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Associations among survivorship care plans, experiences of survivorship care, and functioning in older breast cancer survivors: CALGB/Alliance 369901

Leigh Anne Faul · Gheorghe Luta · Vanessa Sheppard · Claudine Isaacs · Harvey J. Cohen · Hyman B. Muss · Rachel Yung · Jonathan D. Clapp · Eric Winer · Clifford Hudis · Michelle Tallarico · Julhy Wang · William T. Barry · Jeanne S. Mandelblatt

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Abstract

Purpose Survivorship care plans (SCP) are recommended for all cancer patients and could be especially useful to survivors 65 years and over ("older"). This study examined receipt of SCPs among older breast cancer survivors and whether SCPs were associated with improved patient-reported outcomes.

Methods Three hundred and twenty-eight older women diagnosed with invasive, nonmetastatic breast cancer between 2007–2011 were recruited from 78 cooperative-group sites. Participants completed telephone interviews at baseline and 1-year posttreatment. Regression analyses examined SCP receipt (yes/no) and functioning (EORTC-QLQ-C30), cancer worry, and experiences of survivorship care (care coordination, knowledge).

Results Only 35 % of women received SCPs. For each 1-year increase in age, there was a 5 % lower odds of receiving an SCP (odds ratio (OR)=0.94, 95 % confidence interval (CI) 0.91–0.98, $p=0.007$). Besides age, no other factor predicted SCPs. SCP receipt was associated with greater knowledge and understanding of requisite follow-up care ($p<0.05$); however,

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This work was conducted while Dr. Barry was in the Department of Biostatistics and Bioinformatics, Duke University Medical Center, and Alliance/Cancer and Leukemia Group B Statistical Center, Durham, NC

L. A. Faul (✉) · J. Wang · J. S. Mandelblatt
Department of Oncology, Georgetown University Medical Center
and Cancer Prevention and Control Program, Georgetown-Lombardi
Comprehensive Cancer Center, Washington, DC, USA
e-mail: laf56@georgetown.edu

G. Luta
Department of Biostatistics, Bioinformatics and Biomathematics,
Georgetown University Medical Center and Georgetown-Lombardi
Comprehensive Cancer Center, Cancer Prevention and Control,
Washington, DC, USA

V. Sheppard
Department of Oncology, Georgetown University Medical Center
and Breast Cancer Program, Georgetown-Lombardi Comprehensive
Cancer Center, Washington, DC, USA

C. Isaacs
Departments of Medicine and Oncology,
Georgetown University Medical Center and Breast Cancer Program,
Georgetown-Lombardi Comprehensive Cancer Center,
Washington, DC, USA

H. J. Cohen
Department of Medicine and Center for the Study of Aging and
Human Development, Duke University, Durham, NC, USA

H. B. Muss
Department of Medicine, University of North Carolina,
Chapel Hill, NC, USA

R. Yung · E. Winer
Department of Medical Oncology,
Dana-Farber Cancer Institute Harvard Medical School,
Boston, MA, USA

J. D. Clapp · M. Tallarico
Cancer Prevention and Control Program, Georgetown-Lombardi
Comprehensive Cancer Center, Washington, DC, USA

C. Hudis
Department of Medicine,
Memorial Sloan Kettering Cancer Center,
New York, NY, USA

W. T. Barry
Department of Biostatistics and Computational Biology,
Dana-Farber Cancer Institute, Harvard Medical School,
Boston, MA, USA

functioning was not significantly different among those with vs. without SCPs.

Conclusions Receipt of care plans was limited. SCPs improved understanding of breast cancer follow-up care among older survivors, but did not impact functioning one year post-treatment.

Implications for Cancer Survivors To impact functioning and salient needs of the growing cohort of older survivors, survivorship care plans likely should be tailored to geriatric-specific issues. To improve functioning, SCP content should expand to include exercise, nutrition, polypharmacy, social support and management of symptom burden from cancer, and other comorbid conditions. To improve follow-up care for cancer survivors, SCPs should delineate shared care roles between oncology and primary care in managing recurrence surveillance, screening, and cancer sequelae.

Keywords Survivorship care plan · Breast cancer · Cancer survivors · Older adults · Cancer survivorship and aging

Introduction

Women 65 years and older (“older”) constitute 55 % of the three million U.S. breast cancer survivors, and will account for a greater absolute number and proportion of survivors with “the graying of America” [1, 2]. This older survivor population often has age-related declines in functioning and reserve, increasing levels of comorbid illness, and diminished social and economic resources [3–6].

