, but women in satisfying marriages would report fewer symptoms than those in dissatisfying marriages and those who were not married. Given the health consequences of a distressing marriage,<sup>23,24</sup> we also expected that women in unsatisfying marriages would report more psychological and physical symptoms than those who were not married.

## 2 | METHODS

### 2.1 | Participants and procedure

Participants were women with a breast cancer diagnosis ( $n = 209$  stages 0-IIIc) identified at cancer clinics for a longitudinal study on fatigue and immune function. Women were recruited within 1-3 months after their diagnosis to complete a baseline visit prior to beginning cancer treatment and two follow-up visits 6 and 18 months after treatment ended (surgery, radiation, or chemotherapy, whichever came last). Women completed self-report questionnaires at each visit. Exclusion criteria included a history of cancer except basal or squamous cell skin carcinomas and significant visual, auditory, or cognitive impairments that would interfere with study completion. Table 1 provides sample characteristics. The Ohio State University Institutional Review Board approved the project (Approval Number 2007C0079), and all women gave written informed consent prior to participation.

**TABLE 1** Baseline characteristics of breast cancer survivors ( $n = 209$ )

	Mean (SD)	Number (%)
Age	55.59 (11.53)	
BMI	29.00 (7.30)	
Physical comorbidities	0.52 (0.89)	
Race		
White		163 (78%)
Black		32 (15%)
Other		14 (7%)
Cancer stage		
0		39 (19%)
I		92 (44%)
II		55 (27%)
IIIA–C		21 (10%)
Cancer treatment		
Surgery only		63 (30%)
Radiation and surgery		55 (27%)
Chemotherapy and surgery		34 (16%)
Radiation, chemotherapy, and surgery		55 (27%)
Postmenopausal		130 (63%)

## 2.2 | Measures

### 2.2.1 | Marital satisfaction

Women who were married/domestic partners completed the 4-item Couples Satisfaction Index (CSI-4) to assess their marital satisfaction.<sup>29</sup> The short version of the CSI distinguishes between satisfied and dissatisfied partners with greater precision than most commonly used marital satisfaction scales, and has a cut-score of 13.5 to identify notable marital dissatisfaction<sup>29</sup> ( $\alpha = 0.93$  to  $0.96$ ).

### 2.2.2 | Depression

The 20-item Center for Epidemiologic Studies Depression Scale (CES-D) measured depressive symptoms in the past week.<sup>30</sup> The CES-D distinguishes between depressed from nondepressed participants in community and clinical samples and has been widely used in cancer studies.<sup>31</sup> Higher scores indicated greater depressive symptoms ( $\alpha = 0.71$  to  $0.74$ ).

### 2.2.3 | Perceived stress

The 4-item Perceived Stress Scale measured perceived stress over the past week.<sup>32</sup> The 4-item version assesses perceived stress more

easily where short questionnaires are required, such as in longitudinal research<sup>32</sup> ( $\alpha = 0.80$  to  $0.86$ ).

### 2.2.4 | Fatigue

The 30-item Multidimensional Fatigue Symptom Inventory-Short Form (MFSI-SF) measured fatigue over the past week.<sup>33</sup> The total score represents the sum of four subscales (general, physical, emotional, and mental fatigue) minus the vigor scale ( $\alpha = 0.87$ ).

### 2.2.5 | Pain

The pain subscale of the RAND-36 assessed pain in the last week. The subscale has good psychometric properties and has been used among cancer survivors.<sup>34</sup> We reverse coded the scale so that higher scores reflected more pain ( $\alpha = 0.84$  to  $0.90$ ).

