HHS Public Access

Author manuscript

Clin J Oncol Nurs. Author manuscript; available in PMC 2024 January 18.

Published in final edited form as:

Clin J Oncol Nurs. 2022 April 01; 26(2): 155–164. doi:10.1188/22.CJON.155-164.

Comparing fatigue, loneliness, daytime sleepiness, and stress in younger and older breast cancer survivors: a cross sectional analysis

Eunju Choi, PhD, MSN, RN[1], **Ashley Henneghan, PhD, RN, FAAN**[2,*]

[1]School of Nursing, University of Texas at Austin,1710 Red River St, Austin, TX, 78712, USA.

[2]School of Nursing, Department of Oncology, Dell Medical School, University of Texas at Austin, 1710 Red River St, Austin, TX, 78712, USA.

Abstract

Background—Breast cancer treatment can negatively affect breast cancer survivors (BCS)' psychosocial outcomes. The psychosocial outcomes present differently between younger BCS and older BCS.

Objectives—The objective of this study is 1) to compare the psychosocial outcomes between younger BCS and older BCS and 2) to identify the predictors of loneliness in younger BCS.

Methods—This was a cross-sectional descriptive study of 90 women with a history of breast cancer (non-metastatic) who completed chemotherapy 6 months to 10 years prior. Data collection included sociodemographic and clinical characteristics and self-reported measures of psychosocial outcomes (fatigue, depressive symptoms, anxiety, loneliness, daytime sleepiness, and stress). Participants were dichotomized into younger BCS (<50 years old) and older BCS (50 years of age or more). Descriptive statistics, bivariate correlations, and multiple regression were examined.

Findings—Younger BCS reported greater fatigue, loneliness, daytime sleepiness, and stress than older BCS. No differences between the groups were found in depressive symptoms, or anxiety. In the younger BCS, having children and less time since chemotherapy were significant predictors of less loneliness, whereas there were no significant predictors of loneliness in older BCS. Nurses and clinicians should consider these factors in breast cancer survivorship care planning.

[*]**Corresponding author**: Ashley Henneghan, PhD, RN, FAAN, Address: School of Nursing, Department of Oncology, Dell Medical School, University of Texas at Austin, 1710 Red River St, Austin, TX, 78712, Phone: 512-471-5412, ahenneghan@utexas.edu.

Author's contributions. All authors contributed to the study conception and design. AMH was responsible for all aspects of the study conceptualization, design, execution, and data reporting. EC conducted the data analyses. The first draft of the manuscript was written by AH and both AH and EC participated in revising all previous versions of the manuscript. AH and EC read and approved the final manuscript.

Conflict of Interest. The authors have no conflicts of interest disclose.

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

Code availability. the Statistical Package for Social Sciences (SPSS version 21.0; SPSS Inc., Chicago, IL)

Ethics Approval. This study was performed in line with the principles of the Declaration of Helsinki. All study procedures were approved by the University of Texas at Austin IRB (# 2015-10-39).

Consent to Participate. Informed consent was obtained from all individual participants included in the study.

Consent to Publish. All participants signed informed consent regarding publishing their data.

Keywords

Loneliness; psychosocial oncology; breast neoplasms; cancer survivors

BACKGROUND

Breast cancer (BC) diagnostics and treatments have improved and there are now more than 3.1 million BC survivors (BCS) in the United States (American Cancer Society, 2019). The average age at BC diagnosis is 62 years old; however, 20% of those newly diagnosed with BC are under 50 years old (American Cancer Society, 2019). In younger women, delayed diagnoses (Howlader et al., 2016) are common and often accompanied by more advanced tumors and aggressive treatments, which can lead to severe side effects (Menes et al., 2020). Psychosocial and physical late or long-term effects of BC treatment can negatively affect BCS' quality of life for years after adjuvant treatment ends (Assogba et al., 2020). Prior research suggests that persistent late effects of BC treatment present differently, sometimes more severely, in younger BCS (y-BCS) compared to older BCS (o-BCS) (Corey et al., 2020; Menes et al., 2020; Roine et al., 2021).

"Young" is operationalized differently across studies of BCS— sometimes less than 50 years of age (Roine et al., 2021) and other times less than 45 years of age (Assogba et al., 2020; Menes et al., 2020). Younger women are at a different developmental phase than older women, thus BC treatment and its' effects likely impact them in a different way than older women. y-BCS are actively developing professionally or are at the peak of their careers while, women 50 or more are likely at later stages in their careers. Furthermore, y-BCS may be coping with fertility issues (Assogba et al., 2020). While these age and cohort generalizations do not apply to all women, they represent "typical life courses".

Psychosocial symptoms are associated with poor emotional well-being and quality of life in BCS(Gold et al., 2016; Jiayuan et al., 2018; Oh & Cho, 2020). A prior study described clinical levels of anxiety in 19% of cancer survivors and clinical levels of depression in 11% of cancer survivors (Milligan et al., 2018). Subclinical symptoms of anxiety and depression were in 30% and 19% of cancer patients, respectively (Milligan et al., 2018), with worse anxiety and depressive symptoms in women with BC (Crane et al., 2019). 36.4% of BCS reported moderate to severe fatigue at 2 years after completion of chemotherapy (Kelly et al., 2020). BCS may have different psychosocial experience of BC diagnosis and treatment across the lifespan (Roine et al., 2021). Compared to o-BCS (51 to 75 years), y-BCS (32 to 50 years) have reported greater depression, anxiety, stress, fatigue, menopausal concerns, fertility concerns, and poorer cognitive function (Banerjee & Tsiapali, 2016; Goldblatt et al., 2016; Levkovich et al., 2018; Roine et al., 2021).