These forces of aging can pose unique challenges for survivorship care, including the need to monitor adjuvant hormonal therapy, manage multiple symptoms and medications, and coordinate care delivery by multiple physicians [7–10]. Survivorship care can be further complicated if older patients are confused about their cancer treatment history [11], recommended follow-up care [8, 12], or how to manage their multiple illnesses [13]. Older patients may also misattribute modifiable symptoms to “normal aging” or believe that their symptoms are not treatable, leading to under-reporting during follow-up visits [14–17].

To improve post-treatment cancer care, the Institute of Medicine recommends providing survivorship care plans, and this recommendation was formally incorporated into oncology practice guidelines in 2007 [18–23]. The expectation was that care plans would enhance survivorship experiences and translate into improved functioning and survival [18, 20, 24, 25]. While dissemination has been slow [26–28], emerging data suggests that care plans may decrease cancer worry [29], enhance understanding of care coordination [30, 31], increase confidence in communicating with providers [31], and improve adherence to late effects surveillance [32]. However, there is little data regarding the effectiveness of care plans for improving functioning [33], and no data on their use in older populations, a group where functioning is an especially important outcome [34].

To fill this gap, we analyzed data from a national prospective cohort of older breast cancer patients to evaluate the use and impact of survivorship care plans on patient-reported outcomes one-year postactive treatment. After describing correlates of care plan receipt, we test the hypothesis that older women who received plans (vs. not) would report better experiences of survivorship care, controlling for covariates. Further, we postulated that older women with care plans would report better functioning and less worry than women without plans, controlling for age and prediagnosis functioning. These associations were also examined among different subgroups based on age, education, and social support. Finally, we conducted exploratory analyses to assess whether survivors’ experiences of care were associated with functioning. Results of this study are intended to contribute to the growing literature on survivorship care plans, evaluate their benefits among older breast cancer survivors, and guide future interventions to refine care plans for the growing older survivorship population.

Methods

Study design and data collection

This report is a secondary analysis of data from a larger longitudinal cohort study examining chemotherapy patterns and outcomes among older women at 78 hospitals/practices affiliated with Cancer and Leukemia Group B (CALGB) protocol #369901, presently part of the Alliance for Clinical Trials in Oncology [35, 36]. The protocol met HIPAA standards and was approved by CALGB, NCI, and institutional review boards at all sites. Clinical research associates (CRAs) ascertained patients, confirmed eligibility, and upon physician approval, obtained consent. Registration was managed by the CALGB Statistical Center. Oncologists completed a one-time mail survey, and clinical data were obtained via medical chart abstraction. Participants in the cohort were assessed via structured telephone interviews at baseline, 6 months, 12-months postbaseline, 24-months postbaseline, and then annually for up to 7 years. This secondary analysis focused on outcomes at 24-months, as this follow-up timepoint roughly corresponds to one year after active treatment for breast cancer. Active treatment for breast cancer comprised surgery, chemotherapy, and radiation, but excluded hormonal therapy.

Setting and population

Participants were enrolled between January 2004 and April 2011. To enroll in the study, one must have been (a) female with newly diagnosed with invasive nonmetastatic breast cancer (tumors ≥1 cm, stage I–III), b) at least 65 years old at the time of breast cancer diagnosis, (c) English- or Spanish-speaking, and (d) within 20 weeks of their last definitive surgery. Among the 1,703 women registered, 91 % were eligible to complete the baseline interview (Fig. 1). One hundred and forty-five women were ineligible for baseline interviews due to failing the cognitive screen [37], dying prior to interview, or being found stage ineligible. The larger cohort sample included 1,558 participants, 1,288 of whom completed a baseline interview. Among these 1,288 participants, women were excluded from this secondary analysis due to the following: study enrollment before 2007 when care plans were first recommended [19] and enrollment in late 2008 before questions regarding care planning were added to interviews (n= 701). Additionally, we excluded 106 women who experienced breast cancer recurrence between baseline and 24-month follow-up due to re-initiation of active breast cancer treatment.

From this target sample, 328 women (68 %) completed 24-month interviews (one year postactive treatment), thus forming the final analytic sample for this secondary analysis. There were no differences in sociodemographic or clinical factors between the final analytic sample and the 153 women excluded due to missing data. Additionally, the 328 women in the analytic sample were similar to the overall cohort, except for having earlier stage (p=0.04, due to the exclusion of recurrences), and having received treatment in a community setting (vs. comprehensive cancer center, p=0.004). These two factors were not controlled for as covariates in multivariate analyses, given that “site of treatment” did not affect the results when included in the model and “earlier stage” was anticipated given our deliberate exclusion of women with recurrence from the final analytic sample.