### 2.2.6 | Covariates

Cancer treatment, cancer stage, age, physical comorbidities, BMI, and menopause status served as covariates given their associations with psychological and physical health throughout treatment.<sup>19,35,36</sup>

## 2.3 | Statistical methods

We created groups based on women's marital status and satisfaction at each visit using the established CSI cut score of 13.5.<sup>29</sup> At baseline, 155 women provided information about their relationships and completed the CSI if applicable; relationship information was collected for 172 and 169 women at visits 2 and 3, respectively. Married women/domestic partners who scored above 13.5 were classified as in a "satisfying marriage" ( $n = 60, 69$ , and  $81$ ). Married women/domestic partners who scored below 13.5 were considered in a "dissatisfying marriage" ( $n = 25, 43$ , and  $29$ ). Women who were not married/domestic partners reported their marital status as single ( $n = 24, 15, 15$ ), divorced/separated ( $n = 26, 26, 23$ ), and widowed ( $n = 20, 19, 21$ ). Preliminary analyses demonstrated that single, divorced/separated, and widowed women did not differ on depression, fatigue, stress ( $ps > 0.31$ ); thus, we created a third group classified as women who were "not married" ( $n = 70, 60$ , and  $59$ ). For models predicting pain, initial analyses demonstrated that widowed women differed from those who were single or divorced/separated ( $p = 0.04$ ); accordingly, we separated widowed women for pain analyses.

Marital group sizes changed across the study, however, chi-square tests of independence showed no association between the study visit and women's marital group classification ( $ps > 0.06$ ). Although not significant, descriptive statistics showed that across the study, 19 satisfied women became dissatisfied; 10 dissatisfied women became satisfied; three satisfied and three dissatisfied women

changed to not married; three unmarried women changed to a dissatisfying marriage; and one unmarried women changed to a satisfying marriage. Among married women, marital satisfaction was higher at pretreatment compared to 6- and 18-month posttreatment,  $F(2, 119) = 8.18, p < 0.001$  (6-month  $b = 1.76, SE = 0.46, p = 0.001$ ; 18-month  $b = 1.19, SE = 0.46, p = 0.03$ ); satisfaction did not change from 6 to 18 months after treatment ( $p = 0.09$ ). Given the changes in marital status and satisfaction, the marital group variable was specified as a time-varying predictor, allowing women's group classification to vary across the study.

To test the hypotheses, we used MIXED MODELS in SPSS version 25. We specified models for each outcome with the main effects of visit and marital group and their interaction to test group differences at each visit and in trajectories. This modeling approach accounted for the nonindependence in participants' data and maximized the use of existing data by including all participants in the analyses. The mixed models used restricted maximum likelihood estimation, and a subject-specific random effect captured the within-subject correlation. All models corrected for multiple comparisons. The continuous covariates (age, BMI, comorbidities) were grand mean-centered to improve interpretability.

### 3 | RESULTS

Figures 1A–1D depict psychological and physical health trajectories by marital group. Table 2 shows the estimated marginal means by marital group and visit.

#### 3.1 | Psychological health trajectories by marital group

##### 3.1.1 | Depressive symptoms

Visit and marital group were significant ( $ps < 0.002$ ), as was their interaction,  $F(4, 246) = 4.09, p = 0.003$  (Figure 1A). Depressive symptoms were higher at pretreatment compared to 6 and 18 months posttreatment among satisfied women (6-month  $b = 7.49, SE = 1.37, p < 0.001$ ; 18-month  $b = 9.30, SE = 1.36, p < 0.001$ ) and dissatisfied women (6-month  $b = 7.48, SE = 2.03, p = 0.001$ ; 18-month  $b = 7.11, SE = 2.16, p = 0.003$ ). Satisfied and dissatisfied women's depressive symptoms did not change from 6 to 18 months after treatment ( $ps > 0.22$ ). Depressive symptoms among unmarried women did not change over time ( $ps > 0.17$ ).

There were no group differences in pretreatment depressive symptoms ( $ps > 0.99$ ). At 6 months posttreatment, unmarried women had higher depressive symptoms than those in satisfying ( $b = 6.25, SE = 1.52, p < 0.001$ ) and dissatisfying marriages ( $b = 5.75, SE = 1.67, p = 0.002$ ). At 18 months posttreatment, unmarried women had higher depressive symptoms than those in satisfying marriages ( $b = 7.18, SE = 1.50, p < 0.001$ ) but not those in dissatisfying marriages ( $p = 0.05$ ). There were no differences in satisfied and

dissatisfied women's depressive symptoms at 6- or 18-month posttreatment ( $ps > 0.30$ ).

