

RESEARCH ARTICLE

Early life abuse and neglect in breast cancer survivors: Associations with physical and psychological health throughout diagnosis and survivorship

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Abstract

Childhood abuse and neglect worsen physical and mental health through adulthood. This study examined how childhood adversity affected physical and psychological symptoms associated with breast cancer treatment and survivorship at three points within the cancer trajectory. Breast cancer survivors ($N = 209$) were recruited following diagnosis and completed three visits at pre-treatment, 6 months posttreatment, and 18 months posttreatment. All survivors completed the Childhood Trauma Questionnaire to assess abuse and neglect exposure prior to 18 years of age. At each visit, participants completed self-report measures of depressive symptoms, anxiety symptoms, pain, fatigue, and sleep quality. When controlling for disease-related variables, sexual abuse significantly interacted with study visit to predict pain, $p = .002$. No other significant interactions emerged. Analyses of main effects revealed that breast cancer survivors who experienced higher rates of each abuse or neglect type experienced poorer sleep quality, $Bs = 0.20-0.39$, $p < .001-p = .002$; higher fatigue, $Bs = 0.81-1.4$, $ps < .001-p = .020$; more depressive symptoms, $Bs = 0.55-0.56$, $ps \leq .001$; and higher anxiety symptoms, $Bs = 0.35-0.54$, $p < .001-p = .002$. Only physical neglect was significantly associated with pain, $B = 0.12$, $p = .041$. Results suggest that breast cancer survivors who experienced abuse and neglect earlier in life are at increased risk of adverse physical and psychological symptoms throughout survivorship. Providers should consider screening for early life trauma to understand unique risks associated with navigating breast cancer treatment and survivorship.

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In the United States, the Centers for Disease Control and Prevention (CDC) estimates that one in seven children experiences abuse or neglect (CDC, 2024). Individuals who endure maltreatment during childhood often exhibit feelings of despair, low self-worth, a diminished sense of social support, inadequate life satisfaction, and alterations in neurobiological stress response systems (Kumari, 2020). Childhood abuse and neglect are associated with increased rates of depressive and anxiety disorders, bipolar disorder, eating disorders, personality disorders, and trauma-related disorders (Gama et al., 2021; Hinnen et al., 2024). People with histories of abuse, neglect, and other adverse or potentially traumatic events are also more likely to report earlier onset of psychological symptoms and experience a more severe clinical progression, characterized by greater symptom intensity and diminished response to pharmacological and psychological therapies compared to people without such histories (Lippard & Nemeroff, 2023).

In addition to its psychological consequences, many of the leading causes of morbidity and mortality have associations with childhood abuse and neglect. For example, abuse and neglect histories contribute to obesity, cardiovascular diseases, a range of chronic medical illnesses, and certain forms of cancer (Lippard & Nemeroff, 2023; Strathearn et al., 2020). In fact, childhood abuse and neglect promote a reduction in life expectancy by 20 years (Brown et al., 2009; Lippard & Nemeroff, 2023) by increasing cardiovascular disease, obesity, diabetes, and other gastrointestinal and metabolic disorders in adulthood (Johnson et al., 2017; Wegman & Stetler, 2009). The biological embedding model suggests that stress-related experiences, such as abuse or neglect, that occur during critical developmental periods alter stress-sensitive regulatory systems within the body, making individuals more susceptible to chronic illness and its associated physical effects (Miller et al., 2011). As a result, early life adversity can have long-term consequences on both mental and physical health, contributing to increased vulnerability to disease later in life.

Childhood abuse and neglect may also worsen symptoms associated with cancer treatment and survivorship (Ports et al., 2019). The overall impact of neglect and abuse is not only an antecedent of adulthood cancer but also has lasting physical and psychological implications. In one study, breast cancer survivors who experienced significant emotional and physical trauma in childhood exhibited higher vulnerability to cancer-related emotional distress and reported poorer physical functioning throughout treatment and survivorship (Fagundes et al., 2012). Although prior research highlights how childhood adversity contributes to an increased risk for developing cancer (Hu et al., 2021), the longitudinal impact of childhood abuse and neglect on cancer patients and survivors remains

understudied. Understanding how abuse and neglect impact psychological and physical outcomes during a patient's cancer trajectory and into survivorship is not well explored despite a heightened risk for long-term health problems among individuals with these histories.