Measures

Measures were guided by the care planning research paradigm described by Parry and colleagues [33]. After examining correlates of receipt of a survivorship care plan (yes/no), this variable was the primary factor used to assess associations with study outcomes. Women were asked if they “were ever given a written breast cancer care plan by the doctors you have seen when you finished your treatment? This plan might include a summary of your breast cancer and all the treatments you got, and suggestions for what things you or your doctors should do in the next year.”

Outcomes

We examined the association of care plans with two patient-reported outcomes: measures of survivorship care experiences (patient-oncologist communication, care coordination, self-efficacy in communicating with physicians, and knowledge of survivorship care) and functioning (physical, emotional, and role). Cancer worry was a secondary outcome.

Communication with oncologists was adapted from the five-item scale from the Primary Care Assessment Survey (PCAS), and assesses thoroughness of oncologists’ questions about health concerns and clarity of instructions regarding when to seek additional care [38]. Scores range from 0–100 (Cronbach’s=0.97), but given that observed scores were skewed toward excellent communication, scores were categorized into “high” vs. “low” based on the sample median.

Self-efficacy in communicating with physicians (communication self-efficacy) was measured by the Perceived Efficacy in Patient-Physician Interactions scale [39]. This 10-item scale assesses patients’ confidence in effectively communicating their needs and health concerns to providers, with scores ranging from 10–50 (Cronbach's=0.90). Scores were categorized into “high” vs. “low” based on the sample median since there were ceiling effects.

Perception of care coordination was assessed using one item from the Picker adult in-patient questionnaire [40, 41] adapted for cancer survivors. The item asked the survivor to rate the degree to which “doctors coordinated her care so that each physician knows what s/he is responsible for” where responses ranged from “very coordinated” to “very uncoordinated”on a 5-point Likert scale. Based on prior research, responses were grouped into “very coordinated” vs. all other responses [26, 42, 43].

Understanding of breast cancer survivorship care was assessed by a single 4-point Likert-scaled item and dichotomized as “excellent” vs. “less than excellent” [26, 42, 43]. One Picker [40, 44] item was adapted for survivors in order to assess having knowledge of the next steps in cancer follow-up care (“always” vs. “less than always”) [26, 42, 43].

Functional outcomes were assessed by the European Organization for Research and Treatment questionnaire (QLQ-C30), initially developed to assess functioning and quality of life outcomes in cancer populations [45–49]. Three QLQ-C30 subscales, physical functioning (Cronbach’s=0.62), emotional functioning (Cronbach’s=0.76), and role functioning (Cronbach's=0.87), were used; higher scores represent better functioning [45–49].

Cancer worry was assessed by four items from the Cancer Rehabilitation Evaluation System (CARES) (Cronbach’s= 0.77) [50]. Lower scores represent less worry.

Controlling variables

Socio-demographic, clinical, and physician measures were included in these analyses as correlates of receiving a care plan and as potential controlling variables for assessment of outcomes. Socio-demographic factors include age, race, marital status, type of health insurance, education, and year of enrollment. Clinical factors include stage,