In addition to the main study variables, depressive symptoms were lower among older women ( $b = -0.28, SE = 0.06, p < 0.001$ ) and higher among those with greater comorbidities ( $b = 1.12, SE = 0.46, p = 0.02$ ); BMI, cancer stage, treatment type, and menopause status were not related to depression ( $ps > 0.07$ ).

##### 3.1.2 | Perceived stress

Visit and marital group were significant ( $ps < 0.001$ ), as was their interaction,  $F(4, 248) = 3.56, p = 0.008$  (Figure 1B). Perceived stress among satisfied women was higher at pretreatment than at the 6-month ( $b = 2.02, SE = 0.47, p < 0.001$ ) and 18-month posttreatment visits ( $b = 2.04, SE = 0.46, p < 0.001$ ); there were no differences in satisfied women's perceived stress at 6 and 18 months posttreatment ( $p > 0.99$ ). Dissatisfied women's perceived stress was higher pretreatment than 6 months ( $b = 2.54, SE = 0.69, p < 0.001$ ) and 18 months posttreatment ( $b = 1.89, SE = 0.74, p = 0.03$ ); there were no differences in dissatisfied women's perceived stress at 6 and 18 months posttreatment ( $p = 0.51$ ). Perceived stress among unmarried women did not change over time ( $ps > 0.81$ ).

There were no differences in women's pretreatment perceived stress ( $ps > 0.05$ ). At 6 and 18 months posttreatment, satisfied women had lower stress than dissatisfied women (6-month  $b = -1.29, SE = 0.49, p = 0.03$ ; 18-month  $b = -1.96, SE = 0.56, p = 0.002$ ) and women who were not married (6-month  $b = -2.11, SE = 0.51, p < 0.001$ ; 18-month  $b = -1.89, SE = 0.50, p = 0.001$ ). There were no significant differences in dissatisfied and unmarried women's 6- and 18-month posttreatment stress ( $ps > 0.35$ ).