BCS have reported loneliness, or the perception of dissatisfaction with the quality of relationships and social isolation (Fanakidou et al., 2018; Marroquín et al., 2016; Tabrizi et al., 2016), but there is little research on loneliness within the y-BCS population. One prior study reported that y-BCS with breast reconstruction reported greater level of loneliness than y-BCS without breast reconstruction, which led to lower quality of life (Fanakidou et al., 2018). In cancer patients, it has been reported that loneliness has negative relationships

with health outcomes including cancer-related symptoms (Adams et al., 2018; Jaremka et al., 2013; Maguire et al., 2017), and can mediate the relationships between social constraints and cancer-related symptoms (e.g., pain, fatigue, sleep disturbance, and cognitive concerns) (Adams et al., 2018). y-BCS may be especially vulnerable to loneliness since they face many more years of survivorship than o-BCS.

In this study, the aim of this study is to 1) compare the severity of psychosocial outcomes (loneliness, perceived stress, depressive symptoms, anxiety, fatigue, and daytime sleepiness,) between y-BCS (< 50 years of age) and o-BCS (50 years of age or >) who completed chemotherapy 6 months to 10 years prior and 2) identify the predictors of loneliness for y-BCS.

METHODS

Study setting and design.

A cross-sectional descriptive study design was used. Participants were recruited through the local chapter of the Oncology Nursing Society, community oncology centers, a local BC resource center, and the Army of Women database (Susan Love Foundation, California). The University of Texas at Austin Institutional Review Board approved all research procedures (# 2015-10-39). Verbal and written consent were provided by all participants.

Participants.

Women were eligible if they were between 21 to 65 years old, had been diagnosed with stage I to III non-inflammatory BC, had completed chemotherapy treatment 6 months to 10 years before enrollment in this study, and were able to understand and read English, of all races and ethnicities. Interested participants contacted the research office. Women were excluded if they were on systemic steroids in the previous month, diagnosed with inflammatory diseases, had a pre-cancer history of sleep disorders, a verbal learning disability, severe cognitive impairments, or other psychiatric or neurological disorders that could affect cognitive function (clinically diagnosed). These exclusion criteria were chosen based on the parent study which aimed to identify modifiable contributors to inflammation and cognitive outcomes in BCS (Henneghan et al., 2018).

Measures

Sociodemographic and clinical characteristics.—The sociodemographic factors considered for this study were age, education, race/ethnicity, marital status, having children, income, and employment status. The income variable was dichotomized based on the median annual household income for the county where the participants resided (Travis County, 2021). The clinical factors were type and stage of BC, time since completion of chemotherapy, time since BC diagnosis, treatment modalities, menopausal status, comorbidities, current hormonal therapy, and current antidepressant therapy. These were all collected though a self-report questionnaire.

Anxiety, depression, and fatigue.—Anxiety, depressive, and fatigue symptoms were measured with the Patient Reported Outcome Measurement Information System (PROMIS)

Emotional Distress-Anxiety-Short Form (SF) 8a, PROMIS Emotional Distress -Depression-SF 8a, and PROMIS Fatigue-SF 8a (National Institutes of Health, 2018). Each scale is made up of 8 items, and total score range can be between 8 and 40. Higher score indicates greater symptoms. Raw scores were analyzed in this study.

Loneliness.—Loneliness was evaluated with the University of California, Los Angeles -Loneliness Scale-revised (UCLA-R) (Russell, 1996). It consists of 20 items with higher scores suggesting greater loneliness. The total score was used in this study and can range from 20 to 80.

Daytime sleepiness.—The Epworth Sleepiness Scale (ESS) was utilized to evaluate the experience of sleepiness during daytime (Johns, 1991). It consists of 8 items with a 4-ponit Likert scale (0-3). The participants were asked to measure their tendency of having fallen asleep or dozed off. The total score can range from 0 to 24.

Perceived stress.—Perceived stress was evaluated using the Perceived Stress Scale (Cohen et al., 1983), which consists of 10 items. The total score can range from 0 to 40, with a higher score suggesting greater perceived stress.

Data analysis

Study participants were dichotomized into 2 groups based on mean age and previous studies —those younger than 50 (y-BCS) and those 50 years or older (o-BCS). Sociodemographic and clinical characteristics were described for each group using frequencies/percentages for discrete variables and means and standard deviations for continuous variables. Group differences in sociodemographic and clinical characteristics and psychosocial outcomes were evaluated using chi-square or independent t-tests depending on the level of measurement. Correlations were examined between sociodemographic and clinical characteristics and the psychosocial outcomes that differed between two groups, to identify potential predictors of these outcomes in multiple regression models. Correlations that were significant at the $p < .10$ level were considered for multiple regression analyses (Kim et al., 2017; Wang et al., 2020). The Statistical Package for Social Sciences version 21.0 (IBM Corp., 2012) was used to analyze data, and a two-sided $p < 0.05$ was chosen for statistical significance.

RESULTS

Demographic and clinical characteristics.

Demographic and clinical variables for the samples are displayed in Table 1. The groups were similar in regards to minority status, education, having a partner, having children, employment status, annual income, BC type, stage of BC, hormone receptor status, HER-2 receptor status, time since chemotherapy, and treatment modalities. Significant differences were found between the groups in some variables. y-BCS were closer to their BC diagnosis and end of chemotherapy treatment, more likely to have double mastectomy, more likely to have selective estrogen receptor modulator, less likely to have comorbid conditions, and more likely to be premenopausal than o-BCS.

