HHS Public Access

Author manuscript

Psychooncology. Author manuscript; available in PMC 2021 March 17.

Published in final edited form as:

Psychooncology. 2021 March ; 30(3): 279–286. doi:10.1002/pon.5568.

The impact of fear of cancer recurrence on healthcare utilization among long-term breast cancer survivors recruited through ECOG-ACRIN trials

Eric Vachon[1], **Ellen Krueger**[2], **Victoria L. Champion**[1], **David A. Haggstrom**[3,4], **David Cella**[5], **Andrea A. Cohee**[1]

[1]School of Nursing, Indiana University, Indianapolis, Indiana, USA

[2]Department of Psychology, Indiana University-Purdue University Indianapolis, Indianapolis, Indiana, USA

[3]School of Medicine, Indiana University, Indianapolis, Indiana, USA

[4]Center for Health Services Research, Regenstrief Institute, Indianapolis, Indiana, USA

[5]Department of Medical Social Sciences, Northwestern University, Chicago, Illinois, USA

Abstract

Objective: To examine the relationship between fear of cancer recurrence (FCR) and healthcare utilization among long-term breast cancer survivors (BCS).

Methods: In a cross-sectional survey study, 505 younger survivors (YS: ≤45 years) and 622 older survivors (OS: 55–70 years) 3–8 years from diagnosis completed a questionnaire assessing demographics, medical history, FCR, and healthcare utilization. Healthcare utilization consisted of breast cancer (BC) and non-BC-related routine and nonroutine utilization.

Results: YS had significantly higher FCR than OS ($p < 0.01$). Independent of age, FCR was significantly associated with all three types of BC-related utilization ($p < 0.05$). In the multivariate models, we found a significant, positive interaction effect between FCR and increased comorbidities on nonroutine BC appointments ($p = 0.01$) and BC-related emergency room visits ($p = 0.03$). Additionally, comorbidities were associated with non-BC-related utilization ($p < 0.01$), and nonwhites were more likely to utilize nonroutine resources, both BC and non-BC-related ($p < 0.01$).

Conclusions: Increased FCR has been associated with hypervigilance among survivors and may lead to increased healthcare utilization. YS are at higher risk for increased FCR and psychosocial concerns, which may lead to overutilization. Providers should be aware that higher FCR may be related to increased use of healthcare resources and that these patients might be better served with supportive resources to increase quality of life and decrease inappropriate utilization. While this study provides increased evidence of the relationship between FCR and healthcare utilization,

Correspondence: Eric Vachon, School of Nursing, Indiana University, 600 Barnhill Dr., N.U. 317A, Indianapolis, IN 46202, USA. evachon@iu.edu.

DATA AVAILABILITY STATEMENT

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

interventions are needed for survivors at risk to address unmet needs, especially as life expectancy increases among BCS.

Keywords

breast cancer; cancer; fear of cancer recurrence; healthcare utilization; long-term breast cancer survivors; oncology; psycho-oncology

1 | INTRODUCTION

Breast cancer (BC) is the most prevalent cancer diagnosis among women in the United States.[1] Due to increased screening and improved treatments resulting in 90% of BC patients living for 5 years or longer,[2] 3.8 million women were living in the United States with a history of BC in 2019.[1] However, up to 70% of breast cancer survivors (BCS) experience moderate-to-high levels of fear of cancer recurrence (FCR),[3,4] with the majority of long-term BCS still experiencing FCR 5+ years after diagnosis.[5] FCR is defined as "the fear or worry that the cancer will return or progress in the same organ or in another part of the body,"[6] and is one of the top concerns and most unmet supportive care needs of survivors.[7,8] Younger survivors (YS) and those with a greater number and lingering symptoms are at increased risk for FCR.[4,9,10] Increased FCR has a detrimental effect on quality of life (QOL) and has been associated with decreased physical and cognitive functioning, emotional well-being, increased depressive symptoms, and increased fatigue among survivors.[4,5,11–13]