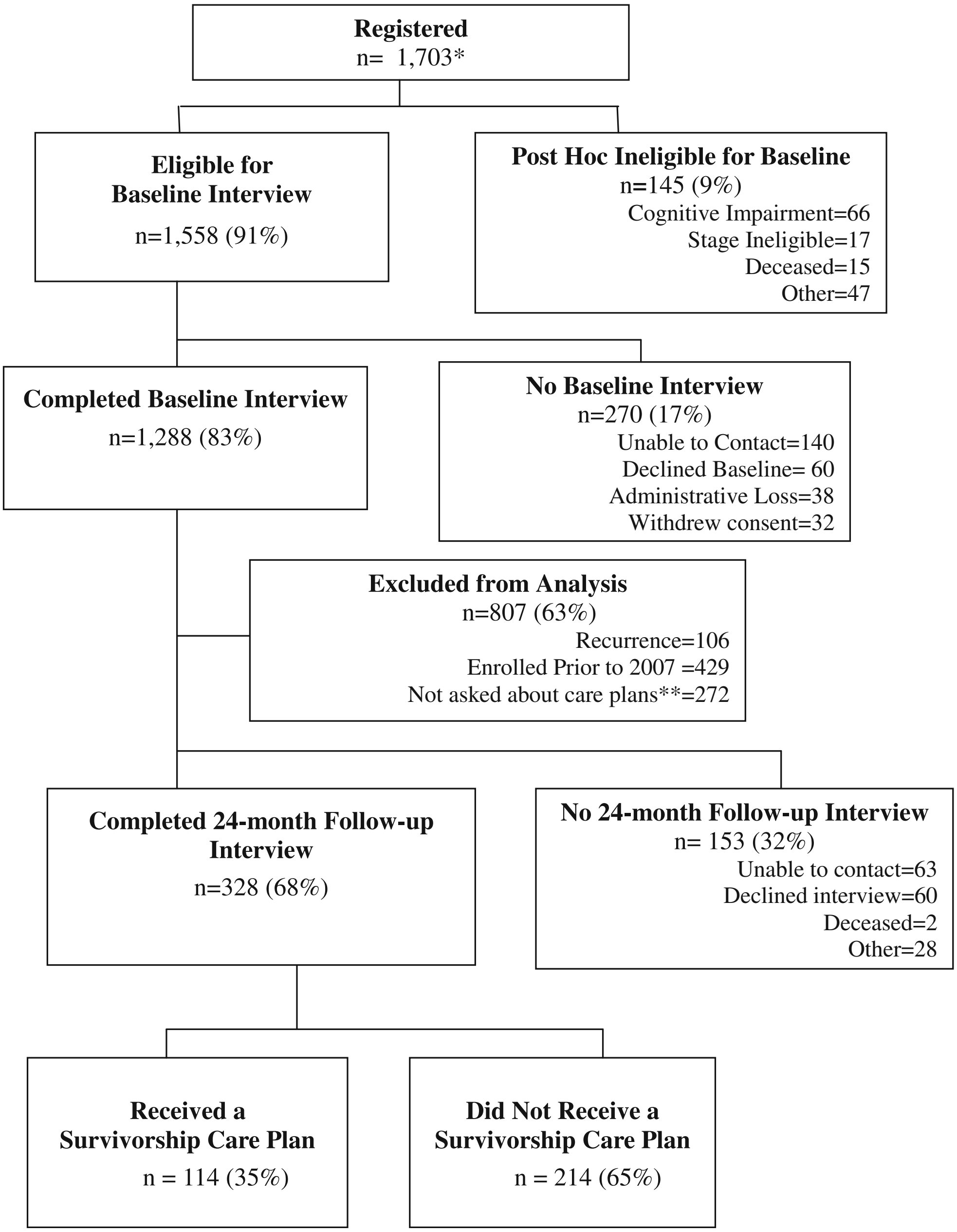

Fig. 1 Consort diagram for sample selection of older breast cancer patients and survivorship care planning. * a total of 1,703 participants registered to the study. This is a correction from a 2012 publication indicating 1,704 participants [36]. A duplicate entry for one participant was deleted. ** 272 participants were missing a response to the item regarding receipt of a survivorship care plan because this item was only added to surveys mid-study in late 2008

estrogen receptor status, time since diagnosis, and treatment (surgery, chemotherapy); data on radiotherapy were not collected. Comorbid illness was assessed by the 16-item Physical Health scale of the Older Americans Resources and Services Multidimensional Functional Assessment [51]. Pre-cancer functioning were measured using the physical (Cronbach's=0.94, PCS) and mental (Cronbach's=0.97, MCS) component summary scores from Medical Outcomes Survey SF-12; prior role function was measured using a single item [52, 53]. Oncologist factors included gender, years since medical school graduation, practice setting, and patient volume for breast cancer and for patients 65 and older (high vs. low based on sample median).

Statistical analysis

We used *t* tests and X^2 tests to determine differences between women who received care plans versus those who did not with respect to socio-demographic, clinical, and physician factors. Next, univariate and logistic regression analyses tested for associations of survivorship care planning and individual measures of experiences of survivorship care. Variables related at $p \leq 0.05$ in univariate analysis to both survivorship care plans and experiences of care were considered for inclusion in the regression model. Backward elimination was then used to select the final model.

Separate linear regression models were used to examine associations between care plans and the three functional outcomes and cancer worry, controlling for age and pre-cancer functioning, a priori covariates. Additionally, in exploratory analyses, we used linear regression models to examine relationships between care plans and functioning among subgroups based on age, education, and social support. Additional exploratory analyses of the associations between functioning and experiences of survivorship care followed similar methodology. The latter were examined to suggest potential pathways of the effect of survivorship care plans. Hosmer-Lemeshow (H-L) and R^2 statistics were used to assess model fit for logistic and linear regressions, respectively.