Psychosocial outcomes differences.

y-BCS reported significantly greater fatigue, loneliness, daytime sleepiness, and perceived stress than o-BCS. No statistical differences were found in feelings of depression or anxiety between y-BCS and o-BCS (see Table 1).

Correlations between psychosocial outcomes and clinical variables.

Table 2 displays the correlations among demographic and clinical variables and psychosocial outcomes that were higher in the y-BCS group (fatigue, loneliness, daytime sleepiness, and stress). Having no children, having annual income less than $100,000, having greater stress, having greater fatigue, and having greater loneliness were all correlated. Greater daytime sleepiness, fatigue, and stress were also correlated. In the o-BCS group, more comorbidities, greater loneliness, greater daytime sleepiness, greater stress and greater fatigue were correlated. Greater comorbidities, lack of employment, and greater daytime sleepiness were also correlated. See Supplementary Table 1 for correlation matrix for the o-BCS group.

Predictors of loneliness.

The correlation analyses revealed significant, or close to significant relationships between having children, annual income, and time since chemotherapy, and loneliness, so these variables were used as predictors in the multiple regression model with loneliness as the dependent variable in the y-BCS group (see Table 3). These three predictors explained 29.8% of the variance in loneliness. y-BCS who do not have children, and had more time since the end of chemotherapy had greater loneliness. In o-BCS, annual income and having comorbidities were identified as predictors in the correlation analyses (Supplementary Table 1) entered into the regression. However, the model was not significant (Supplementary Table 2).

Post Hoc Analyses

Considering that medications can impact psychosocial outcomes in BCS (Aggeli et al., 2021), differences in the psychosocial outcomes were explored for those on hormonal therapies and those not on hormone therapies in y-BCS (N=47). No significant differences between the groups were found (Supplementary Table 3). Differences in the psychosocial outcomes for those on antidepressant therapies and those not on antidepressant therapies were also explored in y-BCS, and no group differences were found (Supplementary Table 4).

DISCUSSION

The present study suggests that y-BCS reported higher levels of fatigue, loneliness, daytime sleepiness and perceived stress compared to o-BCS, and that not having children and more time since chemotherapy may be risk factors for greater loneliness in y-BCS. These findings are congruent with a previous study that have reported that y-BCS have distinct psychosocial concerns (Assogba et al., 2020) and that y-BCS report sharper deterioration and slower recovery in quality of life compared with o-BCS (Roine et al., 2021). There is little research on loneliness in y-BCS, so these study findings add to an understudied, yet clinically important topic.

In this sample, y-BCS and o-BCS were similar in terms of their BC history with the exception of time since BC diagnosis and chemotherapy completion. More y-BCS who were six to 12 months from their chemotherapy completion than o-BCS. It is possible that y-BCS are more likely to engage with, or are eligible for enrollment in, research studies sooner after their treatment ends than o-BCS. Differences in clinical trial engagement of cancer patients by age group have been previously reported with lower rates of engagement in older adults (Unger et al., 2016). y-BCS in this sample were also more likely to be pre-menopausal and had lower rates of comorbidities, which is expected since natural menopause (Perry, 2019) and comorbidity incidences (Rambod et al., 2020) are largely functions of aging.

Differences in feelings of anxiety, depressive symptoms were not found between y-BCS and o-BCS in this sample, which is different than a prior study has reported that y-BCS have higher distress than o-BCS (Assogba et al., 2020). These differences could be explained by differences in ages used to dichotomize y-BCS and o-BCS. Assogba et al. (2020) defined y-BCS aged 45 years or younger when defining y-BCS, and the present study used a cut off of 50 years of age. Future research should focus on determining the best age, or other functional indicator(s), to delineate “young” from “old”.

y-BCS in this sample were more likely to describe greater fatigue, daytime sleepiness, perceived stress and loneliness. Going through BC treatment is challenging at any age, yet the present study suggests that y-BCS have higher levels of perceived stress than o-BCS. Campbell-Enns et al. (2017) suggest that BC diagnoses are more shocking, or stressful, for younger patients than older patients, who are coping with the realities of aging and approach diagnoses in a more matter of fact way. Greater levels of stress found in younger BCS may be related to fertility concerns, childcare, family demands, and/or worries about income that younger survivors are more likely to face than older survivors (Assogba et al., 2020; Lundquist et al., 2020; Nolan et al., 2018).

y-BCS in this study also had more loneliness than o-BCS. Chronic loneliness is now considered an epidemic in the general population (Holt-Lunstad, 2018). Cancer survivors, in general, experience a unique type of loneliness, which resulting from cancer experiences associated with cancer patients or survivors’ cancer-related social expectations (Adams et al., 2017). BCS’ draw on family and intimate partners for social support and it has been suggested that intimate relationships are strained more for y-BCS than o-BCS (Campbell - Enns & Woodgate, 2017), which could help explain the why having no children was a significant predictor of loneliness in this study. It was also found that loneliness severity worsens as time after chemotherapy completion increases in y-BCS. This may be a function of decreasing in social support after cancer treatment ends, and/or related to feeling different than peers. High levels of social isolation from their peer and social groups have been reported by young survivors compared to older survivors (Campbell - Enns & Woodgate, 2017; Mishra et al., 2018). Importantly, social isolation has been associated with poorer long-term survival and quality of life in BCS (Hinzey et al., 2016). Future prospective studies should evaluate the nature of the relationship between loneliness and social support in BCS because while loneliness and social support may be thought to be negative and positive views of the same concept, they are likely measuring different, perhaps complementary, aspects of the same concept.

