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Factors Associated with Symptom Distress in Women with Breast Cancer Prior to Initiation of Chemotherapy

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Abstract

Background: Symptom distress in women with breast cancer is associated with early discontinuation of chemotherapy and may influence treatment outcomes. Describing racial differences in prechemotherapy symptom distress and examining contextual variables of the symptom experience may inform our understanding of the complex problem of racial disparities in breast cancer.

Aim: To determine if perceived social support, healthcare system distrust, and economic hardship predict symptom distress in women with breast cancer prior to their first chemotherapy treatment.

Design: Descriptive, correlational, cross-sectional

Methods: Baseline data (N = 119) was used from a multisite, longitudinal study comparing the symptom experience and ability to receive chemotherapy of Black and White women with breast cancer (R01MD012245;Rosenzweig, PI). Measures included the Symptom Distress Scale, Interpersonal Support Evaluation List, Health Care System Distrust Scale, and Psychological Sense of Economic Hardship scale. The analysis consisted of multiple regression and a t-test.

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CRedit authorship contribution statement:

SM – Conceptualization, Project administration, Roles/Writing - original draft

SP – Data curation, Formal analysis, Roles/Writing - original draft

MC - Conceptualization, Funding acquisition, Investigation, Project administration, Writing - review & editing

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Results: On average, participants reported five symptoms prior to chemotherapy. Black women reported higher symptoms distress than White women; $t(68.34) = 2.15, p = .035$. The model explained 26% of variance in symptom distress; $F(5, 112) = 9.01, p < .001$. While controlling for age and race, greater perceived economic hardship contributed to higher symptom distress ($\beta = .36, p = .001, 95\% \text{ CI: } .34 \text{ to } 1.34$). Race, health care system distrust and social support did not significantly predict symptom distress.

Conclusion: Assessment of perceived financial hardship prior to beginning chemotherapy is critical to identify those patients at risk for greater symptom distress.

Keywords

Symptom distress; Breast cancer; Prechemotherapy; Racial disparities; Financial hardship

1. Introduction

Patients embarking on a course of chemotherapy for breast cancer may present with a myriad of physical and psychological symptoms related to comorbid health conditions, prior cancer surgery, and stress. Studies of women with breast cancer, who had not yet undergone surgery or other treatment, found patterns of significant symptom distress and burden related to mood and sleep disturbances, fatigue, pain, and changes in cognitive functioning (Cimprich, 1999; Denieffe, Cowman, & Gooney, 2014; Matthys et al., 2021). These symptoms can persist post-surgery and can be associated with symptom distress and poor health-related quality of life (HRQOL) in the pre-adjuvant chemotherapy period (Jung et al., 2020).

Racial disparities in breast cancer survival exist, with black women in the United States having a mortality rate that is 40% higher than white women (Siegel, Miller, Fuchs, & Jemal, 2021). Numerous factors have been examined to better understand the causes of this racial disparity (Coughlin, 2019; Yedjou et al., 2019). Although symptom burden and distress prior to chemotherapy initiation may be another factor influencing treatment outcomes, there are few studies of this period in the breast cancer continuum. In a study of 121 African American women with breast cancer, higher levels of symptom distress at baseline, before chemotherapy, were associated with future inability to receive the originally prescribed chemotherapy by the projected time frame, with 40% of the sample receiving less than 85% of their projected chemotherapy doses (Yee et al., 2017). Relative dose intensity (RDI), which is the ratio of the total amount of drug actually given over time (dose intensity) to the standard dose intensity for a particular chemotherapy regimen, has been associated with poorer survival when it falls below 85% (Nielson, Bylsma, Fryzek, Saad, & Crawford, 2021). In a large cross-sectional study of prechemotherapy symptoms in women with breast cancer, white women reported more severe symptoms and distress prechemotherapy than black women, but black women were more likely to have higher baseline scores for symptoms specifically associated with treatment toxicity (Hu et al., 2021). The likely exacerbation of these symptoms during treatment may negatively impact HRQOL, which is associated with early discontinuation of chemotherapy (Richardson, Wang, Hartzema, & Wagner, 2007). Describing racial differences in prechemotherapy symptom distress may inform our understanding of the complex problem of racial disparities in breast cancer.