Theoretical models of FCR hypothesize that greater FCR may lead to increased healthcare utilization among cancer survivors due to seeking reassurance from healthcare providers in order to reduce anxiety and validate symptoms.[14–16] Greater FCR has been found to predict increased oncology visits and phone calls,[17] primary care visits,[14,17] emergency room (ER) visits,[14] unscheduled visits to general practitioners,[3] and increased complementary and alternative medicine use.[3] Survivors with increased FCR also cite unmet needs, such as coordination of care, emotional support, financial support, and up-to-date information.[18,19] Although follow-up care is built into clinical guidelines, previous work has shown increased follow-up care among survivors with increased FCR.[20] However, in another sample of mixed cancer survivors, greater FCR was not related to higher utilization.[21] Survivors with increased FCR may be less likely to seek out utilization due to avoidant coping, or being anxious or fearful about the outcome.[21,22] Overall, the literature points toward increased FCR leading to increased utilization. While some work has examined these short-term outcomes in BCS,[3,17] little is known about the impact of long-term BCS' FCR on utilization, as well as the differences in BC and non-BC-related utilization.

The purpose of the present study was to examine the relationship between FCR and healthcare utilization among BCS consisting of BCS diagnosed at ≤45 years (YS) and 55–70 (older survivors: OS). We hypothesized that increased FCR would be associated with increased healthcare utilization among long-term BCS and that utilization may differ between YS and OS. We would expect to see higher BC-related utilization among YS, due to the risk of increased FCR, and OS experiencing higher non-BC-related utilization related to increased comorbidities.

2 | METHODS

Data for this secondary analysis were derived from a cross-sectional survey study evaluating survivorship issues and QOL differences of YS compared to both OS and aged-matched controls.[10] Only YS and OS data were utilized in this secondary analysis, because FCR was not applicable to the controls.

2.1 | Sample and recruitment

Eligible female BCS were identified utilizing the ECOG-ACRIN statistical center database, which included 97 sites that had previously participated in ECOG-ACRIN clinical trials. Eligibility criteria included women who: (1) were ≤45 years (YS) or 55–70 years (OS) at initial cancer diagnosis at stages I–IIIa, (2) were 3–8 years postinitial treatment at time of enrollment, (3) no BC recurrence, and (4) had been treated with an adjuvant chemotherapy regimen, including Adriamycin, Paclitaxel, and Cyclophosphamide to reduce treatment-related variance. The 10-year age gap between YS and OS was included to ensure groups did not overlap and to mitigate confounding perimenopausal symptoms.

After eligible BCS were identified through the ECOG-ACRIN database and sites provided ECOG-ACRIN with local institutional review board approval (1009001681R007), a list of eligible survivors was given to each participating site. Survivors' oncologists/clinical staff asked survivors permission for the research team to contact them. If survivors agreed, contact information was provided to the research team and information brochures were sent to survivors prior to contact. Research assistants called interested survivors 1 week after mailing the brochures to obtain verbal consent. If verbal consent was obtained, survivors were sent a consent form and the study questionnaire. If consents were not returned within 2 weeks, a second consent form was mailed, if necessary. A total of 744 eligible YS were contacted with 86% verbally consenting and 67% (n = 505) completing the study questionnaire. A total of 937 eligible OS were contacted with 68% verbally consenting and 66% (n = 622) completing the study questionnaire. No data were gathered from individuals that refused participation.

2.2 | Measures

Participants completed the written questionnaire that consisted of sociodemographic factors (age, race, education, and marital status) and medical history (time since diagnosis, treatment, and comorbidities). Participants were also asked about physical, psychological, social, spiritual functioning, and QOL. Included in the questionnaire were sections related to FCR and healthcare utilization, which are the focus of this secondary analysis.

2.2.1 | Fear of cancer recurrence—The primary independent variable for this secondary analysis was FCR. FCR was measured utilizing the Concerns About Recurrence Scale (CARS) Total Worries Index.[23] The CARS Total Worries Index includes 28 items on a 0 ("Not at all")–5 ("All or most of the time") scale that are summed together for a FCR total worries score. These 28 items are divided into five subscales: health worries, womanhood worries, role worries, death worries, and parenting worries. The original CARS total worries index consists of 26 items. We added the two item parenting worries subscale at the request

of American Cancer Society, in order to asses this domain of FCR. The CARS has an internal consistency of $\alpha = 0.87$,[23] and for the current sample was $\alpha = 0.96$.[10,11]

2.2.2 | Healthcare utilization—Participants were asked about healthcare utilization both related and unrelated to BC, which were the primary outcome variables. Specifically, participants were asked how many times in the past 12 months had they seen their physician or other healthcare provider for: (1) routine follow-up for BC, (2) a physical problem related to BC, and (3) an annual checkup or physical problem not related to BC. Participants were also asked how many times in the past 12 months they had gone to the ER for: (4) problems related to BC, and (5) problems not related to BC.