This study assessed early life abuse and neglect as predictors of both psychological and physical health throughout breast cancer diagnosis and survivorship. At three distinct time points throughout the cancer trajectory (postdiagnosis, 6-months posttreatment, and 18 months posttreatment), breast cancer survivors completed measures assessing their pain, sleep quality, fatigue, depressive symptoms, and anxiety symptoms. Survivors also completed a questionnaire assessing experiences of abuse and neglect prior to age 18 during their second visit. We hypothesized that survivors who had experienced higher rates of abuse and neglect would also report worse physical and psychological health across time points compared to those with lower rates of early life abuse and neglect. Interactions between time point and each type of abuse and neglect were also examined to determine if associations differed across time points within the cancer trajectory.

METHOD

Participants and procedure

Participants were breast cancer survivors ($N = 209$) who were recruited 1–3 months after their diagnosis but before beginning adjuvant treatment (e.g., chemotherapy or radiation). Survivors were recruited from cancer clinics for a longitudinal parent study on fatigue and immune dysregulation. Survivors were required to be in stages 0–IIIa, at least 18 years old, able to read and understand English, and willing to provide blood samples and engage in other study activities consistent with the aims of the parent study. Participant sociodemographic information is presented in Table 1. Table 2 provides correlations between and among study variables. Survivors in this study were, on average, middle-aged ($M = 55.59$ years, $SD = 11.53$), and most participants were White (81.8%), married (63.2%), and employed either part-time or full-time (56.3%). Exclusion criteria included a prior history of cancer other than basal or squamous cell skin carcinomas, as well as significant visual, auditory, or cognitive impairments. Additionally, participants were excluded from the present study if they did not complete the second study visit, during which the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994) was administered.

Women were recruited for participation from the James Comprehensive Cancer Center's outpatient breast cancer clinics. Eligible survivors provided written informed

TABLE 1 Baseline participant characteristics

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	%
Age (years)	55.59	11.53		
BMI (kg/m ²)	28.99	7.29		
Physical comorbidities	0.77	1.30		
Race				
White			163	78.0
Black			32	15.3
Asian American			8	3.8
Other			1	0.5
Income (USD)				
< \$10,000			13	6.2
\$10,000–\$24,999			22	10.5
\$25,000–\$49,999			47	22.5
\$50,000–\$74,999			28	13.4
\$75,000–\$99,999			26	12.4
> \$100,000			53	25.4
Did not report/missing			20	9.6
Cancer stage				
0			39	18.7
I			92	44.0
II			55	26.3
III			21	10.0
Cancer treatment				
Surgery only			63	30.1
Radiation and surgery			55	26.3
Chemotherapy and surgery			34	16.3
Radiation, chemotherapy, and surgery			55	26.3
Began endocrine therapy			141	67.5
No longer menstruating			130	62.2
Depressive symptoms	16.57	10.67		
Anxiety symptoms	11.91	9.48		
Pain	1.99	2.29		
Fatigue	14.77	21.60		
Sleep quality	7.58	3.94		
Emotional abuse ^a	8.23	4.74		
Physical abuse ^a	6.97	3.64		
Sexual abuse ^a	6.65	4.09		
Emotional neglect ^a	9.83	5.16		
Physical neglect ^a	6.73	2.92		

Note. BMI = body mass index.

^aBased on continuous scores from each Childhood Trauma Questionnaire subscale.

consent prior to study participation. Participants completed an in-person baseline study visit before cancer treatment and two follow-up visits at 6 and 18 months after treatment ended. At each visit, self-report questionnaires assessing participants' psychological and physical health were completed in addition to other tasks con-

tent with the aims of the parent study. The study received approval from the Ohio State University Institutional Review Board. Survivors received financial compensation for their participation in each of the three visits.

Measures

Trauma and neglect

The CTQ-SF (Bernstein et al., 1994) is a widely utilized, 28-item self-report measure that retrospectively evaluates experiences of abuse and neglect that occurred before 18 years of age. In Items cover physical abuse (e.g., "People in my family hit me so hard that it left me with bruises or marks"), emotional abuse (e.g., "People in my family said hurtful or insulting things to me"), and sexual abuse ("Someone tried to touch me in a sexual way or tried to make me touch them") as well as emotional and physical neglect. Participants rate each item on a 5-point Likert scale ranging from 1 (*never true*) to 5 (*very often true*), reflecting the frequency of these experiences during childhood. The CTQ has demonstrated strong internal consistency and reliability across diverse samples (Cronbach's $\alpha = .89$; Badenes-Ribera et al., 2024). Notably, the CTQ demonstrates high test-retest reliability (0.79) and stability over time, supporting its use in assessing abuse and neglect irrespective of when the measure is administered in adults (Liebschutz et al., 2018). Continuous subscale scores (Physical Abuse, Emotional Abuse, Sexual Abuse, Physical Neglect, and Emotional Neglect) were used in all analyses. The Walker cutoff score, a well-validated scoring algorithm to establish moderate-severe abuse and neglect, was used to descriptively characterize the level of trauma women in this study experienced (Walker et al., 1999). In this study, the CTQ was administered at the second study visit.