Since this was an unplanned analysis, we also estimated post hoc power to detect a relationship between survivorship care plans and our primary outcome—functioning. Given the sample size, the study had more than 80 % power (two-sided, p=0.05) to detect a clinically meaningful difference of 8–10 points on all three functional outcomes [54], representing approximately 1 standard deviation on the EORTC [45–49], between women who received a care plan vs. those who did not. Power to detect a smaller effect (4-point difference or a 0.5 standard deviation) was lower at 34, 63, and 39 % for physical, emotional, and role function scales, respectively. We did not consider correlation of care plans within site since results were largely null; correction for intra-class correlations should only have further decreased significance and power. Data were analyzed with SAS v.9.2 software (SAS Institute Inc., Cary, NC). Results analyzed were available in the study database as of November 6, 2013.

Results

The older survivors included in this analysis were, on average, 72.8 years old (Table 1). Most women had ER-positive, node negative breast cancers, and 39.8 % had received adjuvant chemotherapy. Women reported physical (mean=51.3± 7.9SD) and emotional (mean=56.7±5.4SD) function prior to cancer diagnosis, comparable to population norms (mean=50±10SD).

Use of care plans increased from 20 to 37 % in the study period (p value for trend=0.10), but overall, only an average of 35 % of older women reported ever receiving a plan (Table 1). Women who received plans were younger than those who did not (p=0.006) and more likely to be married (p=0.02). Receipt of a care plan was not related to any other socio-demographic, clinical, or physician-related factors, including receipt of chemotherapy. Only age remained significantly related to care plans in multivariate analyses, where the odds of receiving a survivorship care plan decreased by 5 % for each one-year increase in age (OR=0.94, 95 % CI 0.91–0.98, p=0.007).

Women who received a care plan tended to report better experiences of survivorship care than those who did not receive plans (Table 2). Specifically, those who received care plans (vs. not) had higher adjusted odds of reporting an excellent (vs. less) understanding of follow-up care (aOR 1.73, 95 % CI 1.08–2.9, p=0.02) and greater knowledge of next steps in cancer care (aOR 1.72, 95 % CI 1.03–2.9, p=0.04), controlling for covariates. Women who received care plans tended to also report higher (vs. lower) self-efficacy in communicating with their oncologists, compared to women without care plans (aOR 1.42, 95 % CI 0.92–2.35, p=0.11). Cancer worry and physical, social, and role functioning did not significantly differ among older women with vs. without care plans at one-year post-treatment (Table 3). No association was found between care plan receipt and functioning in any subgroups (e.g., based on age, education, social support; data not shown).

Finally, we conducted separate linear regression analyses to explore potential relationships between functioning and experiences of survivorship care. Each functional domain was significantly associated with two or more care factors. For instance, mean physical function among women reporting low communication with their oncologists (76.6±1.9SD) was nearly 7 points below that of women with higher communication (83.2±1.9SD), p=0.02 (data not shown), where an 8-point difference is considered clinically meaningful.

Discussion

This is the first report of the correlates of survivorship care plan receipt and relationships between care plans and functional outcomes in older breast cancer patients. Only about one-third of older women reported receipt of a care plan and rates decreased with advancing age. While care plans were associated with better survivorship care experiences, they were not related to outcomes of importance to older indiviuals one year after active treatment, including physical, emotional, and role functioning, nor did they diminish worry about cancer.

Very few older women in our sample received a survivorship care plan. This result is similar to that seen nationally [19, 26–28]. Forsythe noted that only 20 % of oncologists reported always providing care plans [26]. In our older cohort, rates rose from 20 % in 2007 to about 37 % by 2011. Low rates of care plans in an older patient population is of specific concern since this is a group where coordination of care, recognition of symptoms related to late effects of cancer care, and distinguishing these symptoms from those attributable to other

Table 1 Characteristics of older breast cancer survivors by self-reported receipt of a survivorship care plan