Symptom distress is a multidimensional concept that refers to the individual's subjective perception of how bothersome a symptom is and encompasses the meaning of the illness for that individual (McClement, Woodgate, & Degner, 1997). It is a component of the symptom experience. According to the Revised Symptom Management Model, the symptom experience includes the individual's perception and evaluation of symptoms, as well as the response to symptoms (Dodd et al., 2001). The symptom experience is also influenced by contextual variables related to the person, health/illness, and environment. In this paper, we examine factors related to symptom distress in women prior to beginning chemotherapy, with a focus on the less often examined contextual variables of the person's physical, social, and cultural environment.

The physical environment includes characteristics of the home. Both qualitative and quantitative studies have found that patients with cancer living in households in poverty are at risk for experiencing greater symptom distress (Lyon et al., 2021; Yeager, Quest, Vena, & Sterk, 2018). Lower income, lack of health insurance, unemployment, and younger age are independent risk factors for financial burden as a direct result of cancer and its treatment, also referred to as financial toxicity, hardship, or strain (Smith et al., 2019). The experience of financial hardship has three domains: (1) the material conditions such as debt, lost income, missed work, and out-of-pocket expenses, (2) the psychological response to the increase in personal/household expenses during cancer care, and (3) the coping behaviors that the individual uses to manage increased expenses (Altice, Banegas, Tucker-Seeley, & Yabroff, 2017). Perceived financial hardship was found to be directly correlated with symptom distress in a study of patients with advanced cancer (Gallups, Copeland, & Rosenzweig, 2017). Financial strain was associated with worse depression, anxiety, and physical symptom burden in a geographically diverse sample of 309 breast cancer survivors (Perry et al., 2019). Authors of a systematic review of nine studies representing 11,544 cancer survivors reported a positive relationship between financial toxicity and psychological symptom burden (depression, anxiety, overall distress, etc.), but less evidence for a relationship between financial toxicity and physical symptoms (Chan et al., 2019).

Social support is a component of the social environment, a key contextual factor for the symptom experience. It is defined as one's perception of available helping relationships or social resources (Gottlieb & Bergen, 2010) and, at diagnosis, is a significant marker for well-being throughout the breast cancer experience. Greater perceived social support at diagnosis was predictive of better physical and mental health-related quality of life (HRQOL) at 3-year follow-up in a longitudinal study of 412 women with breast cancer (Leung, Pachana, & McLaughlin, 2014). Social support's relationship with symptoms and symptom distress in breast cancer has been examined during the treatment and survivorship phases. Lower social support is predictive of cancer-related emotional distress in post-treatment breast cancer survivors (Syrowatka et al., 2017). In addition, it has been found to partially mediate the relationship between symptom distress and HRQOL during and after adjuvant treatment for breast cancer (Manning-Walsh, 2005).

The cultural environment includes "those beliefs, values and practices that are unique to one's identified ethnic, racial, or religious group." (Dodd et al., 2001) (p. 671). Healthcare system distrust is the individual's negative belief that the provider, organization, and/or

system will not act in the individual's best interest based on their previous experiences or knowledge, whereas a similar concept, mistrust, refers to having general wariness toward someone or something that is not due to prior experiences or information (Mouslim, Johnson, & Dean, 2020). African Americans report greater mistrust in the healthcare system and medical research (Bazargan, Cobb, & Assari, 2021; Smirnoff et al., 2018). A scoping review of the literature showed that healthcare system distrust and mistrust have a negative impact on patient outcomes throughout the breast cancer continuum of care (Mouslim et al., 2020). A recent meta-analysis of trust and health outcomes in 47 studies provided some support that greater trust in one's healthcare professionals is associated with better patient-reported symptom outcomes (Birkhäuser et al., 2017).

Examination of the associations between the physical, social, and cultural environmental contextual factors and symptom distress in patients with breast cancer prior to beginning chemotherapy for breast cancer will contribute to our understanding of the symptom experience and identify risk factors for patients needing supportive care prior to and during treatment. The research questions were:

1. What symptoms are most commonly reported prior to beginning chemotherapy?
2. Does symptom distress prior to beginning chemotherapy differ by race?
3. Do perceived social support, healthcare system distrust, and economic hardship predict symptom distress in women with breast cancer prior to their first chemotherapy treatment?