Outcome variables

Depression

The Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), commonly used in cancer patients, was used to assess depressive symptoms. The CES-D is a 20-item scale that asks respondents to indicate the frequency with which they experienced depressive symptoms over the past week. Scores range from 0 to 60, with higher scores representing higher levels of depressive symptoms. A CES-D score of 16 or above is used to indicate clinically significant depressive symptoms consistent with a diagnosis of major depressive disorder. In the present sample, the CESD demonstrated acceptable internal consistency across the three study visits, Cronbach's $\alpha s = .73-.74$.

TABLE 2 Correlations between and among study variables at baseline

Variable	2	3	4	5	6	7	8	9	10	11	12
1. Emotional abuse ^a	.72***	.46***	.69***	.54***	.20***	.25***	.20***	.31***	.16***	-.04	-.03
2. Physical abuse ^a	–	.32***	.51***	.44***	.18*	.13	.17*	.19*	.14	-.10	.02
3. Sexual abuse ^a		–	.33***	.48***	.23***	.30***	.31***	.27***	.27***	-.11	.04
4. Emotional neglect ^a			–	.67***	.18*	.21***	.18*	.29***	.12	-.02	.00
5. Physical neglect ^a				–	.24***	.12	.25***	.16***	.04	.08	.07
6. Sleep					–	.40***	.41***	.33***	.37***	-.10	.13
7. Fatigue						–	.44***	.82***	.78***	-.30***	.11
8. Pain							–	.35***	.43***	.01	.28***
9. Depression								–	.76***	-.30***	.01
10. Anxiety									–	-.25***	.15*
11. Age										–	.19***
12. Comorbid ^b											–

^aAssessed using the Childhood Trauma Questionnaire.^bPhysical comorbidities.* $p < .05$. *** $p < .001$.

Anxiety

The 21-item Beck Anxiety Inventory (BAI; Beck & Steer, 1993) was used to assess anxiety symptoms. Participants were asked to rate how frequently they experienced each symptom over the last month. Scores range from 0 to 63, with higher scores reflecting higher levels of anxiety symptoms. Across study visits, the BAI showed good-to-excellent internal consistency, Cronbach's α = .89–.91.

Sleep quality

The Pittsburgh Sleep Quality Inventory (PSQI; Buysse et al., 1989) was used to measure sleep quality. The PSQI yields seven component scores, which are used to compile an overall sleep quality score. In this sample, the PSQI showed good internal consistency across study visits, Cronbach's α = .83–.89.

Pain

Pain was assessed using a single-item, 10-point rating scale (1 = *no pain*, 10 = *intense pain*). Similar numerical rating scales have been widely used for pain measurement and have demonstrated reliability and validity for assessing pain intensity (Jensen et al., 1999).

Fatigue

The 30-item Multidimensional Fatigue Symptom Inventory (MFSI; Stein et al., 1998) was used to assess fatigue. Participants rate each item on a scale of 0 (*not at all*) to 4 (*extremely*) based on their fatigue over the past 7 days. The total MFSI score reflects behavioral, cognitive, physical, and affective expressions of fatigue in the last week, with higher scores corresponding to more fatigue. Reliability of the MFSI was good or excellent across study visits, Cronbach's α = .87–.96.

Covariates

All analyses statistically controlled for age, cancer stage, treatment type, menopausal status, body mass index (BMI; calculated as kg/m²), and comorbidities. Covariates were selected based on established theoretical and biological links to physical symptoms that individuals commonly experience following breast cancer diagnosis and treatment (Fu et al., 2015; Partridge et al., 2001; Stanton et al., 2005). Comorbidities were assessed using the Charlson Comorbidity Index (CCI; Charlson et al., 1987), which was originally developed in breast cancer populations. The CCI assigns weights to 19 medical conditions, with higher scores equal to a higher comorbidity burden. BMI was derived from objective measurements collected during participants' study visits, and menopausal status was determined through the self-reported date of the participant's last menstrual period.

