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ORIGINAL ARTICLE

Preferences for breast cancer survivorship care by rural/urban residence and age at diagnosis

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Abstract

Purpose Preferences for survivorship care among recently treated breast cancer survivors may vary by rural-urban residence and age, but potential differences have not been examined.

Methods We conducted a cross-sectional survey of survivorship preferences among women treated for non-metastatic breast cancer 6–24 months prior to recruitment.

Results We surveyed 203 women (66% response) with American Joint Committee on Cancer Stage I or II breast cancer. Rural residents comprised 36.5% of respondents (82.7% White, non-Hispanic; 52.5% < college education) and 29.6% were ≥ 65 years. More than 95% indicated that checking for recurrence, receiving additional treatment, evaluation of side effects, and identification of late effects were "very important" reasons for follow-up care. The most common topics identified as "very important" for survivorship care discussions were recommendations for healthy behaviors (65.3%), best sources for breast cancer information (65.3%), and effects on family (53.3%) and job (53.8%). Women 65 years and older preferred to discuss follow-up care at the time of diagnosis ($p = 0.002$), with younger women preferring during (32%) or after treatment (39.1%). Rural survivors were significantly more likely to identify follow-up care reasons not related to the initial breast cancer as "very important" than urban survivors, including screening for other cancers, and examinations or tests for non-cancer diseases (both $p = 0.01$).

Conclusions Survivorship care in accordance with national recommendations will likely be accepted by breast cancer survivors. Tailoring breast cancer survivorship care by timing, integration of primary care services, and specific psychosocial topics may best meet the needs of different ages and demographics.

Keywords Breast cancer · Survivorship · Rural · Geriatrics · Psychosocial · Follow-up care

Introduction

The significant number of women surviving breast cancer, estimated at 3.5 million in 2016 [1], underscores the importance of ongoing care following cancer treatment, often referred to as post-treatment follow-up care or survivorship care [2, 3]. The need for survivorship care is also highlighted by the American College of Surgeon's Commission on Cancer (Coc) standards to provide all cancer survivors with treatment summaries and survivorship care plans (SCPs) by 2019 [4]. Cancer survivors generally perceive that care plans are useful and effective [5], yet gaps in understanding of preferences remain critical to guiding the development of comprehensive programs for heterogeneous breast cancer survivors. In one qualitative study, breast cancer survivors reported desiring a SCP in an in-person consultation and a written format and near the conclusion of treatment, by a provider [6]. Preferred content included (1) diagnostic and treatment summary; (2) information on lifestyle, nutrition, and exercise; (3) side effects and recovery; (4) recurrence; (5) follow-up schedule; (6) available resources; (7) knowledge of information sent to primary care physician; and (8) updates on research findings [6]. Though this study provides some insight to preferences for SCPs among breast cancer survivors, additional complementary quantitative information is needed from a larger sample.

It is also important to understand preferences for breast cancer survivors with unique challenges, such as those residing in rural areas and older/younger survivors to reduce geographic and age disparities in long-term health after cancer [6–10]. Approximately 21% of the estimated 14.5 million

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US cancer survivors live in rural areas [7, 11]. A growing number of studies report poorer health in cancer survivors residing in rural areas versus those residing in urban areas [7, 12–15], and rural survivors may face challenges in accessing appropriate post-treatment cancer care [8, 16]. The experience of breast cancer also differs by age, as older women are likely to have more comorbidities [17] and younger women may experience more treatment-related physical and psychosocial concerns [18]. It was reported in one qualitative study that preferences for SCP content among breast cancer survivors did not differ by rural versus non-rural residence or age; however, more rural survivors preferred electronic communication [6]. Sprague and colleagues [9] evaluated patient satisfaction with personalized SCPs in survivors being treated at an urban academic medical center (n = 37) and a rural community hospital (n = 21). Survivors treated at the rural hospital were less likely to strongly agree that the care plan was easy to understand, but also believed that the care plan was more important for understanding their diagnosis and care coordination compared with survivors treated at the academic medical center. Although these studies suggest some geographic-related differences in preferences for and satisfaction with survivorship care among breast cancer survivors, more information is needed regarding preferences for timing, provider type, and content of survivorship care for rural and older/younger survivors.