2. Methods

2.1 Design / Sample

A descriptive, correlational design using a cross-sectional approach was used. The baseline data used in this analysis was from participants in an ongoing multi-site, longitudinal, repeated measures, comparative, mixed-methods study – *SEMOARS: The Symptom Experience, Management and Outcomes According to Race and Social Determinants of Health (SEMOARS Model) during Breast Cancer Chemotherapy* (1R01 MD012245;Rosenzweig, PI) (Nugent et al., 2020). The aims of this study are to describe and compare the symptom experience (symptom incidence, distress, management, and clinical encounter) of Black and White women receiving treatment for breast cancer. The ability to receive the full dose of the prescribed chemotherapy over time was examined and associated with the symptom experience with consideration of social determinants of health. For that study, a convenience sample is used of patients meeting the inclusion criteria of: female, Black or White race, 18 years of age or older, and prescribed chemotherapy for a diagnosis of invasive breast cancer (stages 1–3). Prior chemotherapy, metastatic breast cancer, impaired cognition, inability to understand English, and receiving treatment outside the clinic of consent are exclusion criteria. Eligible participants are approached by the research assistant in the clinic prior to receiving their first chemotherapy treatment. Informed consent is obtained and baseline measures are completed by phone, online, or via paper forms. Ethical approval for the parent study was received from the Institutional Review

Boards of (1) University of Pittsburgh (IRB number 19050299) and (2) University Hospitals Cleveland Medical Center (IRB number 02–18–60C).

Participants with baseline data as of February 22, 2021 were included in the current analysis. G*power 3.1.9.4 was used to determine sample size. When using a power of .80, alpha of .05, effect size of .15, and a number of predictors of 5, a minimum sample size of 92 was calculated.

2.2 Measures

2.2.1 Symptom Distress—The Symptom Distress Scale (SDS) was used to measure the symptom distress (McCorkle & Young, 1978). The SDS consists of a total of 13 items, asking the frequency of 11 symptoms (appearance, concentration, bowel, fatigue, pain, insomnia, appetite, nausea, cough, outlook, and breathing), and the severity for two of these symptoms (nausea and pain). Scores are summed and the total score ranges from 13 to 65, with a higher score indicating higher degrees of symptom distress. In the current study, Cronbach's alpha for the scale was .82.

2.2.2 Social Support—The Interpersonal Support Evaluation List (ISEL) was used to measure social support (Cohen & Hoberman, 1983; Cohen, Mermelstein, Kamarck, & Hoberman, 1985). The ISEL has a total of 40 items with 4 subscales: appraisal support (10 items), tangible support (10 items), self-esteem support (10 items), and belonging support (10 items). The possible answers range from 0 (definitely false) to 3 (definitely true). Each subscale has a total score ranging from 0 to 30, with total score ranges from 0 to 120. Higher scores reflect a higher social support. The internal reliability of the scale was .94, with Cronbach alpha ranging from .72 to .88 for the four subscales.

2.2.3 Health Care System Distrust—The Health Care System Distrust Scale was used (Rose, Peters, Shea, & Armstrong, 2004). The scale consists of 10 items on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). A total score ranges from 10 to 50, with higher scores representing a higher health care system distrust. Cronbach's alpha for the scale was .82.

2.2.4 Economic Hardship—Economic hardship was measured by the Psychological Sense of Economic Hardship (Barrera, Caples, & Tein, 2001). The scale consists of 17 items with 4 subscales: financial strain (2 items), inability to make ends meet (2 items), not enough money for necessities (4 items), and economic adjustments (9 items). Financial strain, inability to make ends meet, and not enough money for necessities are scored on a 5-point scale, and the scores are averaged, ranging from 1 to 5. For the economic adjustments subscale, each participant answered "yes" or "no" with "yes" counted, ranging from 0 to 9. The weighted Z-scores for four subscales were summed to create a single score (Barrera et al., 2001). The internal reliability of each subscale ranged from .82 to .96.