Data analysis

SPSS (Version 29) was used to conduct all analyses. Abuse and neglect history was measured at the second visit; thus, participants in the parent study who did not complete the second visit ($n = 29$) were excluded from the analysis sample, resulting in a total of 180 participants' data analyzed. A post hoc power analysis examined the ability to determine significant effects with a medium effect size and an alpha level of .05. Results yielded a power estimate of 62.6% to detect significant interaction effects between visit and maltreatment type with the inclusion of six covariates. However, the models were powered at 98.1% to detect large effects.

Mixed linear models were constructed to test the study hypotheses that abuse and neglect histories would correspond to psychological and physical health across visits. This modeling approach accounted for the nonindependence in participants' data (i.e., the correlation between an individual's scores on the same variable over time) and maximized the use of existing data by including all participants in the analyses regardless of missing data points (Brauer & Curtin, 2018); the mixed models used restricted maximum likelihood estimation, and a subject-specific random intercept captured the within-subject correlation. Separate models were run for each type of abuse and neglect (physical abuse, sexual abuse, emotional abuse, emotional neglect, and physical neglect), used as continuous variables, as well as each outcome variable (fatigue, sleep quality, pain, depressive symptoms, anxiety symptoms). Given that outcomes were assessed at three visits, initial models included visit as an interaction term. Interaction terms that were not statistically significant were removed from the models, and main effects were instead evaluated. The Benjamini–Hochberg method was used to correct for family-wise comparisons to correct for multiple comparisons. There were five predictor variables for each potential outcome. Therefore, the p values for each outcome were ranked, and an adjusted p value was computed using the following formula: [original p value*count]/rank. A two-sided significance level of .05 was used for all tests.

Each model adjusted for physical comorbidities, age, BMI, menopausal status (yes or no), and visit (1, 2, or 3) as time-varying (Level 1) covariates, as well as treatment type (surgery only; radiation and surgery; chemotherapy and surgery; or radiation, chemotherapy, and surgery) and cancer stage (0, I, II, or IIIa) as time-invariant (Level 2) covariates. All covariates were included in the final models. Continuous covariates were grand mean centered to improve the interpretability of the intercepts.

RESULTS

Descriptive statistics

Table 2 provides correlations between and among study variables. Of the 209 participants who enrolled at Visit 1, 29 did not complete the second visit, during which the CTQ was administered, resulting in a total analytic sample of 180. A total of 174 survivors completed Visit 3. Independent samples t tests and chi-square analyses revealed that participants who dropped out did not differ significantly from those who completed all three study visits in terms of outcome measures, treatment type, cancer stage, age, or medical comorbidities, $ps = .173-.843$.

Although continuous scores were entered into all models to test the study hypotheses, the Walker cutoff score characterized how many survivors endorsed a history of abuse and neglect. Using this cutoff, approximately 24% of survivors reported experiencing childhood physical abuse, and a similar number of survivors (24.9%) reported childhood physical neglect. Survivors also reported relatively high rates of emotional abuse (25.7%) and neglect (20.3%) compared to recent CDC reports (CDC, 2024). Interestingly, no survivors reported a history of sexual abuse that met the Walker cutoff score criteria.

Regarding changes in outcomes over time, both depressive symptoms, $B = -2.70$ ($SE = 0.39$), $p < .001$, and anxiety symptoms, $B = -1.52$ ($SE = 0.30$), $p < .001$, significantly decreased across the three visits. Fatigue, $B = -3.12$ ($SE = 0.74$), $p < .001$, also decreased across the three visits, whereas pain increased across time, $B = 0.40$ ($SE = 0.09$), $p < .001$. There were no changes in sleep quality across time, $B = -0.33$ ($SE = 0.23$), $p = .149$.

Abuse and neglect history and physical health

The associations between childhood abuse and neglect history and physical health are presented in Table 3. Regarding sleep quality, there were no significant interactions between abuse and neglect history and visit, although the interaction between physical abuse and visit approached significance, $p = .051$. With interaction terms removed from the models, higher levels of all types of abuse and neglect were significantly associated with poorer sleep quality, $ps \leq .001$. Each of these associations remained significant after p -value correction, $ps < .001-p = .002$.