2.3 | Statistical analysis

Data were analyzed using STATA 15. Frequencies and measures of central tendency were calculated for demographic variables. Descriptive statistics were calculated to characterize demographics, medical history, FCR, and utilization among YS and OS. *t*-test and chi-square analyses compared YS and OS on all study variables. Additionally, partial correlations and simple logistic regression were used to examine the independent effect of FCR on utilization. Given the distributions of the healthcare utilization outcome, the routine utilization variables (1,3) were treated as count outcomes, while the nonroutine utilization variables (2,4,5) were treated as binary outcomes, due to items 2,4,5 having majority of counts as none or one. For routine utilization, negative binominal regressions were used to examine the effect of FCR on utilization, while multiple logistic regression was used for the nonroutine utilization outcomes. For all five models, CARS Total Worries Index (FCR), YS versus OS, time since diagnosis, comorbidities, race, education, marital status, and income were included. Additionally, various interaction terms were tested based on conceptual literature and content expertise, notably between FCR and age and FCR and comorbidities. Seventeen patients were not included in the multivariate models, as they were missing utilization data; there were no characteristics differences within these individuals.

3 | RESULTS

A total of 1127 long-term BCS were included in this secondary data analysis, including 505 YS (≤45 years old at cancer diagnosis) and 622 OS (55–70 years old) with 66% being stage II at diagnosis. Table 1 includes the relevant demographic and medical history characteristics for the sample. Signicant *p*-values (≤ 0.05) are bolded within each table. The average age of YS was 45 years old, while the OS group was on average 67 years. The sample was primarily white. Compared to the general population, the sample was more highly educated, with almost 25% completing some or earning a graduate degree. The YS were more educated than the OS group. The majority of the sample was married, or in a long-term commitment, at the time of the study. A larger portion of YS were married, while more OS were widowed. The sample was evenly distributed across the income brackets, although YS had a higher average household income than OS ($p < 0.01$). Participants in the sample had ~2 comorbidities, with YS having 1.38 and OS having nearly three comorbidities per survivor. The most commonly reported comorbidities were arthritis (37%), hypertension

(36%), hyperlipidemia (30%), and depression (25%). The sample was on average ~6 years out from their initial cancer diagnosis, with no difference between the two groups.

3.1 | Fear of cancer recurrence and healthcare utilization

Frequencies and bivariate analyses for FCR and healthcare utilization are reported in Table 2. The sample had a mean CARS Total Worries score of 30.5 (range: 0–109), with the YS (39.0) having a significantly higher worries score than OS (23.6) ($p < 0.01$). Survivors had on average 2.4 routine BC follow-up appointments over the past 12 months, with YS having significantly more than OS ($p = 0.02$). Survivors had a similar number of non-cancer-related physician appointments (2.35), with OS having significantly more than YS ($p < 0.01$). More than a quarter had an unplanned physician visit related to a physical problem with their BC, with no difference between groups. Only 6.2% of the sample had an ER visit related to BC, with more OS visiting the ER ($p = 0.03$). More than 20% of the sample had visited the ER over the past 12 months for a reason other than BC, with no difference between groups. Independent of age, there was a significant correlation between increased FCR and increased routine BC follow-ups ($p < 0.01$). When running simple logistic regression, we also found significant associations between increased FCR and unplanned BC appointment ($p < 0.01$) and FCR and ER visits related to BC ($p = 0.05$).

3.2 | Multivariate analysis for healthcare utilization

Table 3 reports the negative binomial regression results for the count outcomes for routine BC follow-up and annual appointments not related to BC. After controlling for education, marital status, and income, those with higher FCR ($p = 0.02$), less time since diagnosis ($p < 0.01$), and YS ($p < 0.01$) had significantly more routine BC follow-ups. Race and comorbidities had no impact on routine BC follow-ups. For annual appointments not related to BC, increased comorbidities ($p < 0.01$) was significantly associated with increased utilization.