Bivariate correlation analyses in the present study demonstrated positive associations among psychosocial symptoms such as fatigue, loneliness, and perceived stress in both the y-BCS and the o-BCS. Psychosocial symptoms including loneliness, fatigue, perceived stress, depression, and anxiety have been previously described as a “symptom cluster” in BCS (Lee et al., 2020; Levkovich et al., 2018). Symptom clusters are likely to have greater negative cumulative effects on people with cancer than individual symptoms (Lee et al., 2020). Therefore, future studies should investigate how symptoms clusters occur and what the impact of the symptom clusters in y-BCS.

Limitations

Limitations to the current study should be considered. A cross sectional design was used, and it is possible that differences in psychosocial symptoms (perceived stress, fatigue, and loneliness) between y-BCS and o-BCS change over time. The external validity is limited to BCS who had been treated with chemotherapy and willing to participate in a research study (i.e., selection bias). The majority of the sample was also White, non-Hispanic and well-educated, further limiting the study’s external validity. Psychosocial symptoms could be explained by clinical variables not collected in the present study such as family history, cancer recurrence, or treatment complications, fertility concerns, family dynamics (e.g., whether BCS live with their children; number of children, ages of children), or support group/therapy status. These variables should be considered in future studies of loneliness in y-BCS. This present study also lacks a control group in this study, limiting the interpretations of the findings. The self-reported psychosocial symptoms are subject to recall bias and may not adequately capture psychosocial consideration for BCS. In addition, dichotomizing at 50 years old potentially distills out nuances in different life stages in people in their 20s, 30s, and 40s, and their effects on the study outcomes.

Implications for Nursing

Nurses provide psychosocial support and assess psychosocial symptoms of BCS across the cancer trajectory. The present study highlights the importance of considering age as a factor when nurses develop and provide survivorship care to BCS. Nurses need to be aware that y-BCS who are further from the time of completing chemotherapy, or those who do not have children may be at greater risk for loneliness. As time passes after treatment, formal support systems (e.g., oncology care team, regular clinic visits) wane, and loneliness may set in which can reduce quality of life. Referral to community organizations for support groups with other survivors could aid in this transition from treatment to survivorship. This is important since y-BCS face many years of survivorship. Oncology nurses working with BCS should also consider clinical assessment and monitoring of the multiple psychosocial symptoms which may present, or cluster, together. These include stress, fatigue, and loneliness, in y-BCS, and loneliness, stress, daytime sleepiness, and fatigue in o-BCS. Survivorship programs that target multiple psychosocial symptoms simultaneously may advance quality of live in this population.

Conclusion

The findings of this study suggest that y-BCS may have worse psychosocial symptoms (i.e., fatigue, loneliness, daytime sleepiness, and perceived stress) than o-BCS. The psychosocial symptoms were interrelated, suggesting they may occur as a symptom cluster. Future research should prospectively examine these symptom clusters in y-BCS. Having children and more time since completion of chemotherapy may be protective against developing loneliness in y-BCS, and should be considered in clinical assessments of BCS.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgement.

The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. Ashley M. Henneghan was supported by the Doctoral Degree Scholarship in Cancer Nursing, DSCN-15-072-01 from the American Cancer Society. The research team would like to thank both the Breast Cancer Resource Center (Austin, TX) and Texas Oncology for their support and assistance recruiting participants for this study.

Funding statements.

Research reported in this publication was supported by National Institute of Nursing Research of the National Institutes of Health under award number F31NR015707 (A.M.H.)

References

Adams RN, Mosher CE, Rand KL, Hirsh AT, Monahan PO, Abonour R, & Kroenke K (2017). The cancer loneliness scale and cancer-related negative social expectations scale: development and validation. Quality of Life Research, 26(7), 1901–1913. 10.1007/s11136-017-1518-4 [PubMed: 28236266]

Adams RN, Mosher CE, Winger JG, Abonour R, & Kroenke K (2018). Cancer-related loneliness mediates the relationships between social constraints and symptoms among cancer patients. Journal of Behavioral Medicine, 41(2), 243–252. 10.1007/s10865-017-9892-5 [PubMed: 28983735]

Aggeli P, Fasoi G, Zartaloudi A, Kontzoglou K, Kontos M, Konstantinidis T, Kalemikerakis I, & Govina O (2021). Posttreatment anxiety, depression, sleep disorders, and associated factors in women who survive breast cancer. Asia-Pacific Journal of Oncology Nursing, 8(2), 147–155. 10.4103/apjon.apjon_65_20 [PubMed: 33688563]

American Cancer Society. (2019). Breast cancer facts & figures 2019-2020. https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/breast-cancer-facts-and-figures/breast-cancer-facts-and-figures-2019-2020.pdf

Assogba ELF, Mamguem Kamga A, Costaz H, Jankowski C, Dumas A, Roignot P, Jolimoy G, Coutant C, Arveux P, & Dabakuyo-Yonli TS (2020). What are young women living conditions after breast cancer? Health-related quality of life, xexual and fertility issues, professional reinsertion. Cancers, 12(6), 1564. 10.3390/cancers12061564 [PubMed: 32545701]

Banerjee R, & Tsiapali E (2016). Occurrence and recall rates of fertility discussions with young breast cancer patients. Supportive Care in Cancer, 24(1), 163–171. 10.1007/s00520-015-2758-x [PubMed: 25967235]