The purpose of this study was to identify preferences for survivorship care among recently treated breast cancer survivors. We characterized rural and urban survivors receiving care at an academic medical center that serves a large rural population and hypothesized that rural versus urban survivors and younger (< 65 years) versus older (≥ 65 years) survivors would have different preferences and priorities for survivorship care after breast cancer.

Methods

Design and setting

We conducted a cross-sectional study of women treated for breast cancer at the Wake Forest Baptist Comprehensive Cancer Center (WFBCCC) [19]. The Wake Forest Health Sciences Institutional Review Board approved the study with a waiver of written informed consent.

Population, recruitment, and data collection

Eligibility Female survivors were eligible if they were diagnosed with a first primary in situ or invasive breast cancer and received some or all of their treatment at the WFBCCC from January 1, 2009, to November 30, 2011. Survivors must have completed their cancer treatment 6–24 months previously. Survivors diagnosed with metastatic (stage IV) or unknown stage breast cancers were excluded because the nature of their care differs from that provided to survivors of earlier stage cancers. We excluded survivors who did not speak English or were noted to be cognitively impaired by referring providers or upon contact with study interviewers.

Recruitment Eligible survivors were identified from the WFBCCC cancer registry, and medical records were reviewed to confirm treatment completion. Eligible women were recruited through mailings and telephone calls. A $10 gas card was included in the initial recruitment mailing.

Measures

Sociodemographic and cancer-related characteristics Behavioral Risk Factor Surveillance System (BRFSS) [20] questions were used to gather age, race/ethnicity, education level, and insurance coverage. To avoid small cell sizes, we compared Whites with non-Whites. Education was categorized into two categories (college graduate and non-college graduate). Current insurance coverage included four categories (none, private only, public only, and both private and public).

We categorized younger survivors as less than 65 years of age at diagnosis and older survivors as 65 years of age and older at diagnosis. Cancer-related characteristics including stage at diagnosis and diagnosis date were abstracted from the institutional cancer registry. We used these in combination with the date of survey completion to calculate the time from diagnosis to survey. Time since diagnosis was categorized into less than 18 months, 18 months to less than 2 years, and 2 years or more (minimum, 10 months; maximum, 2.5 years).

Rural-urban residence Rural and urban residence was defined by applying the zip code approximation of rural-urban commuting area (RUCA) codes to survivor zip codes [21]. Following the approach recommended by the developers and used in previous studies [e.g., 22], metropolitan areas and other areas with ≥ 30% of residents commuting to an urban area were considered urban (codes 1-3 and 4.1, 5.1, 7.1, 8.1, and 10.1). Rural areas included all other classifications, such as small towns and frontier areas.

Follow-up care preferences Follow-up care preferences were assessed using adapted questions from the NCI Surveillance Epidemiology and End Results (SEER) rapid response, Assessment of Patients' Experience of Cancer Care (APECC) [23], and Follow-Up Care Use and Health Outcomes of Cancer Survivors (FOCUS) [24] studies. Women were asked 3 questions regarding preferred timing (at diagnosis, during treatment, or after treatment) and preferred provider (doctor, nurse practitioner or physician assistant, and nursing staff) for engaging in follow-up care discussions, as well as the most important reason for the provider preference. Survivors were asked about the perceived importance of written follow-up care information and a single written summary after breast cancer treatment (not or only slightly important, somewhat important, or very important). Women were also asked questions regarding how important they thought it was for “a doctor involved in your cancer care to discuss these reasons for follow-up care with you and other women with breast cancer” (not or only slightly important, somewhat important, or very important). The eight follow-up care components included checking for recurrence, additional treatment, development of late-/long-term effects, evaluation of symptoms or side effects of treatment, routine physical exam, screening tests for other cancers, tests or exams for non-cancer diseases, and referral to other specialists. Survivors were also asked a similar question for 6 additional discussion topics identified by the Livestrong Essential Components of Survivorship Care Conference [25] as important survivorship topics (impact of cancer on family, impact of cancer on relationships with friends, challenges at work, community-based support groups, best sources for additional breast cancer information, and recommendations for healthy behaviors).