Table 4 reports the multiple logistic regression results for the binary outcomes for appointments for physical problems related to BC, ER visits related to BC, and ER visits not related to BC. After controlling for education, marital status, and income, nonwhites ($p < 0.01$) were significantly more likely to have an appointment for physical problems related to BC. Forty-nine percent of nonwhites compared to 35% of whites had at least one such appointment. Additionally, we found a positive interaction effect between increased FCR and increase comorbidities ($p = 0.02$) on nonroutine BC appointments. OS ($p = 0.02$) and nonwhites ($p < 0.01$) were more likely to visit the ER for a problem related to BC. Similar to BC-related appointments, we saw a positive interaction effect between increased FCR and increased comorbidities ($p = 0.03$) on BC-related ER visits. Individuals with increased comorbidities ($p < 0.01$) and nonwhites ($p < 0.01$) were more likely to visit the ER for a non-BC related problem. Marital status, income, and education had no impact on any type of utilization, and therefore, was not reported.

4 | DISCUSSION

This study is one of few[3,14,17] that examines the relationship between FCR and healthcare utilization among BCS, while comparing the impact of age (YS and OS). Additionally, our work differentiated utilization with BC-related utilization compared to non-BC-related utilization, which was not done in previous works.

As hypothesized, we found that increased FCR among long-term BCS was associated with increased BC-related routine follow-ups, independent of age. Previous literature has shown that cancer survivors with increased FCR are more likely to be hypervigilant in monitoring symptoms, engaging in surveillance behaviors, and potentially overutilize healthcare resources, which may lead to substantial costs for the healthcare system.[16,17,20] However, some survivors may not seek out follow-up out of fear of receiving bad news,[21] but we did not find this. If survivors with increased FCR do not receive follow-up cancer care, they may feel guilty about not doing so, and thus further increasing FCR and anxiety.[16] When looking at non-BC-related utilization, FCR was not significantly associated with this utilization. This finding indicates that while survivors with increased FCR may be hypervigilant for physical problems, they are more focused on cancer-related issues and are not as likely to utilize resources for noncancer problems.

In addition to seeing a significant main effect of FCR on routine BC follow-ups, we found a significant, positive interaction effect between increased FCR and increased comorbidities on nonroutine BC utilization (appointments for physical problem related to BC and BC-related ER visits). As FCR and comorbidities increased, so did nonroutine BC utilization. This finding links back to increased hypervigilance of individuals with increased FCR. In this case, individuals who have both increased FCR and comorbidities, may be misattributing symptoms or physical problems related to comorbidities as being related to their cancer. This misinterpretation of physical problems may lead to overutilization of healthcare services in general, but also seeking out inappropriate care, such as seeing their oncologist instead of primary care provider (PCP).

Comparing age groups, YS had significantly higher FCR than OS. This finding is consistent with FCR literature, as well as mental health literature in general, showing that YS have increased psychological symptoms and needs. In addition to increased FCR, YS experienced significantly higher levels of depression, anxiety, sleep disturbance, social constraints, worse attention function, worse body image, worse martial satisfaction, and lower QOL than OS, as reported in the main study paper.[10] This indicates that YS are at greater risk not only for increased FCR but also poorer QOL. Health care utilization varied by age, with YS having increased routine follow-ups related to BC, while OS were more likely to visit the ER related to BC. Additionally, OS had significantly higher number of non-BC-related follow-up appointments in bivariate analysis, but this relationship did not hold when factoring in other predictor variables. We would like to acknowledge that although we found significant impacts of FCR and interaction effects with comorbidities, that the odds ratios and incidence rate ratios were only slightly >1.

Additionally, we found that survivors with less time since diagnosis had higher rates of routine BC follow-ups. This is consistent with clinical guidelines that survivors have less frequent follow-up appointments as time goes on, so long as there are no indications of recurrence.[24] Comorbidities had a significant main effect on both routine and nonroutine non-BC-related utilization, which is expected, given that individuals with increased comorbidities are more likely to need increased care. Additionally, we found race to be significantly associated with all types of nonroutine utilization. In our sample, nonwhites had lower education levels and lower household income than nonwhites. Individuals of lower socioeconomic status are more likely to utilize ER visits and other emergent resources than seeing a PCP, due to reduced access. We believe that this is likely the reason for nonwhites having higher nonroutine utilization than whites. However, only 7% of the sample was nonwhite, and therefore presents a shortcoming when comparing race in our study.