Regarding fatigue, a significant interaction between physical abuse and visit emerged, $p = .047$. However, this interaction was no longer significant following p -value correction, $p = .235$. There were no other significant interactions with visit for any of the abuse or neglect subtypes when fatigue was included as the outcome variable. An examination of main effects revealed that all types of abuse and neglect were associated with higher rates of fatigue prior to p -value correction, $ps < .001-p = .020$. Each of these results remained significant after applying the Benjamini–Hochberg correction, $p < .001-p = .010$.

A significant interaction between sexual abuse and visit, $p = .002$, revealed that although survivors with high and low rates of abuse had similar rates of pain at Visit 1, women with lower sexual abuse rates experienced steeper increases in pain across visits. In contrast, women with higher reported sexual abuse experienced more pain consistently across visits. This interaction is depicted in Figure 1. The difference between participants who reported

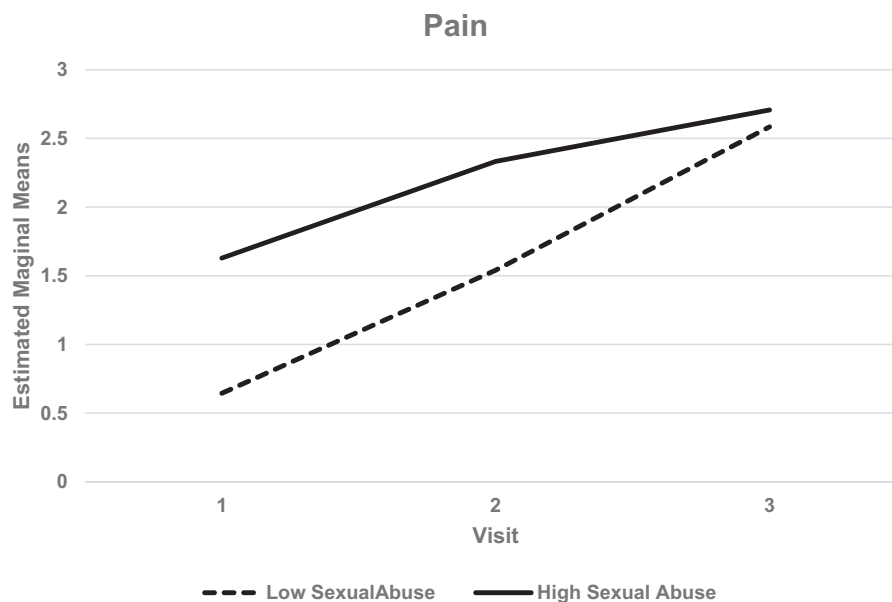


FIGURE 1 Estimated marginal means for the interaction between sexual abuse and visit on pain scores

Note: The interaction was probed at 1.0 standard deviation ($SD = 4.09$) above and below the mean sexual abuse rate.

TABLE 3 Associations between abuse and neglect^a exposure and physical health

Variable	B	SE	p
Sleep quality			
Emotional abuse	0.24	0.06	< .001
Physical abuse	0.26	0.07	< .001
Sexual abuse	0.23	0.06	< .001
Emotional neglect	0.19	0.06	.002
Physical neglect	0.39	0.09	< .001
Fatigue			
Emotional abuse	0.98	0.27	< .001
Physical abuse	0.81	0.35	.020
Sexual abuse	1.01	0.31	.012
Emotional neglect	1.14	0.28	< .001
Physical neglect	1.42	0.46	.014
Pain			
Emotional abuse	0.06	0.03	.057
Physical abuse	0.06	0.04	.119
Sexual abuse	0.09	0.03	.010
Emotional neglect	0.06	0.03	.064
Physical neglect	0.12	0.05	.041

Note: Bolded values were significant following p value correction. B = beta, SE = standard error. Depressive symptoms were measured using the Center for Epidemiological Studies – Depression Scale. Anxiety symptoms were assessed via the Beck Anxiety Inventory.

^aAssessed using the Childhood Trauma Questionnaire.

higher versus lower sexual abuse was significant at Visit 1, $B = 0.12$ ($SE = 0.04$), $p = .009$, and Visit 2, ($B = 0.10$ ($SE = 0.04$), $p = .021$, but not Visit 3, $B = 0.02$ ($SE = 0.04$), $p = .749$. This interaction remained significant fol-

lowing a correction for multiple comparisons, $p = .028$. There were no other significant interactions between sexual abuse and visit. Examining the main effects revealed that higher rates of emotional abuse, $B = 0.06$, $p = .038$, and physical neglect, $B = 0.12$, $p = .015$, were associated with more pain among survivors across visits. The association between physical neglect and pain, $p = .041$, remained significant after p -value correction, but the association between emotional abuse and pain did not, $p = .057$. In models unadjusted for multiple comparisons, there were no significant associations between either physical abuse or emotional neglect and pain, $ps = .064-.119$.