2.3 Statistical Analysis

IBM SPSS Statistics 27 was used for the statistical analysis. Sample characteristics were examined using descriptive statistics. Categorical (nominal, ordinal) variables were reported

as counts and percentages, while continuous (interval, ratio) variables were reported as mean, standard deviation, and range. To identify the effects of social support, health care system distrust, and economic hardship on symptom distress, multiple regression were used while controlling for age and race. Assumptions for multiple regression were tested. Also, a t-test was conducted to test whether symptom distress differed by race.

3. Results

Sample characteristics were presented in Table 1. Participants were, on average, 54.97 years old (range: 28 to 80), Caucasian (63%), non-Hispanic (97.5%), married or living with a partner (54.6%), and employed (57.7%).

The scores for the main study variables of economic hardship, health care system distrust, social support, and symptom distress are presented in Table 2. On average, participants reported having five different symptoms prior to beginning chemotherapy. Symptoms that were most commonly reported prior to starting chemotherapy by the participants were outlook of worry or fear (88.2%), followed by fatigue (77.3%), insomnia (74.8%), pain (52.9%), trouble with concentration (48.7%), cough (33.6%), poor appetite (32.8%), altered bowel pattern (28.6%), nausea (20.2%), change in appearance (18.5%), and trouble breathing (16.8%). Symptom distress was significantly different by race; $t(68.34) = 2.15, p = .035$. Black women ($M = 23.50, SD = 7.68$) reported higher symptoms distress prior to beginning chemotherapy than White women ($M = 20.67, SD = 5.41$).

Correlations among study variables with each subscale are presented in Table 3. Participants with higher symptom distress reported higher levels of economic hardship ($r = .50, p < .001$) and health care system distrust ($r = .25, p = .006$) while having a lower social support ($r = -.37, p < .001$). Young age ($r = -.20, p = .027$) and African-American race ($r = .21, p = .020$) were associated with greater symptom distress. Economic hardship was positively related with health care system distrust ($r = .39, p < .001$) and negatively correlated with social support ($r = -.59, p < .001$). Health care system distrust was negatively correlated with social support ($r = -.45, p < .001$).

The multiple regression analysis was used to assess the effects of economic hardship, health care system distrust, and social support on symptom distress while controlling for age and race (see Table 4). The model explained 26% of variance in symptom distress prior to chemotherapy in breast cancer patients; $F(5, 112) = 9.01, p < .001$. For the covariates, age was significantly associated with symptom distress ($\beta = -.16, p = .048, 95\% \text{ CI: } -.17 \text{ to } -.00$), with younger breast cancer patients having higher symptom distress. However, race was not a significant predictor of symptom distress. While controlling for age and race, greater perceived economic hardship contributed to higher symptom distress ($\beta = .36, p = .001, 95\% \text{ CI: } .34 \text{ to } 1.34$). Health care system distrust and social support did not significantly predict symptom distress.

3. Discussion

This study explored symptom distress at a timepoint along the breast cancer care continuum that is not often the focus in the literature – pre-chemotherapy treatment. Although

symptom distress scores were in the low range, participants in this sample reported a significant symptom burden with having, on average, five symptoms prior to beginning chemotherapy. The finding that more than three-quarters of the sample experienced worry or fear, fatigue, and insomnia and that just over half of the sample reported pain is consistent with the literature (Hu et al., 2021). Anticipating treatment is a stressful experience that may trigger psychological and physical symptoms. In this analysis, Black women reported greater symptom distress than White women when surveyed specifically about appearance, concentration, bowel, fatigue, pain, insomnia, appetite, nausea, cough, outlook, and breathing using the Symptom Distress Scale. This finding is partially supported by Hu et al. (2021), who noted racial differences in symptom reporting before starting chemotherapy. In that study, Black women reported more severe scores than White women for eight symptoms associated with treatment toxicity – weight changes, nausea/vomiting, dry mouth, appetite, bowel movements, taste changes, sore throat/trouble swallowing, and hair loss.