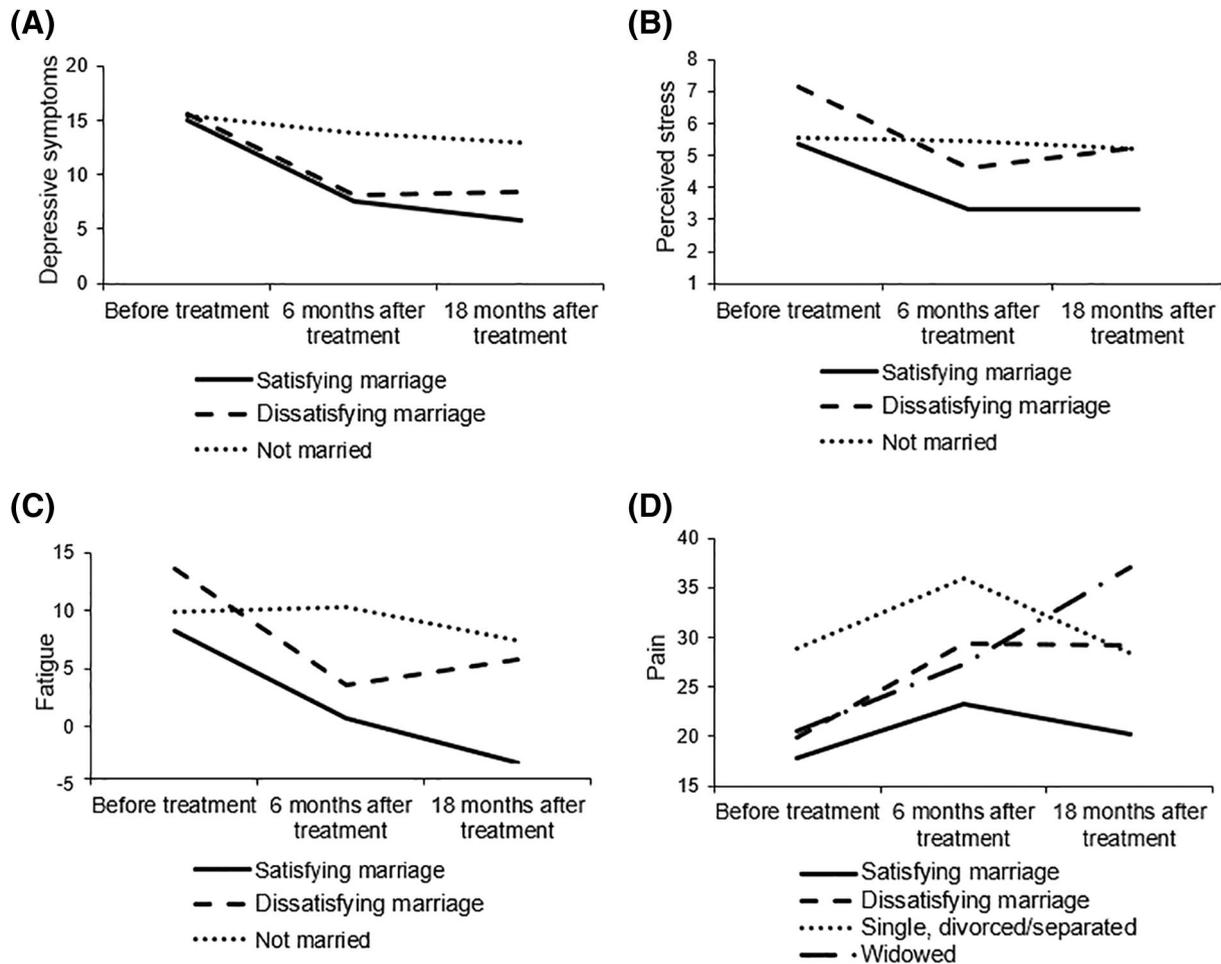
Perceived stress was also lower among older women ( $b = -0.08, SE = 0.02, p < 0.001$ ) and higher among those with greater comorbidities ( $b = 0.33, SE = 0.15, p = 0.03$ ); BMI, cancer stage, treatment type, and menopause status were not related to stress ( $ps > 0.14$ ).

#### 3.2 | Physical health trajectories by marital group

##### 3.2.1 | Fatigue

Significant main effects of visit and marital group ( $ps < 0.008$ ) were qualified by their interaction  $F(4, 221) = 2.68, p = 0.03$  (Figure 1C). Fatigue among satisfied women was higher at pretreatment than 6 months ( $b = 7.59, SE = 2.67, p = 0.02$ ) and 18 months posttreatment ( $b = 11.42, SE = 2.65, p < 0.001$ ). In contrast, dissatisfied women's fatigue was higher at 6 months posttreatment than at baseline ( $b = 10.02, SE = 3.97, p = 0.04$ ), but their 18-month posttreatment fatigue did not differ from their baseline or their 6-month posttreatment fatigue ( $ps > 0.32$ ). Fatigue among unmarried women did not change across the three visits ( $ps > 0.32$ ).

There were no pretreatment group differences in fatigue ( $ps > 0.55$ ). At 6 months posttreatment, unmarried women had higher



**FIGURE 1** A visual representation of the *Visit X Marital group* interaction on (A) depressive symptoms, (B) perceived stress, (C) fatigue, and (D) pain. Preliminary analyses showed pain differed among widowed women and those who were single or divorced/separated and were thus separated for analyses

fatigue than those in satisfying marriages ( $b = 9.60$ ,  $SE = 3.06$ ,  $p = 0.006$ ), but not dissatisfying marriages ( $p = 0.12$ ); there were no differences between satisfied and dissatisfied women's fatigue at 6 months posttreatment ( $p = 0.62$ ). At 18 months posttreatment, satisfied women had lower fatigue than dissatisfied women ( $b = -8.83$ ,  $SE = 3.05$ ,  $p = 0.01$ ) and women who were not married ( $b = -10.54$ ,  $SE = 3.03$ ,  $p = 0.002$ ). There were no differences in fatigue among unmarried women and those in dissatisfying marriages 18 months posttreatment ( $p = 0.96$ ).