Campbell - Enns HJ, & Woodgate RL (2017). The psychosocial experiences of women with breast cancer across the lifespan: a systematic review. Psychooncology, 26(11), 1711–1721. 10.1002/pon.4281 [PubMed: 27648726]

Cohen S, Kamarck T, & Mermelstein R (1983). A global measure of perceived stress. Journal of Health and Social Behavior, 24(4), 385–396. [PubMed: 6668417]

Corey B, Smania MA, Spotts H, & Andersen M (2020). Young women with breast cancer: Treatment, care, and nursing implications. Clinical Journal of Oncology Nursing, 24(2), 139–147. 10.1188/20.CJON.139-147 [PubMed: 32196004]

Crane TE, Badger TA, Sikorskii A, Segrin C, Chiu-Hsieh H, & Rosenfeld AG (2019). Trajectories of depression and anxiety in Latina breast cancer survivors. Oncology Nursing Forum, 46(2), 217–227. 10.1188/19.ONF.217-227 [PubMed: 30767959]

Fanakidou I, Zyga S, Alikari V, Tsironi M, Stathoulis J, & Theofilou P (2018). Mental health, loneliness, and illness perception outcomes in quality of life among young breast cancer patients after mastectomy: The role of breast reconstruction. Quality of Life Research, 27(2), 539–543. 10.1007/s11136-017-1735-x [PubMed: 29119452]

Gold M, Dunn LB, Phoenix B, Paul SM, Hamolsky D, Levine JD, & Miaskowski C (2016). Co-occurrence of anxiety and depressive symptoms following breast cancer surgery and its impact on quality of life. European Journal of Oncology Nursing, 20, 97–105. 10.1016/j.ejon.2015.06.003 [PubMed: 26187660]

Goldblatt H, Cohen M, & Azaiza F (2016). Expression of emotions related to the experience of cancer in younger and older Arab breast cancer survivors. Ethnicity & Health, 21(6), 564–577. 10.1080/13557858.2016.1143089 [PubMed: 26895181]

Henneghan AM, Carter P, Stuifbergan A, Parmelee B, & Kesler S (2018). Relationships between self-reported sleep quality components and cognitive functioning in breast cancer survivors up to 10 years following chemotherapy. Psychooncology, 27(8), 1937–1943. 10.1002/pon.4745 [PubMed: 29683228]

Hinzey A, Gaudier-Diaz MM, Lustberg MB, & DeVries AC (2016). Breast cancer and social environment: getting by with a little help from our friends. Breast Cancer Research, 18(1), 54. 10.1186/s13058-016-0700-x [PubMed: 27225892]

Holt-Lunstad J (2018). Why social relationships are important for physical health: A systems approach to understanding and modifying risk and protection. Annual Review of Psychology, 69(1), 437–458. 10.1146/annurev-psych-122216-011902

Howlader N, Noone A, Krapcho M, Miller D, Bishop K, Altekruse S, Kosary C, Yu M, Ruhl J, Tatalovich Z, Mariotto A, Lewis DR, Chen HS, Feuer EJ, & Cronin KA (2016). SEER cancer statistics review, 1975-2013. https://seer.cancer.gov/archive/csr/1975_2013/

Jaremka LM, Fagundes CP, Glaser R, Bennett JM, Malarkey WB, & Kiecolt-Glaser JK (2013). Loneliness predicts pain, depression, and fatigue: understanding the role of immune dysregulation. Psychoneuroendocrinology, 38(8), 1310–1317. 10.1016/j.psyneuen.2012.11.016 [PubMed: 23273678]

Jiayuan Z, Yuqiu Z, Ziwei F, Yong X, & Guangchun Z (2018). Longitudinal trends in anxiety, depression, and quality of life during different intermittent periods of adjuvant breast cancer chemotherapy. Cancer Nursing, 41(1), 62–68. 10.1097/NCC.0000000000000451 [PubMed: 27922916]

Johns MW (1991). A new method for measuring daytime sleepiness: the Epworth sleepiness scale. sleep, 14(6), 540–545. [PubMed: 1798888]

Kelly DL, Yang GS, Starkweather AR, Siangphoe U, Alexander-Delpech P, & Lyon DE (2020). Relationships among fatigue, anxiety, depression, and pain and health-promoting lifestyle behaviors in women with early-stage breast cancer. Cancer Nursing, 43(2), 134–146. 10.1097/NCC.0000000000000676 [PubMed: 30543571]

Kim SH, Seong DH, Yoon SM, Choi YD, Choi E, & Song H (2017). Predictors of health-related quality of life in Korean prostate cancer patients receiving androgen deprivation therapy. European Journal of Oncology Nursing, 30, 84–90. 10.1016/j.ejon.2017.08.009 [PubMed: 29031319]

Lee LJ, Ross A, Griffith K, Jensen RE, & Wallen GR (2020). Symptom clusters in breast cancer survivors: A latent class profile analysis. Oncology Nursing Forum, 47(1), 89–100. 10.1188/20.ONF.89-100 [PubMed: 31845918]

Levkovich I, Cohen M, Alon S, Kuchuk I, Nissenbaum B, Evron E, Pollack S, & Fried G (2018). Symptom cluster of emotional distress, fatigue and cognitive difficulties among young and older breast cancer survivors: the mediating role of subjective stress. Journal of geriatric oncology, 9(5), 469–475. [PubMed: 29759914]

Lundquist DM, Berry DL, Boltz M, DeSanto-Madeya SA, & Grace PJ (2020). I'm still mom: Young mothers living with advanced breast cancer. Oncology Nursing Forum, 47(4), 405–414. 10.1188/20.ONF.405-414 [PubMed: 32555556]