Abuse and neglect history and psychological health

Findings related to the association between abuse and neglect history and psychological health are presented in Table 4. There were no significant Abuse/Neglect Type x Visit interactions for any of the abuse and neglect types or visits when depressive or anxiety symptoms were entered as outcomes. Thus, interaction terms were removed from each model, and main effects were evaluated. Consistent with the study hypotheses, emotional abuse, $B = 0.56$, $p < .001$; physical abuse, $B = 0.50$, $SE = 0.15$, $p = .001$; and sexual abuse histories, $B = 0.58$, $p < .001$, were linked with higher levels of depressive symptoms. Emotional neglect, $B = 0.59$, $p < .001$, and physical neglect, $B = 0.80$, $p < .001$, were also both associated with higher depressive symptoms across visits. These associations remained significant following p -value correction, $ps < .001-p = .002$.

TABLE 4 Associations between abuse and neglect exposure^a and psychological health

Variable	<i>B</i>	<i>SE</i>	<i>p</i>
Depressive symptoms			
Emotional abuse	0.56	0.12	< .001
Physical abuse	0.50	0.15	.002
Sexual abuse	0.58	0.14	< .001
Emotional neglect	0.59	0.12	< .001
Physical neglect	0.80	0.20	< .001
Anxiety symptoms			
Emotional abuse	0.43	0.10	< .001
Physical abuse	0.35	0.13	.002
Sexual abuse	0.46	0.12	< .001
Emotional neglect	0.36	0.11	.008
Physical neglect	0.54	0.18	< .01

Note: All results were significant after a *p* value correction was applied. Depressive symptoms were measured using the Center for Epidemiological Studies–Depression Scale. Anxiety symptoms were assessed via the Beck Anxiety Inventory.

^aAssessed using the Childhood Trauma Questionnaire.

Similarly, emotional, $B = 0.43$, $p < .001$; physical, $B = 0.35$, $p = .010$; and sexual abuse, $B = 0.46$, $p < .001$, histories were associated with higher levels of anxiety symptoms across the three visits. Higher reported emotional, $B = 0.36$, $p = .001$, and physical neglect, $B = 0.54$, $p = .002$, were also associated with higher anxiety symptoms across the visits. As was the case with depressive symptoms, each of these associations remained significant following *p*-value correction, $ps < .001$ – $p = .002$.

Supplementary analyses

Given that the hypothesized models do not provide evidence of cumulative maltreatment and its impact on psychological and physical health, CTQ items were summed to create a total maltreatment score. These totals were entered into all models as predictors. Higher sum scores were significantly associated with higher depressive symptoms, $B = 0.20$ ($SE = 0.03$), $p < .001$; higher anxiety symptoms, $B = 0.14$ ($SE = 0.03$), $p < .001$; worse fatigue, $B = 0.37$ ($SE = 0.08$), $p < .001$; higher pain, $B = 0.02$ ($SE = 0.01$), $p = .012$; and poorer sleep quality, $B = 0.08$ ($SE = 0.02$), $p < .001$, across visits. Each of these associations remained significant following *p*-value correction, $ps < .001$ – $p = .002$. There were no significant interactions between maltreatment sum score and visit, $ps = .071$ – $.490$.

DISCUSSION

This study examined associations between childhood abuse and neglect and both physical and psychological

health outcomes among adult breast cancer survivors across three distinct time points during the cancer trajectory: after diagnosis, 6 months after treatment completion, and 18 months after treatment completion. We hypothesized that more experiences of abuse and neglect in childhood would negatively impact fatigue, sleep problems, pain, depressive symptoms, and anxiety symptoms among breast cancer survivors across these three time-points. Approximately one quarter of survivors in this study reported a history of physical abuse, emotional abuse, physical neglect, and/or emotional neglect prior to age 18. Prior research assessing childhood trauma in breast cancer survivors has found relatively similar rates to our study (Heshmati et al., 2023); however, this rate of reporting is notably higher than the CDC's estimate that approximately one in seven children experience abuse or neglect (CDC, 2024).