5 | STUDY LIMITATIONS

Despite the new findings adding to the FCR literature, our work is not without its limitations. First, while we have a fairly large sample compared to other studies examining FCR, our sample was non-diverse in terms of race, with >92% being white. Additionally, our sample is more highly educated and had a higher mean income than the average population. Therefore, our findings may not be generalizable to all types of BCS, nor all types of cancer. In terms of data collection, our study was cross-sectional, which limits our inference of predictor variables on the outcome of healthcare utilization, particularly the directional relationship with FCR. Additionally, our data were completely self-report. Specifically, we acknowledge survivors' reporting of utilization,[25] particularly differentiating between BC-related and non-BC-related utilization, may have inaccuracies. Some survivors may have attributed other physical problems to their BC history, and thus may have miscategorized the type of utilization. While we acknowledge these limitations, we believe that this study provides a valuable contribution to the FCR literature for BC survivors and further supports the need for the development of interventions to alleviate increased FCR and stress, particularly with YS.

6 | CLINICAL IMPLICATIONS

Our results indicate that FCR is associated with higher BC-related utilization among long-term survivors, suggesting that FCR has long lasting consequences on the healthcare system. Specifically, YS are more at risk for higher FCR and psychosocial issues. Providers should be aware that FCR may still be a significant problem for long-term BCS years after diagnosis. Thus, providers should monitor FCR in long-term survivors, and may recommend psychological services to those experiencing high levels of FCR.[26] There is evidence to suggest that traditional cognitive-behavioral therapy and contemporary therapies, such as acceptance and commitment therapy, may reduce survivors' FCR.[27,28] Although seeking reassurance from providers may temporarily reduce FCR, it is likely to perpetuate FCR in the long-term for survivors with multiple unmet needs.[29] Therefore, providers can offer psychoeducation about possible signs and symptoms of recurrence and subsequent steps if recurrent symptoms arise. Ultimately, monitoring FCR in survivors and providing necessary psychoeducation and resources may reduce distal healthcare utilization in long-term BCS.

7 | CONCLUSIONS

In conclusion, our study is one of the few to examine the relationship between FCR and healthcare utilization, and the only study that we found which differentiated between BC and non-BC-related utilization. While there has been conflicting evidence on the relationship between FCR and utilization, we found that increased FCR is associated with multiple increased forms of breast-cancer utilization, independent of age. Not only may FCR have a primary impact on utilization, but also BCS may misinterpret physical problems related to comorbidities as being related to their cancer. This hypervigilance in monitoring symptoms and physical problems can lead to not only increased healthcare utilization but also inappropriate utilization. Our study found that YS are at greater risk for increased FCR than OS, as well as other psychosocial issues that may exacerbate FCR and lead to increased utilization. In addition to the clinical implications discussed earlier, additional research is needed to examine the causal relationship between FCR and increased utilization. Future research should be focused on determining the concerns that BCS have related to their cancer history and other unmet needs, in order to promote greater QOL and reduce unnecessary healthcare utilization. While our work provides strong evidence of the detrimental effect of FCR, researchers need to progress towards developing interventions to target the unmet psychosocial and physical needs of survivors.

ACKNOWLEDGEMENTS

This study was coordinated by the ECOG-ACRIN Cancer Research Group (Peter J. O'Dwyer, MD and Mitchell D. Schnall, MD, PhD, Group Co-chairs) and supported by the National Cancer Institute of the National Institutes of Health under grant numbers UG1CA189828, UG1CA233320, and Training Grant T32CA117865. Additional support was provided by the American Cancer Society (RSGPB-04-089-01-PBP). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH. Mention of trade names, commercial products, or organizations does not imply endorsement by the US government.

Funding information

American Cancer Society, Grant/Award Number: RSGPB-04-089-01-PBP; National Cancer Institute, Grant/Award Numbers: T32CA117865, UG1CA189828, UG1CA233320