Analysis

Descriptive statistics (count, percent) were calculated for variables of interest overall, by rural/urban status, and by age group (< 65 vs 65+). Chi-square or Fisher’s exact tests as appropriate were used to examine the association between variables of interest and rural/urban status and age group. All analyses were performed using SAS v 9.4 (SAS Institute, Cary, NC) and p values of less than 0.05 were considered statistically significant.

Results

Surveys were sent to 328 survivors; however, 16 were later deemed ineligible because they denied a history of breast cancer or reported treatment in the prior 6 months. Two hundred thirty-three women completed and returned the survey (66%). Respondents and non-respondents were similar in rural-urban residence, age, ethnicity, stage at diagnosis, and time since diagnosis. Non-White women were less likely to respond (68% of White survivors responded and 54% of non-White survivors responded, $p = 0.03$).

Characteristics of study population Sample characteristics are reported in Table 1. Survivors were on average 59.4 (SD = 12.7) years of age, with 60 (29.6%) 65 or older. Seventy-four respondents (36.5%) were from rural areas and the sample was predominantly White (82.7%). A little more than half of survivors had less than a college diploma (52.5%) and were not currently working (53.5%); the majority of non-working survivors were retired (60.4%). The majority of survivors had private insurance only (60.4%), followed by 25.9% who had both private and public insurance. Time since diagnosis and TNM stage varied, with 41.4% receiving a diagnosis two or more years prior and 41.1% having stage I disease. All participants received surgery and slightly more than half also received radiation therapy (53.2%) and/or hormone therapy (54.2%).

Differences by rural-urban residence and age Rural and non-rural survivors were similar on sociodemographic and disease characteristics (all $p > .05$); however, there were significant differences among younger (< 65 years of age) and older (≥ 65 years of age) survivors (Table 1). Compared with younger survivors, older survivors were more likely to lack a college education (69.5% vs 45.3%, $p = .002$), report not currently working (89.8% vs 38.1%, $p < .0001$), and less likely to lack health insurance (1.7% vs 7.2%, $p < .0001$).

Follow-up care preferences For the overall sample, a similar proportion of women preferred discussing follow-up care at diagnosis (27.6%), during treatment (31.4%), and after treatment (33.0%) (Table 2). Most women preferred to discuss their follow-up care with a doctor (72.5%), with less interest in a nurse practitioner/ physician assistant (21.3%) or nurse (1.1%). Knowledge and expertise was the most commonly reported reason for provider preference (78.7%); a minority of women identified communication skills (10.0%) and a caring attitude (7.3%) as the primary reason. Written follow-up care information was considered “very important” by virtually all women (92.5%), and most women thought it was “very important” (74.4%) or “somewhat important” (23.1%) that this information be provided in a single written summary.

Differences by rural-urban residence and age Preferences for clinical aspects of transition to follow-up care were similar for rural and urban survivors (all $p \geq .05$), though preferences varied for timing of follow-up care among younger and older survivors (Table 2). Compared with younger women, a greater proportion of older women preferred to hear about follow-up care at the time of diagnosis ($p = 0.002$), with younger women preferring during (32%) or after treatment (39.1%).