The results suggest that, overall, early adverse experiences were significantly associated with poorer psychological and physical health outcomes. Specifically, there were significant associations between abuse and neglect and poorer sleep quality, which remained robust after correction for multiple comparisons. This aligns with prior research linking early trauma to long-term dysregulation of stress response systems, such as the hypothalamic–pituitary–adrenal (HPA) axis, which can disrupt circadian rhythm and sleep architecture (Chapman et al., 2011; Koskenvuo et al., 2010). Fatigue was also significantly related to abuse and neglect, which remained significant following *p*-value correction. Similarly, emotional abuse and neglect maintained significant associations with fatigue, which extends research showing a profound impact of emotional neglect on sleep outcomes, fatigue, and insomnia, even when accounting for other adverse experiences in physically healthy populations (Pfaff & Schlarb, 2022; Rasmussen et al., 2023; Strathearn et al., 2020). Indeed, epidemiological studies report that emotional maltreatment and neglect are common but often underreported or underrecognized forms of childhood adversity (Norman et al., 2012; Teicher & Samson, 2016). This pattern suggests that physical abuse, along with emotional abuse or neglect, may have enduring impacts on fatigue.

In terms of main effects, initially, higher reported emotional abuse, sexual abuse, and physical neglect were all associated with more pain among survivors across visits. Although the association between physical neglect and pain remained significant following *p*-value correction, the association between emotional abuse and pain did not. This may reflect the idea that different types of abuse and neglect may exert differential effects on mental health (Spinazzola et al., 2014). Consistent with the study hypotheses, there were

strong associations between emotional, physical, and sexual abuse and elevated depressive and anxiety symptoms. These associations are consistent with prior research linking interpersonal trauma with internalizing psychopathology, including depression and anxiety, through stress sensitization mechanisms such as HPA axis dysregulation (Heim et al., 2008; Liu, 2017). Importantly, this study extends existing work by showing these associations longitudinally in breast cancer survivors, providing evidence that childhood trauma contributes to worsening psychological symptoms over time (Lope et al., 2024; Mahal et al., 2021). Emotional and physical neglect were also associated with worse depressive and anxiety symptom outcomes, reinforcing the growing evidence that neglect, like abuse, can have long-lasting psychological consequences (Hinnen et al., 2024; McLaughlin et al., 2014).

Although we did not have specific hypotheses about differing associations across time points, we tested interactions between abuse and neglect histories and study visit and their associations with psychological and physical symptoms. The significant interaction between sexual abuse and visit on pain revealed an interesting pattern of results. Women who reported lower levels of sexual abuse had significantly less pain at Visit 1 compared to those who reported higher levels of sexual abuse. However, over time, this difference shrank, with both groups looking similar in terms of reported pain by Visit 3. Survivors who reported experiencing less sexual abuse, therefore, had steeper increases in pain across visits, although those who reported more sexual abuse experienced persistently higher pain across time. Interestingly, there were no other significant interaction effects between abuse or neglect history and visit. Our findings overall highlight that women who experienced higher rates of abuse or neglect had a higher psychological and physical symptom burden regardless of where they were in their cancer trajectory, with these associations staying consistent over time. This lack of significant interactions, therefore, highlights a steady, yet enduring, impact of childhood abuse and neglect on survivors' psychological and physical well-being from diagnosis through survivorship.

The findings from this study highlight the need for future interventions that target both psychological and physical distress through biopsychosocial approaches to reduce symptom burden throughout treatment and survivorship (Janusek et al., 2013). Clinicians and researchers should prioritize comprehensive trauma screening that includes an assessment of both abuse and neglect and consider these experiences in the development of prevention and intervention strategies. In survivorship care, trauma-informed approaches are especially critical, as survivors with early-life adversity may experience exacerbated psychological distress, fatigue, pain, and disrupted sleep,

which can complicate recovery and quality of life (Bower, 2014; Lawson & Lawson, 2018). Integrating trauma history assessments into routine clinical practice can help identify at-risk individuals and tailor prevention and intervention strategies accordingly. Psychosocial interventions that target emotion regulation, stress management, and social support have shown promise in mitigating the long-term effects of childhood trauma and improving survivorship outcomes (Cohen et al., 2018; Murnaghan et al., 2024) and, therefore, may be salient targets for breast cancer survivors. Such interventions offer the opportunity to improve holistic health outcomes and enhance quality of life among breast cancer survivors.