REFERENCES

1. Miller KD, Nogueira L, Mariotto AB, et al. Cancer treatment and survivorship statistics, 2019. CA A Cancer J Clin. 2019;69(5): 363–385.
2. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2020. CA A Cancer J Clin. 2020;70(1):7–30.
3. Thewes B, Butow P, Bell ML, et al. Fear of cancer recurrence in young women with a history of early-stage breast cancer: a cross-sectional study of prevalence and association with health behaveiours. Support Care Cancer. 2012;20(11):2651–2659. [PubMed: 22328003]
4. Simard S, Thewes B, Humphris G, et al. Fear of cancer recurrence in adult cancer survivors: a systematic review of quantitative studies. J Cancer Surviv. 2013;7(3):300–322. [PubMed: 23475398]
5. Koch L, Jansen L, Brenner H, Arndt V. Fear of recurrence and disease progression in long-term (≥5 years) cancer survivors–a systematic review of quantitative studies. Psychooncology. 2013; 22(1):1–11.
6. Simard S, Savard J. Fear of Cancer Recurrence Inventory: development and initial validation of a multidimensional measure of fear of cancer recurrence. Support Care Cancer. 2009;17(3):241–251. [PubMed: 18414902]

7. Hodgkinson K, Butow P, Hunt GE, Pendlebury S, Hobbs KM, Wain G. Breast cancer survivors' supportive care needs 2–10 years after diagnosis. Support Care Cancer. 2007;15(5):515–523. [PubMed: 17120068]
8. Ness S, Kokal J, Fee-Schroeder K, Novotny P, Satele D, Barton D. Concerns across the survivorship trajectory: results from a survey of cancer survivors. Oncol Nurs Forum. 2013;40(1):35–42. [PubMed: 23269768]
9. Crist JV, Grunfeld EA. Factors reported to influence fear of recurrence in cancer patients: a systematic review. Psychooncology. 2013; 22(5):978–986. [PubMed: 22674873]
10. Champion VL, Wagner LI, Monahan PO, et al. Comparison of younger and older breast cancer survivors and age-matched controls on specific and overall quality of life domains. Cancer. 2014; 120(15):2237–2246. [PubMed: 24891116]
11. Cohee AA, Adams RN, Johns SA, et al. Long-term fear of recurrence in young breast cancer survivors and partners. Psychooncology. 2017;26(1):22–28. [PubMed: 26490953]
12. Koch L, Bertram H, Eberle A, et al. Fear of recurrence in long-term breast cancer survivors–still an issue. Results on prevalence, determinants, and the association with quality of life and depression from the Cancer Survivorship–a multi-regional population-based study. Psychooncology. 2014;23(5):547–554. [PubMed: 24293081]
13. Dumalaon-Canaria JA, Prichard I, Hutchinson AD, Wilson C. Fear of cancer recurrence and psychological well-being in women with breast cancer: the role of causal cancer attributions and optimism. Eur J Cancer Care. 2018;27(1).
14. Lebel S, Tomei C, Feldstain A, Beattie S, McCallum M. Does fear of cancer recurrence predict cancer survivors' health care use? Support Care Cancer. 2013;21(3):901–906. [PubMed: 23269420]
15. Lee-Jones C, Humphris G, Dixon R, Bebbington Hatcher M. Fear of cancer recurrence–a literature review and proposed cognitive formulation to explain exacerbation of recurrence fears. Psychooncology. 1997;6(2):95–105. [PubMed: 9205967]
16. Simonelli LE, Siegel SD, Duffy NM. Fear of cancer recurrence: a theoretical review and its relevance for clinical presentation and management. Psychooncology. 2017;26(10):1444–1454. [PubMed: 27246348]
17. Otto AK, Soriano EC, Siegel SD, LoSavio ST, Laurenceau JP. Assessing the relationship between fear of cancer recurrence and health care utilization in early-stage breast cancer survivors. J Cancer Surviv. 2018;12(6):775–785. [PubMed: 30341560]
18. Ellegaard MB, Grau C, Zachariae R, Bonde Jensen A. Fear of cancer recurrence and unmet needs among breast cancer survivors in the first five years. A cross-sectional study. Acta Oncol (Stockh). 2017; 56(2):314–320.
19. Fang SY, Fetzer SJ, Lee KT, Kuo YL. Fear of recurrence as a predictor of care needs for long-term breast cancer survivors. Canc Nurs. 2018;41(1):69–76.
20. Champagne A, Ivers H, Savard J. Utilization of health care services in cancer patients with elevated fear of cancer recurrence. Psychooncology. 2018;27(8):1958–1964. [PubMed: 29719072]
21. Sarkar S, Sautier L, Schilling G, Bokemeyer C, Koch U, Mehnert A. Anxiety and fear of cancer recurrence and its association with supportive care needs and health-care service utilization in cancer patients. J Cancer Surviv. 2015;9(4):567–575. [PubMed: 25676473]
22. Tomei C, Lebel S, Maheu C, Lefebvre M, Harris C. Examining the preliminary efficacy of an intervention for fear of cancer recurrence in female cancer survivors: a randomized controlled clinical trial pilot study. Support Care Cancer. 2018;26(8):2751–2762. [PubMed: 29500582]
23. Vickberg SM. The Concerns About Recurrence Scale (CARS): a systematic measure of women's fears about the possibility of breast cancer recurrence. Ann Behav Med. 2003;25(1):16–24. [PubMed: 12581932]
24. NCCN Clinical Practice Guidelines in Oncology: Breast Cancer. 2020. https://www.nccn.org/professionals/physician_gls/pdf/breast.pdf.
25. Unger-Saldaña K, Peláez-Ballestas I, Infante-Castañeda C. Development and validation of a questionnaire to assess delay in treatment for breast cancer. BMC Canc. 2012;12:626.