Importance of follow-up care components and follow-up care discussion topics A large proportion of women indicated that checking for recurrence (98.5%), receiving additional treatment (96.5%), evaluation of side effects (96.0%), and identification of late effects (97.0%) were “very important” reasons

Table 1 Sociodemographic and cancer-related characteristics of women with early-stage breast cancer ($N = 203$)

Variable	Total ($n = 203$) N (%)	Not rural ($n = 129$) N (%)	Rural ($n = 74$) N (%)	P+	Age < 65 ($n = 143$) N (%)	Age 65+ ($n = 60$) N (%)	P++
Age at diagnosis							
< 65	143 (70.4)	93 (72.1)	50 (67.6)	0.50			
65+	60 (29.6)	36 (27.9)	24 (32.4)				
Rural status							
Rural	74 (36.5)				50 (35.0)	24 (40.0)	0.50
Not rural	129 (63.5)				93 (65.0)	36 (60.0)	
Race*							
White	163 (82.7)	98 (79.0)	65 (89.0)	0.07	113 (81.9)	50 (84.7)	0.63
Other	34 (17.3)	26 (21.0)	8 (11.0)		25 (18.1)	9 (15.3)	
Education*							
Not college graduate	104 (52.5)	63 (50.4)	41 (56.2)	0.43	63 (45.3)	41 (69.5)	0.002
College graduate	94 (47.5)	62 (49.6)	32 (43.8)		76 (54.7)	18 (30.5)	
Employment*							
Full-time or part-time	92 (46.5)	60 (48.0)	32 (43.8)	0.57	86 (61.9)	6 (10.2)	< 0.0001
Not working	106 (53.5)	65 (52.0)	41 (56.2)		53 (38.1)	53 (89.8)	
Insurance*							
None	11 (5.6)	9 (7.2)	2 (2.8)	0.26	10 (7.2)	1 (1.7)	< 0.0001
Private	119 (60.4)	79 (63.2)	40 (55.6)		108 (77.7)	11 (19. 0)	
Public	16 (8.1)	9 (7.2)	7 (9.7)		8 (5.8)	8 (13.8)	
Both private and public	51 (25.9)	28 (22.4)	23 (31.9)		13 (9.4)	38 (65.5)	
Time since diagnosis							
< 18 months	64 (31.5)	37 (28.7)	27 (36.5)	0.50	43 (30.1)	21 (35)	0.68
18 months–< 2 years	55 (27.1)	37 (28.7)	18 (24.3)		41 (28.7)	14 (23.3)	
2+ years	84 (41.4)	55 (42.6)	29 (39.2)		59 (41.3)	25 (41.7)	
TNM stage							
0	52 (25.6)	37 (28.7)	15 (20.3)	0.34	42 (29.4)	10 (16.7)	0.09
I	84 (41.4)	53 (41.1)	31 (41.9)		53 (37.1)	31 (51.7)	
II or III	67 (33.0)	39 (30.2)	28 (37.8)		48 (33.6)	19 (31.7)	
Received surgery	203 (100)	129 (100)	74 (100)	NA	143 (100)	60 (100)	NA
Received radiation therapy	108 (53.2)	68 (52.7)	40 (54.1)	0.85	74 (51.7)	34 (56.7)	0.52
Received chemotherapy	74 (36.5)	44 (34.1)	30 (40.5)	0.36	55 (38.5)	19 (31.7)	0.36
Received hormone therapy	110 (54.2)	69 (53.5)	41 (55.4)	0.79	74 (51.7)	36 (60.0)	0.28

*A small number of participants chose not to answer certain questions, resulting in missing observations for these variables

+p value for association between variable and rural/non-rural status

++p value for association between variable and age at diagnosis

for follow-up care (Table 3). Most survivors also indicated that screening for other cancers (78.9%), receiving routine exams (75.9%), obtaining referrals to other specialists (66.2%), and receiving tests/exams for non-cancer diseases (60.6%) as "very important" reasons for follow-up care. Less women perceived these reasons as "somewhat important" for follow-up care (i.e., screening for other cancers, 16.1%; routine exams, 16.4%; obtaining referrals to other specialists, 23.1%; and receiving tests/ exams for non-cancer diseases, 26.3%) with very little women perceiving any reason as "not important or only slightly important" (Table 3).