Maguire R, Hanly P, Balfe M, Timmons A, Hyland P, O'Sullivan E, Butow P, & Sharp L (2017). Worry in head and neck cancer caregivers: The role of survivor factors, care-related stressors, and loneliness in predicting fear of recurrence. Nursing Research, 66(4), 295–303. 10.1097/NNR.0000000000000223 [PubMed: 28654567]

Marroquín B, Czamanski-Cohen J, Weihs K, & Stanton A (2016). Implicit loneliness, emotion regulation, and depressive symptoms in breast cancer survivors. Journal of Behavioral Medicine, 39(5), 832–844. 10.1007/s10865-016-9751-9 [PubMed: 27287618]

Menes TS, Sella T, & Chodick G (2020). Time to cancer diagnosis in young women presenting to surgeons with breast-related symptoms: A population-based cohort study. Journal of Women's Health (15409996), 29(4), 493–502. 10.1089/jwh.2019.7967

Milligan F, Martinez F, Aal SHMA, Ahmed SA, Joby B, Matalam JS, Nair SS, De Leon Maxion A, Sayed S, & Melepeedikayil SS (2018). Assessing anxiety and depression in cancer patients. British Journal of Nursing, 27(10), S18–S23. 10.12968/bjon.2018.27.10.S18

Mishra SI, Rishel Brakey H, Kano M, Nedjat-Haiem FR, & Sussman AL (2018). Health related quality of life during cancer treatment: Perspectives of young adult (23–39 years) cancer survivors and primary informal caregivers. European Journal of Oncology Nursing, 32, 48–54. 10.1016/j.ejon.2017.11.007 [PubMed: 29353632]

National Institutes of Health. (2018). Patient-Reported Outcomes Measurement Information System (PROMIS). http://www.nihpromis.org/

Nolan TS, Frank J, Gisiger-Camata S, & Meneses K (2018). An integrative review of psychosocial concerns among young African American breast cancer survivors. Cancer Nursing, 41(2), 139–155. 10.1097/NCC.0000000000000477 [PubMed: 28221214]

Oh P-J, & Cho J-R (2020). Changes in fatigue, psychological distress, and quality of life after chemotherapy in women with breast cancer: A prospective study. Cancer Nursing, 43(1), E54–E60. 10.1097/NCC.0000000000000689 [PubMed: 30601265]

Perry M (2019). Menopausal symptoms and hormone replacement therapy. Journal of Community Nursing, 33(3), 61–66.

Rambod M, Ghodsbin F, & Moradi A (2020). The association between body mass index and comorbidity, quality of life, and cognitive function in the elderly population. International Journal of Community Based Nursing & Midwifery, 8(1), 45–54. 10.30476/IJCBNM.2019.81677.0 [PubMed: 32039279]

Roine E, Sintonen H, Kellokumpu-Lehtinen PL, Penttinen H, Utriainen M, Vehmanen L, Huovinen R, Kautiainen H, Nikander R, Blomqvist C, Hakamies-Blomqvist L, & Saarto T (2021). Long-term health-related quality of life of breast cancer survivors remains impaired compared to the age-matched general population especially in young women. Results from the prospective controlled BREX exercise study. Breast, 59, 110–116. 10.1016/j.breast.2021.06.012 [PubMed: 34225091]

Russell DW (1996). UCLA Loneliness Scale (Version 3): reliability, validity, and factor structure. Journal of Personality Assessment, 66(1), 20–40. 10.1207/s15327752jpa6601_2 [PubMed: 8576833]

Tabrizi FM, Radfar M, & Taei Z (2016). Effects of supportive-expressive discussion groups on loneliness, hope and quality of life in breast cancer survivors: a randomized control trial. Psychooncology, 25(9), 1057–1063. 10.1002/pon.4169 [PubMed: 27302306]

Travis County. (2021). Income eligibility. https://www.traviscountytx.gov/health-human-services/cdbg/income-eligibility

Unger JM, Cook E, Tai E, & Bleyer A (2016). The role of clinical trial participation in cancer research: Barriers, evidence, and strategies. American Society of Clinical Oncology Educational Book, 35, 185–198. 10.14694/EDBK_156686 [PubMed: 27249699]

Wang G, Sarkar A, Carbonetto P, & Stephens M (2020). A simple new approach to variable selection in regression, with application to genetic fine-mapping. Journal of The Royal Statistical Soceity: Series B, 82(5), 1273–1300. 10.1111/rssb.12388

Implications for Practice

1. Considering age as a factor when nurses develop and provide survivorship care to breast cancer survivors is important.

2. Nurses need to be aware that younger breast cancer survivors who are further from the time of completing chemotherapy, or those who do not have children may be at greater risk for loneliness.

3. Nurses working with breast cancer survivors should consider clinical assessment and monitoring of the multiple psychosocial symptoms which may present, or cluster, together.

Table 1.