In the correlational analysis, our finding that younger age and lower perceived social support were associated with greater symptom distress is supported by a systematic review that included studies examining distress in breast cancer survivors at various times since diagnosis (Syrowatka et al., 2017). However, in another study, age was not significantly associated with symptom distress as measured with the McCorkle and Young Symptom Distress Scale at baseline, prior to receiving chemotherapy, in a sample of Black women with breast cancer (Yee et al., 2017). Although Black race was weakly associated with greater symptom distress in our analysis, race was not associated with symptom distress, as measured by the McCorkle and Young Symptom Distress Scale, in women with breast cancer in the postsurgical period (Kenefick, 2006).

An important finding was that perceived economic hardship, rather than race, healthcare system distrust, or social support, was a significant predictor of symptom distress in women with breast cancer. Age accounted for a small but statistically significant amount of variance in symptom distress. Similar to Gallups et al. (2017), we found significant moderate correlations between scores for perceived economic hardship and symptom distress.

3.1 Clinical Implications

The symptom experience associated with breast cancer begins early in the care trajectory, often at diagnosis before the start of treatment. Therefore, it is crucial to assess and manage symptoms early. Ratings by patients of symptoms before chemotherapy were associated with stopping chemotherapy early and overall survival time in a study of women with ovarian cancer (Roncolato et al., 2017). Patients should be asked and encouraged to report not only their symptoms, but also the distress associated with the symptoms, prior to treatment initiation to allow for prompt evaluation and support. Symptom management strategies may need to be revised and/or reinforced with the patient to improve symptom distress, with ongoing follow-up on the status of baseline symptoms throughout the cycles of chemotherapy. It is essential for nurses to recognize that symptoms rarely occur in isolation and are often the “tip of the iceberg” for other non-disclosed concerns. As described by Liu et al. (Liu et al., 2021) in a systematic review of qualitative research, women receiving chemotherapy for breast cancer experience distressing physical side effects, and each side

effect exerts multiple, profound effects on other aspects of well-being, such as family and social functioning, psychological status, and quality of life. The symptom experience is complex and individualized, requiring tailored assessment and intervention to enhance self-management and improve functioning and quality of life.

Assessment of the patient's perceived financial hardship prior to beginning chemotherapy is critical to identify those individuals at risk for greater symptom distress and the potential for prescribed chemotherapy intolerance. Clinician recognition and understanding of financial toxicity as an adverse effect of treatment and their willingness to discuss financial aspects of treatment with patients and their family caregivers are essential first steps. Several interventions have been suggested to mitigate financial toxicity, including systematic, routine screening for financial toxicity before beginning treatment and use of financial navigators and social workers for evaluation and counseling (Lentz, Benson, & Kircher, 2019).

In addition, holistic assessment of patients to include neighborhood assessment, social support, and financial worry must be incorporated into clinical practice. No longer can these assessments be considered secondary and deferred to a more convenient time for staff. These factors have real implications for cancer care outcomes and must be assessed in the same manner as physiologic parameters potentially influencing care.

3.2 Limitations

There are several limitations to this study. First, the time frame is limited to the pretreatment phase and cannot be generalized to other points along the trajectory. Second, the cross-sectional, correlational design limits our ability to make any conclusion regarding causality. Third, the Symptom Distress Scale, which was originally designed in 1978 to assess distress associated with "symptoms of concern to patients," may have had too narrow a scope to measure symptom distress in this population (McCorkle & Young, 1978). Finally, only one psychological symptom is included in the measure. A more extensive measure is needed to capture the true extent of psychological symptom distress.

4. Conclusions

Using the Revised Symptom Management Model as a framework, this study examined environmental factors associated with the symptom experience of women with breast cancer prior to initiation of chemotherapy. The findings underscore the importance of comprehensive assessment and management of symptom distress prior to initiating chemotherapy, extending beyond checklist notations of symptom characteristics to a discussion of the patient's perceived economic hardship as a result of cancer treatment. In addition, early triage of patients at risk for financial toxicity will hopefully mitigate downstream effects on symptom distress, adherence to treatment, and HRQOL.

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Highlights

- Although symptom distress scores were in the low range, participants in this sample reported a significant symptom burden with having, on average, five symptoms prior to beginning chemotherapy for breast cancer.
- Black women reported higher symptoms distress prior to beginning chemotherapy than White women.
- Perceived economic hardship, rather than race, healthcare system distrust, or social support, was a significant predictor of symptom distress in women with breast cancer.
- Assessment of the patient's perceived financial hardship prior to beginning chemotherapy is critical to identify those individuals at risk for greater symptom distress and the potential for prescribed chemotherapy intolerance.