Survivors' perceived importance of follow-up care topics varied (Table 3). The most common topics identified as "very important" for survivorship care discussions were recommendations for healthy behaviors (65.3%) and best sources for additional information about breast cancer (65.3%). Slightly more than half of women also reported that the effects of breast cancer on family (53.3%) and their job (53.8%) were "very important". Many women perceived each of the topics as "somewhat important," though the most commonly endorsed topics included community-based support groups (40.6%) and impact on

Table 2 Preferences for clinical aspects of transition to follow-up care among women treated for early-stage breast cancer

	Total (n = 203)* *N* (%)	Not rural (n = 129) *N* (%)	Rural (n = 74) *N* (%)	*P+*	Age < 65 (n = 143) *N* (%)	Age 65+ (n = 60) *N* (%)	*P++*
Preferred timing							
At diagnosis	51 (27.6)	28 (24.1)	23 (33.3)	0.61	*25 (19.5)*	*26 (45.6)*	*0.002*
During treatment	58 (31.4)	38 (32.8)	20 (29.0)		*41 (32.0)*	*17 (29.8)*	
After finish chemo- or radiotherapy	61 (33.0)	40 (34.5)	21 (30.4)		*50 (39.1)*	*11 (19.3)*	
Other	15 (8.1)	10 (8.6)	5 (7.2)		*12 (9.4)*	*3 (5.3)*	
Preferred provider							
Doctor	129 (72.5)	82 (71.3)	47 (74.6)	0.06	89 (71.8)	40 (74.1)	0.87
Nurse practitioner or physician assistant	38 (21.3)	29 (25.2)	9 (14.3)		28 (22.6)	10 (18.5)	
Nursing staff	2 (1.1)		2 (3.2)		1 (0.8)	1 (1.9)	
Other	9 (5.1)	4 (3.5)	5 (7.9)		6 (4.8)	3 (5.6)	
Most important reason for this provider							
Knowledge or expertise	118 (78.7)	78 (79.6)	40 (76.9)	0.56	83 (77.6)	35 (81.4)	0.25
Communication skills	15 (10.0)	10 (10.2)	5 (9.6)		12 (11.2)	3 (7.0)	
Caring attitude	11 (7.3)	6 (6.1)	5 (9.6)		7 (6.5)	4 (9.3)	
Convenient office location	1 (0.7)		1 (1.9)			1 (2.3)	
Other	5 (3.3)	4 (4.1)	1 (1.9)		5 (4.7)		
Written information							
Very important	184 (92.5)	116 (92.1)	68 (93.2)	0.78	130 (93.5)	54 (90.0)	0.39
Single written summary							
Very important	148 (74.4)	90 (71.4)	58 (79.5)	0.21	102 (73.4)	46 (76.7)	0.72

*A small number of participants chose not to answer certain questions, resulting in missing observations variables below

+*p* value for association between variable and rural/non-rural status

++*p* value for association between variable and age at diagnosis; italicized values are statistically significant ($p < .05$)

friends (37.8%). A minority yet still notable proportion of women perceived some topics as "not or only slightly important" including effects of breast cancer on relationships with friends (26.5%), on their job (16.8%), and community-based support groups (14.2%).

Differences by rural-urban residence and age Rural survivors were significantly more likely to identify follow-up care reasons that were not related to the initial breast cancer as "very important" including screening for other cancers (p = 0.01) and examinations or tests for non-cancer diseases than urban survivors (p = 0.01). There were no significant differences in perceived importance of follow-up care components between younger and older respondents. Women living in rural and urban areas desired similar topics for follow-up care discussion, with the exception of the effects of breast cancer on family; a larger proportion of rural survivors indicated this topic is very important (63.4% vs 47.6%, p = 0.03). Younger survivors were more likely than older survivors to identify community-based support groups (p = 0.01) as very important topics for survivorship care discussions, but showed no other differences across the follow-up care topics.