Demographic and clinical variables of the study participants grouped by younger breast cancer survivors and older breast cancer survivors (N = 90)

Characteristics	Age < 50 (n = 48)		Age ≥ 50 (n = 42)		Effect size	*p*
	N (%)	Means (SD)	N (%)	Means (SD)		
Age		41.96 (6.39)		56.31 (4.19)	2.66[b]	<0.001
Minority status						
Minority	9 (18.8)		6 (14.3)		0.060[a]	0.778
Non-minority	39 (81.3)		36 (85.7)			
Race/Ethnicity						
Non-Hispanic white	39 (81.3)		36 (85.7)		0.223[c]	0.213
Hispanic white	3 (6.2)		2 (4.8)			
African American	2 (4.2)		4 (9.5)			
Asian	3 (6.2)		0			
Other	1 (2.1)		0			
Education (years)		16.83 (2.13)		16.48 (2.23)	0.166[b]	0.440
Having a partner (n = 89)					0.103[a]	
Yes	29 (61.7)		30 (71.4)			0.375
No	18 (38.3)		12 (28.6)			
Having children						
Yes	27 (56.3)		30 (71.4)		0.157[a]	0.188
No	21 (43.7)		12 (28.6)			
Employment status						
Not employed	2 (4.2)		6 (14.3)		0.216[c]	0.122
Part time	10 (20.8)		12 (28.6)			
Full time	36 (75.0)		24 (57.1)			
Annual household income (n = 88)						
< $100K	26 (55.3)		18 (43.9)		0.114[a]	0.393
≥ $100K	21 (44.7)		23 (56.1)			
Breast cancer type (n = 84)						

Characteristics	Age < 50 (n = 48)		Age ≥ 50 (n = 42)		Effect size	*p*
	N (%)	Means (SD)	N (%)	Means (SD)		
IDC	34 (73.9)		26 (68.4)		0.131[c]	0.775
DCIS	8 (17.4)		9 (23.7)			
ILC	4 (8.7)		3 (7.9)			
Stage (n = 89)						
1	11 (22.9)		8 (19.5)		0.069[c]	0.811
2	26 (54.2)		25 (61.0)			
3	11 (22.9)		8 (19.5)			
ER receptor						
Positive	40 (83.3)		32 (76.2)		0.089[a]	0.438
Negative	8 (16.7)		10 (23.8)			
PR receptor						
Positive	27 (56.3)		19 (45.2)		0.110[a]	0.398
Negative	21 (43.8)		23 (54.8)			
HER 2 (n = 88)						
Positive	19 (40.4)		14 (34.1)		0.065[a]	0.660
Negative	28 (59.6)		27 (65.9)			
Time since diagnosis		39.23 (27.01)		56.79 (37.85)	0.534[b]	0.015
Time since chemotherapy		33.60 (27.02)		51.57 (35.49)	−0.582[b]	0.009
Number of treatment modalities		3.67 (0.75)		3.90 (0.79)	−0.302[b]	0.147
2	3 (6.3)		2 (4.8)		0.171[c]	0.449
3	15 (31.3)		9 (21.4)			
4	25 (52.1)		22 (52.4)			
5	5 (10.4)		9 (21.4)			
Surgery						
Yes	48 (100)		41 (97.6)		−0.113[a]	0.467
No	0		1 (2.4)			
Lumpectomy						
Yes	14 (29.2)		19 (45.2)		0.166[a]	0.130

Characteristics	Age < 50 (n = 48)		Age ≥ 50 (n = 42)		Effect size	*p*
	N (%)	Means (SD)	N (%)	Means (SD)		
No	34 (70.8)		23 (54.8)			
Mastectomy (n=89)						
Yes	7 (14.9)		12 (28.6)		0.167[a]	0.127
No	40 (85.1)		30 (71.4)			
Double mastectomy (n=89)						
Yes	30 (63.8)		17 (40.5)		−0.234[a]	0.035
No	17 (36.2)		25 (59.5)			
Radiation therapy						
Yes	31 (64.6)		28 (66.7)		0.022[a]	0.836
No	17 (35.4)		14 (33.3)			
Doxorubicin (n=89)						
Yes	29 (61.7)		22 (52.4)		−0.094[a]	0.399
No	18 (38.3)		20 (47.6)			
Hormone therapy (n=89)						
Yes	35 (74.5)		36 (85.7)		0.140[a]	0.290
No	12 (25.5)		6 (14.3)			
Herceptin (n=88)						
Yes	14 (30.4)		17 (40.5)		0.105[a]	0.376
No	32 (69.6)		25 (59.5)			
Current medication						
Yes	14 (29.2)		18 (42.9)		0.143[a]	0.193
No	34 (70.8)		24 (57.1)			
Aromatase inhibitors						
Yes	11 (22.9)		14 (33.3)		0.116[a]	0.347
No	37 (77.1)		28 (66.7)			
SERM						
Yes	21 (43.8)		8 (81.0)		−0.264[a]	0.014
No	27 (56.3)		34 (19.0)			

Characteristics	Age < 50 (n = 48)		Age ≥ 50 (n = 42)		Effect size	*p*
	N (%)	Means (SD)	N (%)	Means (SD)		
ERDR						
Yes	0		1 (2.4)		0.113[a]	0.467
No	48 (100)		41 (97.6)			
Antidepressants						
Yes	12 (25.0)		12 (28.6)		0.040[a]	0.812
No	36 (76.0)		30 (71.4)			
Number of comorbidities						
None	43 (89.6)		30 (71.4)		0.299[c]	0.018
1	5 (10.4)		6 (14.3)			
2	0		6 (14.3)			
Menopausal status						
Pre menopause	11 (22.9)		1 (2.4)		0.301[a]	0.005
Post menopause	37 (77.1)		41 (97.6)			
Psychosocial outcomes						
Anxiety[d]		17.10 (7.71)		16.17 (8.93)	0.113[b]	0.594
Depression[e]		13.65 (5.46)		12.98 (7.07)	0.108[b]	0.614
Fatigue[f]		22.71 (7.94)		18.76 (7.84)	0.506[b]	0.020
Loneliness[g]		40.19 (11.69)		35.40 (10.36)	0.436[b]	0.044
Daytime sleepiness[h]		7.42 (4.42)		5.47 (4.06)	0.463[b]	0.033
Perceived stress[i]		15.70 (7.43)		11.43 (8.35)	0.548[b]	0.012

Note. a=phi, b=Cohen's d, c=Cramer's V.