Table 1.

Sample characteristics (N=119)

Sample Characteristics	<i>M (SD)</i>	<i>n (%)</i>	Range
Age (years)	54.97 (12.41)		28–80
Race			
Black or African-American		44 (37.0)	
White		75 (63.0)	
Ethnicity			
Non-Hispanic		116 (97.5)	
Do not know		3 (2.5)	
Marital Status			
Never married		22 (18.5)	
Married/ living with partner		65 (54.6)	
Separated/Divorced		25 (21.0)	
Other		7 (5.9)	
Educational Level			
High school or less		26 (22.7)	
College		50 (43.5)	
Graduate school		29 (25.3)	
Other		10 (8.7)	
Employment Status			
Full-time employed		58 (49.2)	
Part-time employed		10 (8.5)	
Retired		27 (22.8)	
Other		13 (19.4)	

Table 2.

Study variables

Study Variables	<i>M (SD)</i>	Range	Possible Range
Economic Hardship	-.01 (2.78)	-2.58 – 8.90	
Financial strain	<.01 (.73)	-.35 – 2.94	
Inability to make end meet	<.01 (.95)	-1.02 – 2.34	
Not enough money for necessities	<.01 (.73)	-.74 – 2.73	
Adjustment/Cutbacks	<.01 (.76)	-.47 – 2.73	
Health Care System Distrust	22.48 (5.97)	11 – 39	10 – 50
Social Support	99.69 (16.39)	48 – 120	0 – 120
Appraisal	26.10 (5.00)	11 – 30	0 – 30
Tangible	25.18 (5.18)	8 – 30	0 – 30
Self-esteem	22.94 (3.90)	10 – 30	0 – 30
Belongings	25.47 (4.51)	11 – 30	0 – 30
Symptom Distress	21.71 (6.46)	13 – 43	13 – 65

Note. Economic hardship: weighted z-score

Table 3.

Correlations among study variables and subscales

	1	2	3	4	5	6	7	8	9	10	11	12
1. EH Total score	-	.85**	.92**	.87**	.86**	.39**	-.59**	-.50**	-.61**	-.43**	-.49**	-.50**
2. EH: financial strain		-	.67**	.63**	.71**	.38**	-.48**	-.38**	-.53**	-.34**	-.43**	.52**
3. EH: inability to make ends meet			-	.79**	.71**	.32**	-.48**	-.43**	-.48**	-.39**	-.38**	.36**
4. EH: not enough money for necessities				-	.61**	.42**	-.49**	-.39**	-.52**	-.37**	-.45**	.31*
5. EH: adjustments					-	.26*	-.57**	-.53**	-.58**	-.37**	-.48**	.55**
6. Health Care System Distrust						-	-.45**	-.29*	-.40**	-.45**	-.45**	.25*
7. Social support Total Score							-	.87**	.89**	.83**	.92**	-.37**
8. Social Support: appraisal								-	.68**	.62**	.74**	-.35**
9. Social Support: tangible									-	.65**	.79**	-.36**
10. Social Support: self-esteem										-	.73**	-.24*
11. Social Support: belonging											-	-.32**
12. Symptom distress												-

Note. EH: Economic hardship;

* $p < .01$,

** $p < .001$

Table 4

Effects of economic hardship, health care system distrust, and social support on symptom distress

	B	SE B	β	<i>t</i>	<i>p</i>	95% CI
(constant)	31.82	5.99		5.31	<.001	19.95 to 43.68
Age	-.08	.04	-.16	-2.00	.048	-.17 to -.00
Race	.66	1.18	.05	.56	.578	-1.68 to 3.00
Economic Hardship	.84	.25	.36	3.34	.001	.34 to 1.34
Health Care System Distrust	.02	.10	.02	.24	.814	-.17 to .22
Social Support	-.06	.04	-.15	-1.46	.147	-.15 to .02

Note. Adjusted R^2 = .26, $F(5, 112) = 9.01$, $p < .001$

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