Discussion

Breast cancer survivors largely concurred with the Institute of Medicine (IOM), Livestrong, and American Cancer Society/American Society of Clinical Oncology recommendations regarding elements of survivorship care [25–27]. Checking for recurrence, receiving additional treatment, evaluating side effects, and identifying late effects were all reported as very important reasons for follow-up care discussions. A similar proportion of survivors prefer to discuss SCPs at diagnosis, during cancer treatment, and after treatment, challenging the appropriateness of uniform timing. Survivors largely perceived follow-up care topics prioritized by national organizations [25, 27] as very important, particularly recommendations for healthy behaviors and sources for breast cancer information. Survivors from rural and non-rural areas and who are older and younger have similar preferences for SCPs, components of survivorship care, and discussion topics, with exceptions regarding timing of discussions and importance of certain topics. Data suggest that survivorship care consistent with national recommendations will be accepted by breast cancer survivors, but tailoring regarding timing, primary care integration, and topics may be needed for rural and younger survivors.

Table 3 Reasons for follow-up care discussions and topics to be included in follow-up care discussions deemed “very important” among women treated for early-stage breast cancer

	Total (n = 203)* N (%)	Not rural (n = 128) N (%)	Rural (n = 75) N (%)	P^{+}	Age < 65 (n = 143) N (%)	Age 65+ (n = 60) N (%)	P^{++}
Reasons for follow-up care discussions deemed “very important”							
Check for recurrence	197 (98.5)	125 (99.2)	72 (97.3)	0.56	137 (97.9)	60 (100)	0.56
Receive additional treatment	192 (96.5)	121 (96.0)	71 (97.3)	0.99	133 (95.0)	59 (100)	0.11
Evaluate side effects	190 (96.0)	119 (96.0)	71 (95.9)	0.99	134 (97.1)	56 (93.3)	0.25
Identify late effects	194 (97.0)	121 (96.0)	73 (98.6)	0.42	137 (97.9)	57 (95.0)	0.37
Receive routine examination	148 (75.9)	90 (72.6)	58 (81.7)	0.15	105 (76.1)	43 (75.4)	0.92
Screen for other cancers	*157 (78.9)*	*92 (73.0)*	*65 (89.0)*	*0.01*	113 (80.7)	44 (74.6)	0.33
Receive test or examinations for non-cancer diseases	*120 (60.6)*	*67 (53.6)*	*53 (72.6)*	*0.01*	85 (61.2)	35 (59.3)	0.81
Obtain referral(s) to other specialist(s)	129 (66.2)	76 (62.3)	53 (72.6)	0.14	89 (65.4)	40 (67.8)	0.75
Topics deemed “very important” to be included in follow-up care discussions							
Possible effects of breast cancer on relationship with my family	*105 (53.3)*	*60 (47.6)*	*45 (63.4)*	*0.03*	79 (55.6)	26 (47.3)	0.29
Possible effects of breast cancer on relationships with my friends	70 (35.7)	41 (32.5)	29 (41.4)	0.21	53 (37.9)	17 (30.4)	0.32
Challenges I may experience at my job because of my breast cancer[§]	64 (53.8)	35 (47.3)	29 (64.4)	0.09	55 (54.5)	9 (50.0)	0.80
Community-based support groups	89 (45.2)	60 (47.2)	29 (41.4)	0.43	*72 (51.4)*	*17 (29.8)*	*0.01*
Best sources for additional information about breast cancer	128 (65.3)	85 (68.0)	43 (60.6)	0.29	95 (67.4)	33 (60.0)	0.33
Recommendations for healthy behaviors	128 (65.3)	80 (64.0)	48 (67.6)	0.61	96 (68.1)	32 (58.2)	0.19

*A small number of participants chose not to answer certain questions, resulting in missing observations for variables below

+*p* value for association between variable and rural/non-rural status; italicized values are statistically significant (p<.05)

++*p* value for association between variable and age at diagnosis; italicized values are statistically significant (p<.05)

[§] 73 women did not have jobs

The significant interest in survivorship care among breast cancer survivors in this study and others [5, 28] reinforces the importance of the IOM’s call for SCPs. Survivors want to hear about a SCP, most commonly from their physician, and desire a written care plan, but preferences for timing of discussions differed. Focus groups with breast cancer survivors [6] and various cancers [29] have also revealed support for written treatment summaries. However, survivors in these other studies preferred for a nurse to provide survivorship information and at treatment conclusion [6, 29]. This suggests that SCP delivery may need to be tailored to breast cancer survivors’ preferences. Our data suggest that older survivors may prefer to discuss survivorship care earlier in the treatment process, whereas younger women may prefer after treatment.