[d]Measured using the Patients Reported Outcome Measurement Information System (PROMIS) Emotional Distress-Anxiety-Short From (SF) 8a; possible scores range from 8 to 40, with higher scores indicating greater anxiety.

[e]Measured using the PROMIS Emotional Distress-Depression-Short From (SF) 8a; possible scores range from 8 to 40, with higher scores indicating greater depression.

[f]Measured using the PROMIS Emotional Distress-Fatigue-Short From (SF) 8a; possible scores range from 8 to 40, with higher scores indicating greater fatigue.

[g]Measured using the University of California, Los Angeles-Loneliness Scale-revised; possible scores range from 20 to 80, with higher scores indicating greater loneliness.

[h] Measured using the Epworth Sleepiness Scale; possible scores range from 0 to 24, with higher scores indicating greater tendency of having fallen asleep or dozed off.

[i] Measured using the Perceived Stress Scale; possible scores range from 0 to 40, with higher scores indicating greater perceived stress.

Note. Independent t tests were used for years of education, time since chemotherapy, and number of treatment modalities. Chi squares were used for race, highest degree, marital status, employment status, annual income, breast cancer type, stage, ER receptor, PR receptor, HER 2+, menopausal status, number of comorbid conditions, and specific comorbidities.

DCIS, ductal carcinoma in situ; ER, estrogen receptor; ERDR, estrogen receptor down regulator; HER, human epidermal growth factor receptor; IDC, invasive ductal carcinoma; ILC, invasive lobular carcinoma; PR, progesterone receptor; SD, standard deviation; SERM, selective estrogen receptor modulator.

Table 2.

Correlations for younger breast cancer survivors between sociodemographic, clinical, and psychosocial outcomes variables (N = 48)

	Fatigue[c]	Loneliness[d]	Daytime sleepiness[e]	Perceived stress[f]
	r	r	r	r
Years of education[a]	−0.061	0.125	−0.056	0.066
Having a partner[b]	−0.011	−0.174	0.033	0.108
Having children[b]	−0.151	−0.377**	−0.027	−0.187
Employment[b]	0.068	0.013	0.114	0.104
Income[b]	0.008	−0.258**	0.044	−0.199
Breast cancer stage[b]	−0.201*	−0.121	0.156	0.060*
ER receptor[b]	0.024	−0.049	−0.127	0.090
Time since chemotherapy[a]	−0.020	0.273*	0.087	0.050
Menopause status[b]	0.142	0.079	−0.023	0.158
Treatment modalities[b]	0.170	−0.055	−0.143	0.080
Number of comorbidities[b]	−0.078	0.035	0.121	0.085
Surgery	N/A	N/A	N/A	N/A
Lumpectomy	0.089	0.110	−0.114	−0.006
Mastectomy	−0.198	−0.031	0.131	0.031
Double mastectomy	0.027	−0.067	−0.038	−0.040
Radiation therapy	0.136	−0.008	−0.167	0.024
Doxorubicin	−0.095	−0.097	0.022	0.123
Hormone therapy	0.083	−0.093	0.002	0.195
Herceptin	0.030	−0.019	−0.130	−0.091
Current medication	−0.058	0.195	0.035	−0.183
Aromatase inhibitors	0.036	−0.040	0.023	0.060
SERM	0.039	−0.102	−0.097	0.135
ERDR	N/A	N/A	N/A	N/A
Antidepressants	0.073	−0.132	−0.207*	−0.159

	Fatigue[c]	Loneliness[d]	Daytime sleepiness[e]	Perceived stress[f]
	r	r	r	r
Loneliness[a]	0.482***	1	-	-
Daytime sleepiness[a]	0.231	0.191	1	-
Perceived stress[a]	0.563***	0.488***	0.456***	1

Note. a=Pearson correlation, b= Kendall's tau correlation.

[c]Measured using the PROMIS Emotional Distress-Fatigue-Short From (SF) 8a; possible scores range from 8 to 40, with higher scores indicating greater fatigue.

[d]Measured using the University of California, Los Angeles-Loneliness Scale-revised; possible scores range from 20 to 80, with higher scores indicating greater loneliness.

[e]Measured using the Epworth Sleepiness Scale; possible scores range from 0 to 24, with higher scores indicating greater tendency of having fallen asleep or dozed off.

[f]Measured using the Perceived Stress Scale; possible scores range from 0 to 40, with higher scores indicating greater perceived stress.

ER, estrogen receptor; ERDR, estrogen receptor down regulator; SERM, selective estrogen receptor modulator.

* p < 0.1

** p < 0.05

*** p < 0.01

Table 3.

Multiple regression model for younger breast cancer survivors with loneliness as the dependent variable (n = 47)

	B	SE	β	t	*p*
Having children	−10.420	3.060	−0.443	−3.405	0.001
Annual income	−4.156	3.037	−0.177	−1.369	0.178
Time since chemotherapy (months)	0.143	0.054	0.328	2.631	0.012
Model summary			*Adj.* $R^2 = 0.298$, $F = 7.518$, $p < 0.001$		

Note. Variables dichotomized as 0=Annual income less than $100,000 and 1=Annual income $100,000 or more, 0 = not having children and 1=having children