26. Berrett-Abebe J, Cadet T, Vitello J, Maramaldi P. Developing content for an interprofessional training on fear of cancer recurrence (FCR): key informant interviews of healthcare professionals, researchers and cancer survivors. J Psychosoc Oncol. 2018;36(3): 259–273. [PubMed: 29634412]

27. Johns SA, Stutz PV, Talib TL, et al. Acceptance and commitment therapy for breast cancer survivors with fear of cancer recurrence: a 3-arm pilot randomized controlled trial. Cancer. 2020;126(1): 211–218. [PubMed: 31539169]

28. Tauber NM, O'Toole MS, Dinkel A, et al. Effect of psychological intervention on fear of cancer recurrence: a systematic review and meta-analysis. J Clin Oncol. 2019;37(31):2899–2915. [PubMed: 31532725]

29. Stark D, Kiely M, Smith A, Morley S, Selby P, House A. Reassurance and the anxious cancer patient. Br J Canc. 2004;91(5):893–899.

Psychooncology. Author manuscript; available in PMC 2021 March 17.

TABLE 1

Comparison of sociodemographic and disease characteristics between younger and older survivors

Variable	Total sample (*N* = 1,127)	Younger survivors (*n* = 505)	Older survivors (*n* = 622)	*p*-value
Age (years), mean (SD)	57.1 (11.6)	45.3 (4.8)	66.8 (4.4)	N/A
Race, *n* (%)				
White	1041 (92.4)	459 (90.9)	582 (93.6)	0.09
Other	86 (7.6)	46 (9.1)	40 (6.4)	
Education, *n* (%)				
High school or less	313 (27.8)	107 (21.2)	206 (33.1)	**<0.01**
Some college or trade school	299 (26.5)	128 (25.3)	171 (27.5)	
Associate or Bachelor's degree	248 (22.0)	155 (30.7)	93 (15.0)	
Some or complete graduate school	267 (23.7)	115 (22.8)	152 (24.4)	
Current marital status, *n* (%)				
Married	836 (75.4)	417 (83.1)	419 (69.0)	**<0.01**
Divorced	80 (7.2)	37 (7.4)	43 (7.1)	
Widowed	104 (9.4)	4 (0.8)	100 (16.5)	
Single	89 (8.0)	44 (8.8)	45 (7.4)	
Income, *n* (%)				
$0-$50,000	403 (35.8)	109 (21.5)	294 (47.3)	**<0.01**
$50,001-$100,000	442 (39.2)	227 (45.0)	215 (34.6)	
>$100,000	244 (21.7)	159 (31.5)	85 (13.7)	
Don't know or prefer not to answer	38 (3.4)	10 (2.0)	28 (4.5)	
Number of comorbidities, mean (SD)	2.14 (1.8)	1.38 (1.5)	2.77 (1.8)	**<0.01**
Number of comorbidities ≥3, *n* (%)				
Yes	433 (38.4)	92 (18.2)	341 (54.8)	**<0.01**
No	694 (61.6)	413 (81.8)	281 (45.2)	
Time since diagnosis, mean (SD)	5.94 (1.5)	5.89 (1.5)	5.97 (1.5)	0.34

TABLE 2

Comparison of concerns about cancer recurrence and healthcare utilization between younger and older survivors