Findings revealed some distinct survivorship care preferences among women from rural areas. Rural survivors preferred a more comprehensive approach addressing cancer and general health concerns. This may reflect differences in availability and access of medical services in rural areas, but could be challenging in specialist-driven survivorship care models [30]. A shared care model with a primary care provider as an integrated member of a cancer survivorship care team may better meet rural survivors’ preferences for comprehensive care. Rural survivors are more likely to have multiple non-cancer comorbidities, poorer health after cancer, and behavioral risk factors [7, 31]. Women from rural areas are less likely to adhere to primary cancer screening [32, 33] and rural residents have higher rates of comorbidities and risk factors compared with non-rural residents [7, 8]. Thus, survivor’s preference to test for non-cancer diseases on a follow-up visit may represent an opportunity to address health more holistically. Rural primary care providers are receptive to caring for survivors, but as they do not commonly report receipt of SCPs, greater attention to communication and coordination of care is needed [34, 35]. Rural survivors were also more likely to want discussions regarding family relationships, likely reflecting the importance of familial ties in rural communities.

A limitation of this study is the focus on breast cancer survivors who received some component of their cancer care at an academic medical center. Rural survivors who travel to receive care in this setting may have different characteristics and perhaps survivorship care preferences than those receiving cancer care locally. The lack of education and insurance differences between rural and urban survivors was surprising, given rural-urban differences observed in the overall population of survivors [7]. Further, rural-urban classification is complex and schemes vary. We used federally designated RUCA codes that are used to identify areas economically linked to metropolitan areas, designated as urban in our study. The same definitions have been used in other studies [36, 37] and facilitate comparison with our published national estimates of rural-urban differences in cancer survivors [7]. Finally, we recognize that preferences may differ in the youngest survivors (under 40 years), but because breast cancer is less common in this age group, we did not have sufficient numbers to further stratify the younger survivors group.

This study included a well-characterized population of breast cancer survivors, with diagnosis and treatment history verified with cancer registry data. Survey items were based on validated, established measures from prior NCI studies. This study augments the limited qualitative literature reporting on rural-urban and age-related differences in survivorship care preferences [6, 10]. Future larger studies with greater geographic diversity are needed to extend the generalizability of these findings.

Findings provide key information regarding breast cancer survivors' follow-up care preferences and may inform design of survivorship programs serving broad geographic regions. To best meet breast cancer survivors needs, who expressed no clear preference for timing of survivorship discussions relative to receipt of treatment, it may be necessary to adapt timing to personal preferences which presents challenges for clinical workflow. Early introduction may be ideal, with details provided as survivors' desire them and/or a care plan can be developed longitudinally during treatment and reviewed as part of post-treatment survivorship care visits. Breast cancer survivors appear to strongly endorse multiple reasons for follow-up care, suggesting many will not need education or convincing about the importance of such care. Finally, many psychosocial follow-up care topics were perceived as "very important" by most survivors. SCPs that solely focus on medical aspects of care may not fully address the needs of post-treatment breast cancer survivors. Integrated assessment of areas of concern and interest could be used to personalize discussions. In summary, breast cancer survivors endorse medical and psychosocial topics that are commonly promoted for inclusion in survivorship care discussions. Tailoring regarding timing of such discussion, integration of primary care services, and topics may result in care that best meets the needs of survivors who are diverse in regard to geographic location and age.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflicts of interest.

Ethical approval This study was approved by the Wake Forest Health Sciences Institutional Review Board (IRB). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent The Wake Forest Health Sciences Institutional Review Board approved the study with a waiver of written informed consent.

Disclaimer The opinions expressed in this article are the authors' own and do not reflect the views of the National Cancer Institute, National Institutes of Health, the Department of Health and Human Services, or the United States government.

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