Fatigue was lower among older women ( $b = -0.59$ ,  $SE = 0.14$ ,  $p < 0.001$ ), as well as higher among women who were postmenopausal ( $b = -8.25$ ,  $SE = 2.79$ ,  $p = 0.003$ ) and who had greater comorbidities ( $b = 2.44$ ,  $SE = 0.91$ ,  $p = 0.008$ ). BMI, cancer stage, and treatment type were not related to fatigue ( $ps > 0.15$ ).

### 3.2.2 | Pain

Significant visit and marital group main effects ( $ps < 0.008$ ) were qualified by their interaction,  $F(6, 198) = 2.29$ ,  $p = 0.04$

(Figure 1D). There were no changes in women's pain across visits ( $ps > 0.07$ ), except widowed women had higher pain at 18 months posttreatment compared to pretreatment ( $b = 16.46$ ,  $SE = 4.78$ ,  $p = 0.002$ ).

There were no differences in women's pain at the pretreatment visit ( $ps > 0.06$ ). At 6 months posttreatment, women in satisfying marriages had lower pain than their single or divorced/separated counterparts ( $b = -12.66$ ,  $SE = 4.28$ ,  $p = 0.02$ ); there were no other differences in pain 6 months after treatment ( $ps > 0.41$ ). At 18 months posttreatment, satisfied women had lower pain than widowed women ( $b = -16.78$ ,  $SE = 5.35$ ,  $p = 0.01$ ). There were no other group differences at 18-month posttreatment ( $ps > 0.13$ ).

Pain was lower among older women ( $b = -0.32$ ,  $SE = 0.16$ ,  $p = 0.045$ ), and higher among those with a higher BMI ( $b = -0.67$ ,  $SE = 0.21$ ,  $p = 0.002$ ), greater comorbidities ( $b = 3.91$ ,  $SE = 1.07$ ,  $p < 0.001$ ), and those who were postmenopausal ( $b = -9.87$ ,  $SE = 3.18$ ,  $p = 0.002$ ). Cancer stage and treatment type were not related to pain ( $ps > 0.33$ ).

TABLE 2 Estimated marginal means and standard errors of study variables by visit and marital group

	Mean (SE)				
	Satisfying marriage	Dissatisfying marriage	Not married	Single or divorced/separated	Widowed
Depression					
Visit 1	15.08 (1.95) <sup>a</sup>	15.56 (2.44) <sup>a</sup>	15.49 (1.97) <sup>a</sup>		
Visit 2	7.59 (1.77) <sup>a</sup>	8.09 (1.97) <sup>a</sup>	13.84 (1.87) <sup>b</sup>		
Visit 3	5.78 (1.76) <sup>a</sup>	8.46 (2.16) <sup>a,b</sup>	12.96 (1.91) <sup>b</sup>		
Perceived stress					
Visit 1	5.35 (0.67) <sup>a</sup>	7.15 (0.84) <sup>a</sup>	5.56 (0.67) <sup>a</sup>		
Visit 2	3.33 (0.60) <sup>a</sup>	4.61 (0.66) <sup>b</sup>	5.44 (0.63) <sup>b</sup>		
Visit 3	3.30 (0.59) <sup>a</sup>	5.26 (0.72) <sup>b</sup>	5.20 (0.64) <sup>b</sup>		
Fatigue					
Visit 1	8.28 (4.32) <sup>a</sup>	13.63 (5.25) <sup>a</sup>	9.95 (4.41) <sup>a</sup>		
Visit 2	0.69 (3.91) <sup>a</sup>	3.61 (4.20) <sup>a,b</sup>	10.28 (4.10) <sup>b</sup>		
Visit 3	-3.14 (3.90) <sup>a</sup>	5.75 (4.51) <sup>b</sup>	7.41 (4.19) <sup>b</sup>		
Pain					
Visit 1	17.89 (4.45) <sup>a</sup>	19.94 (5.35) <sup>a</sup>		28.86 (5.03) <sup>a</sup>	20.60 (6.38) <sup>a</sup>
Visit 2	23.28 (4.33) <sup>a</sup>	29.40 (4.77) <sup>a,b</sup>		35.94 (5.02) <sup>b</sup>	27.28 (6.21) <sup>a,b</sup>
Visit 3	20.28 (4.27) <sup>a</sup>	29.26 (5.17) <sup>a,b</sup>		28.48 (5.10) <sup>a,b</sup>	37.06 (6.07) <sup>b</sup>