Variable	Total sample (*N* = 1127)	Younger survivors (*n* = 05)	Older survivors (*n* = 622)	*p*-value
CARS–total worries, mean (SD)	30.50 (23.7)	39.01 (24.4)	23.58 (20.7)	**<0.01**
Range: 0-109				
Routine BC follow-up, mean (SD)	2.37 (2.4)	2.55 (2.9)	2.22 (1.7)	**0.02**
Range: 0-52				
Annual NOT related to BC, mean (SD)	2.35 (2.9)	2.10 (2.6)	2.56 (3.1)	**<0.01**
Range: 0-35				
Physical problem related to BC, *n* (%)				
Yes	315 (28.0)	147 (29.1)	168 (27.0)	0.44
No	812 (72.0)	358 (70.9)	454 (73.0)	
ER related to BC, *n* (%)				
Yes	70 (6.2)	23 (4.6)	47 (7.6)	**0.03**
No	1057 (93.8)	482 (95.4)	575 (92.4)	
ER NOT related to BC, *n* (%)				
Yes	238 (21.1)	95 (18.8)	143 (23.0)	0.08
No	889 (78.9)	410 (81.2)	479 (77.0)	

Abbreviations: BC, breast cancer; CARS, Concerns About Recurrence Scale; ER, emergency room; SD, standard deviation.

TABLE 3

Routine healthcare utilization negative binomial regression results (n = 1100)

Routine healthcare utilization Independent variables	Routine BC follow-up			Annual NOT related to BC		
	Coef (SE)	IRR (SE)	*p*-value	Coef (SE)	IRR (SE)	*p*-value
Fear of recurrence	0.002 (0.01)	**1.003 (0.01)**	**0.02**	0.001 (0.01)	**1.00 (0.01)**	0.54
Younger survivors	0.161 (0.05)	**1.17 (0.06)**	**<0.01**	0.062 (0.07)	**1.06 (0.07)**	0.35
Time since diagnosis	−0.127 (0.02)	**0.88 (0.01)**	**<0.01**	−0.009 (0.02)	**0.99 (0.02)**	0.62
Comorbid conditions	0.022 (0.01)	1.02 (0.01)	0.11	0.184 (0.02)	**1.20 (0.02)**	**<0.01**
Race (white)	0.009 (0.09)	1.00 (0.08)	0.91	0.153 (0.11)	1.17 (0.13)	0.17

Note: Models controlling for income, education, and marital status.

Abbreviations: BC, breast cancer; IRR, incidence rate ratio; SE, standard error.

TABLE 4

Non-routine healthcare utilization logistic regression results ($n = 1110$)

Non-routine healthcare utilization Independent variables	Physical problem related to BC			ER-related to BC			ER NOT related to BC		
	Coef (SE)	OR (SE)	*p*-value	Coef (SE)	OR (SE)	*p*-value	Coef (SE)	OR (SE)	*p*-value
Fear of recurrence	0.001 (0.01)	1.00 (0.01)	0.95	−0.001 (0.01)	0.99 (0.01)	0.99	0.003 (0.00)	0.99 (0.01)	0.42
Younger survivors	0.136 (0.17)	1.15 (0.19)	0.42	−0.735 (0.32)	**0.48 (0.15)**	**0.02**	0.024 (0.19)	1.03 (0.19)	0.89
Time since diagnosis	−0.084 (0.05)	0.92 (0.04)	0.08	0.052 (0.09)	1.05 (0.09)	0.67	0.032 (0.05)	1.03 (0.05)	0.54
Comorbid conditions	0.024 (0.07)	1.02 (0.07)	0.72	−0.181 (0.13)	0.83 (0.11)	0.17	0.178 (0.04)	**1.09 (0.07)**	**<0.01**
Race (white)	−0.955 (0.24)	**0.38 (0.09)**	**<0.01**	−1.38 (0.35)	**0.25 (0.01)**	**<0.01**	−1.04 (0.25)	**0.35 (0.08)**	**<0.01**
FCR × Comorbdities	0.004 (0.00)	**1.005 (0.01)**	**0.02**	0.006 (0.01)	**1.006 (0.01)**	**0.03**	N/A	1.00 (0.01)	N/A

Note: Models controlling for income, education, and marital status.

Abbreviations: BC, breast cancer; ER, emergency room; FCR, fear of cancer recurrence; OR, odds ratio; SE, standard error.