This study has several strengths. Using the CTQ, we were able to assess several specific types of abuse and neglect and examine their ties to physical and mental health among breast cancer survivors. Additionally, we examined these associations at three distinct points within the cancer trajectory—after diagnosis, then 6 and 18 months after treatment completion. The longitudinal design with repeated assessments of psychological and physical outcomes highlights the stability of the findings throughout diagnosis, treatment, and survivorship, rather than providing insight regarding symptom burden at a single time point. Additionally, the use of multiple domains of physical and psychological health allowed for a comprehensive understanding of the long-term effects of childhood trauma among survivors. These findings also contribute to a growing body of literature emphasizing the long-term impact of various forms of maltreatment, including emotional abuse and neglect, rather than focusing solely on traditional traumatic experiences outlined in Criterion A of the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.) criteria for posttraumatic stress disorder (e.g., physical or sexual abuse; American Psychiatric Association, 2013). Understanding the common impact that these experiences have on physical and mental health highlights the need for broader conceptualizations of trauma and its associated adverse outcomes in both research and clinical settings.

Despite these strengths, some limitations warrant consideration. First, abuse and neglect histories were retrospectively reported based on events that occurred before 18 years of age, and we did not account for current traumatic experiences or events that occurred in adulthood. Second, the sample was predominantly White and employed, which may limit the generalizability of the findings to more diverse populations. Future research with larger and more diverse populations is needed to replicate and extend these findings and better capture the heterogeneity of traumatic experiences and outcomes in breast cancer survivors. Third, unmeasured confounding factors, such as family environment or other life stressors, may influence

the observed associations, limiting the ability to isolate the specific effects of childhood maltreatment on adult health outcomes. Moreover, the low rate of reported sexual abuse in this sample may limit the ability to detect associations with the physical health outcomes in this study. Although no participants met the Walker cutoff for sexual abuse, some survivors reported experiences that may have been impactful but did not reach the numeric threshold. More broadly, reliance on cutoff scores can oversimplify complex trauma histories and may not fully capture the severity or long-term impact of individual traumatic events. Lastly, this study did not assess potential mediators or moderators in the associations between abuse and neglect history and psychological and physical health. Future studies should investigate potential mediating mechanisms, such as emotion regulation, stress, physiology, and social support, which might explain the pathways from early adversity to adult health outcomes, especially in cancer survivors (Cloitre et al., 2019; Gudina et al., 2021). Further, future studies would benefit from testing potential mechanisms linking specific abuse and neglect subtypes to psychological and physical health outcomes, pathways that could not be tested in the current study. For example, emotional abuse and neglect may impact psychological and physical health through emotional pathways, whereas physical neglect and abuse might lead individuals to delay or avoid medical appointments, which may impact pain sensitivity. Longitudinal designs with repeated assessments of these mediators could provide insight into the direction of these associations. Additionally, exploring potential moderators, including genetic vulnerabilities, coping styles, and cultural or contextual factors, may help identify subgroups of breast cancer survivors with a heightened risk of or resilience to poor psychological and physical health as they navigate treatment and survivorship (Sheffler et al., 2019).

This study underscores the enduring impact of childhood emotional abuse and neglect on physical and mental health in breast cancer survivors, a group already at risk for poor health and reduced quality of life. Additionally, these findings suggest the importance of recognizing not only the enduring effects of early childhood adversity but also how the trauma related to a cancer diagnosis and treatment may result in a resurfacing of past experiences, highlighting the need for trauma-informed approaches in survivorship care. Routine screenings for traumatic experiences could further aid in identifying individuals at higher risk for persistent physical and psychological symptoms and allow for targeted supportive interventions throughout treatment and survivorship, ultimately improving overall functioning and quality of life in this population.

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OPEN PRACTICES STATEMENT

The study reported in this article was not formally preregistered. Neither the data nor the materials have been made available on a permanent third-party archive; requests for the data or materials should be sent via email to Renna.4@osu.edu.

AUTHOR CONTRIBUTIONS

Sonal K. Johal: conceptualization, writing—original draft, formal analysis; **M. Rosie Shrout:** conceptualization, writing—review and editing, formal analysis, visualization; **Annelise A. Madison:** writing—review and editing, conceptualization; **Stephanie J. Wilson:** writing—review and editing, conceptualization; **Stephen P. Povoski:** writing—review and editing, resources; **William E. Carson, III:** resources, writing—review and editing; **Janice K. Kiecolt-Glaser:** funding acquisition, writing—review and editing, project administration, supervision; **Megan E. Renna:** supervision, writing—original draft, conceptualization, writing—review and editing, formal analysis.

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