Note: Preliminary analyses showed pain differed among widowed women and those who were single or divorced/separated and were thus separated for analyses. Within each row(visit), means that do not share the same superscript differ at  $p < 0.05$ .

## 4 | DISCUSSION

This longitudinal study demonstrated the importance of breast cancer survivors' marital status and marital satisfaction in their psychological and physical health trajectories. Married women—both those in satisfying and dissatisfying marriages—experienced improvements in their depressive symptoms, stress, and fatigue from pretreatment to 6- and 18-month posttreatment. In contrast, unmarried (i.e., single, divorced/separated, and widowed) women's depressive symptoms, stress, fatigue, and pain did not change over time, instead remaining elevated 18 months after treatment ended. Satisfied women also had fewer psychological and physical health symptoms after treatment than dissatisfied and unmarried women. Although marriage was associated with improved health, these results demonstrate that the gains were most notable when survivors' marriages were satisfying.

When examining each psychological and physical health symptom among married women, both those in satisfying and dissatisfying marriages had higher depressive symptoms, fatigue, and stress before treatment than after treatment. These declines are consistent with research showing that psychological and physical symptoms are highest when adjusting to a cancer diagnosis and cancer treatment.<sup>4</sup> Satisfied and dissatisfied women's depressive symptoms, fatigue, and stress remained consistent from 6 to 18 months after treatment, suggesting the married women experienced the greatest improvements in their psychological and physical symptoms from

pretreatment to 6 months posttreatment. In contrast, satisfied and dissatisfied women's pain did not change over time. At the final 18-month posttreatment visit, satisfied women had lower fatigue and stress than dissatisfied women. Thus, although satisfied and dissatisfied women's psychological and physical symptoms were similar before treatment, satisfied women fared better after treatment. These findings show that the quality of survivors' marriages, rather than the marriage itself, promoted their psychological and physical health throughout survivorship.

In contrast, unmarried women's depressive symptoms, fatigue, and stress did not change over time, indicating that their pretreatment psychological and physical symptoms persisted 6 and 18 months after treatment. In addition, widowed women's pain increased from pretreatment to 18 months posttreatment. At the final 18-month posttreatment visit, unmarried women had higher depression, fatigue, stress, and pain than those in satisfying relationships, whereas there were no differences in unmarried and dissatisfied women's depression, fatigue, stress, and pain across study visits. Thus, while the health of survivors in satisfying marriages improved, women in dissatisfying marriages were no better off than their unmarried counterparts.

These findings fit within and contribute to literature on the salutary effects of survivors' marriages. For instance, married survivors were less fatigued and reported fewer treatment-related symptoms relative to unmarried women,<sup>23-25</sup> and those in non-distressed marriages were less stressed and better physical

functioning than those in distressed marriages.<sup>23</sup> Our findings revealed that, relative to those in dissatisfying marriages and those who were not married, women in satisfying marriages had better psychological and physical health after treatment. Moreover, prior work in healthy populations has shown that spouses in low quality marriages have similar or worse health than those who are single, divorced/separated, and widowed<sup>24,25</sup>; our study extended these findings to breast cancer survivors by demonstrating that dissatisfied and unmarried survivors' psychological and physical health were similar 18 months after treatment. Additionally, previous research has shown longitudinal associations between marital quality and depressive symptoms in physically healthy populations.<sup>37</sup> However, our findings showed differences between unmarried and married survivors, rather than between satisfied and dissatisfied survivors, suggesting that survivors benefitted from their dissatisfying marriage after receiving a cancer diagnosis and cancer treatment. This research highlights the importance of examining both marital status and marital satisfaction when assessing marriage's health impact.

#### 4.1 | Study strengths and limitations

This study's strengths include assessment of survivors from breast cancer diagnosis to 6 and 18 months after cancer treatment. Capturing women's psychological and physical health over time allowed us to compare their symptoms before treatment to their symptoms in early survivorship. The longitudinal assessment also provided novel insight into how fast or slow their symptoms changed across visits. In addition, this research examined the effects of both marital status and marital satisfaction on health trajectories, demonstrating that marriage can improve and impair survivors' health. Lastly, by examining depressive symptoms, stress, fatigue, and pain trajectories, this study showed marriage's health impact across several important psychological and physical dimensions of health.

One limitation is that our sample's demographic characteristics were fairly homogeneous. Though we controlled for important confounds, such as age, BMI, comorbidities, menopause status, cancer stage, and treatment type, future work should examine marriage's effects on health trajectories in more diverse samples. In addition, this was an observational study where we, of course, did not manipulate marital status or marital satisfaction. Therefore, we did not randomly assign survivors to groups, resulting in different group sizes.

#### 4.2 | Clinical implications

This research has important implications for cancer survivorship and survivors' long-term health. Survivors whose depressive symptoms, stress, fatigue, and pain remain elevated after treatment have an increased risk for serious health conditions, cancer recurrence, heightened inflammation, and premature mortality.<sup>26,28,38</sup> Our study

showed that unmarried women's depressive symptoms, stress, fatigue, and pain persisted 6 and 18 months after treatment, and widowed women in particular reported increased pain after treatment, indicating that their long-term health might be at risk. These findings illustrate the need to screen for continued symptoms, and particularly pain, to link women to necessary resources, and to help unmarried survivors strengthen their nonmarital support systems, including encouraging survivors to seek support from their family and friends.

In contrast, women in satisfying marriages may be less vulnerable to poor health after treatment. As shown in previous work, survivors who shared their cancer-related concerns with their partners, and felt understood, cared for, and accepted during these discussions, had lower distress and greater intimacy.<sup>21,22</sup> Having a spouse to help confront a breast cancer diagnosis and cancer treatment may have reduced survivors' psychological and physical symptoms and enhanced their health throughout the cancer trajectory. However, survivors' marital satisfaction declined from pre- to post-treatment, demonstrating the importance helping survivors stay connected with their partners during early survivorship. In addition to screening for distress in accordance with national guidance from the American College of Surgeons' Commission on Cancer<sup>39</sup> and the American Society of Clinical Oncology,<sup>40</sup> our findings highlight the need to screen survivors' marital satisfaction and refer dissatisfied couples to counseling when appropriate.

## 5 | CONCLUSION

This longitudinal study showed that women in satisfying and dissatisfying marriages experienced improvements in their psychological and physical symptoms from pretreatment to the 6- and 18-month posttreatment, and that satisfied women had fewer symptoms after treatment than their dissatisfied and unmarried counterparts. Unmarried women's psychological and physical symptoms remained elevated 18 months after treatment ended. This research demonstrates the need to identify resources to help improve unmarried survivors' health outcomes, as well as the importance of strengthening survivors' marriages so that they enjoy the most health benefits their marriage can offer.

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### CONFLICT OF INTEREST

The authors have declared no conflicts of interest.

### DATA AVAILABILITY STATEMENT

The data that support the findings from this study are available from the corresponding author upon reasonable request.

## ORCID

M. Rosie Shrout  <https://orcid.org/0000-0001-5751-1782>

Megan E. Renna  <https://orcid.org/0000-0003-3941-4270>

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