	Total sample[a, b]		Survivorship care plan[b]				
	N=328		YES, N=114		NO, N=214		
	No.	%	No.	%	No.	%	*p*-value
Age (65–88 years) mean±SD	72.8±5.8		71.6±5.5		73.4±5.8		*0.006*
65–69	116	35	47	41	69	59	
70–74	86	26	34	40	52	60	
75–79	72	22	21	29	51	71	
80 or older	54	17	12	22	42	78	
Marital status							
Married	191	58	76	40	115	60	*0.02*
Not married	137	42	38	28	99	72	
Race[c]							
Hispanic/Latina	4	1	1	25	3	75	0.12[c]
AI/AN	5	2	1	20	4	80	
A/PI	2	<1	2	100	–	–	
AA/B	20	6	11	55	9	45	
C/W	296	90	99	33	197	67	
More than one race	1	<1	–	–	1	100	
Education							
12 years or less	128	39	41	32	87	68	0.62
More than 12 years	200	61	73	36	127	64	
Insurance							
Medicare only	29	8	11	38	18	62	0.93
Medicare+Medicaid	34	10	12	35	22	65	
Medicare+private	265	82	91	34	174	66	
HMO							
Yes	53	16	24	45	29	55	0.08
No	275	84	90	33	185	67	
Cancer stage							
I	160	49	58	36	102	64	0.81
IIA	108	33	37	34	71	66	
IIB–III	60	18	19	32	41	68	
Surgery type							
Breast conservation	210	64	74	35	136	65	0.85
Mastectomy	117	36	40	34	77	66	
Estrogen receptor status							
Positive	280	88	94	34	186	66	0.36
Negative	47	12	19	40	28	60	
Chemotherapy							
No	197	60	68	35	129	65	0.87
Yes	130	40	46	35	84	65	
Time since cancer diagnosis (mean±SD)	24.1±4.1		24.1±4.3		24.0±3.8		0.79
Comorbid illness (mean±SD)	2.8±1.6		2.7±1.6		2.9±1.6		0.40
Physical function, pre-cancer[d] (mean±SD)	51.3±7.9		51.6±7.3		51.2±8.2		0.71
Mental function, pre-cancer[e] (mean±SD)	56.7±5.4		57.0±5.1		56.6±5.6		0.47
Setting of cancer care							
NCI Cancer Center	74	23	24	32	50	68	0.63
Community	254	77	90	35	164	65	
Oncologist gender							
Male	192	62	70	36	122	64	0.24
Female	117	38	35	30	82	70	

Table 1 (continued)

	Total sample[a, b]		Survivorship care plan[b]				
	N=328		YES, N=114		NO, N=214		
	No.	%	No.	%	No.	%	*p*-value
Years since graduation from medical school[f] (mean±SD)	20.9±9.0		20.7±9.9		20.9±8.5		0.82
% Patients 65 and older (mean±SD)	44.4±12.5 %		44.8±13 %		44.1±12 %		0.68
Patient volume breast cancer							
Less than 50 %	162	56	55	34	107	66	0.95
50 % or more	128	44	43	34	85	66	
Seen by a medical oncologist							
Yes	304	93	104	34	200	66	0.46
No	24	7	10	42	14	58	
Year of study enrollment[g]							
2007	50	15	10	20	40	80	0.06
2008	110	33	42	38	68	62	
2009	99	30	37	37	62	63	
2010/2011	69	21	25	36	44	64	

No. number of participants, *SD* standard deviation, for *p*-values, where italics indicates $p < .05$, *AI/AN* American Indian/Alaskan Native, *A/PI* Asian/Pacific Islander, *AA/B* African American/ Black, *C/W* Caucasian/non-Hispanic White, *HMO* health maintenance organization, *NCI* National Cancer Institute

[a] Some numbers may not add to total, since some variables have missing data. All variables are missing <5 %, except physician-reported patient volumes (12–16 % missing)

[b] We have used column percentages to describe the distribution of each characteristic variable and row percentages to describe the distribution of survivorship care plan for each level of the characteristic variables

[c] Race was collapsed into two categories for univariate analyses, White (n=296) vs. non-White(n=32)

[d] Pre-cancer physical function assessed by the SF-12 Physical Component Summary. Scores range from 0–100, where higher PCS scores represent better function; the population average score is 50 with a standard deviation of 10 [52, 53]

[e] Pre-cancer mental function assessed by the SF-12 Mental Component Summary. Scores range from 0–100, where higher MCS scores represent better mental function; the population average score is 50 with a standard deviation of 10 [52, 53]

[f] Years since medical school graduation=(survey completion date)−(physician-reported graduation date)

[g] Coinciding with initial Institute of Medicine recommendations [18, 19]

comorbid illnesses are especially important in improving functioning [34, 55]. Notably, women who underwent chemotherapy were no more likely to receive care plans, despite their heightened risk of heart failure and other treatment-related late effects [56].

The original development of survivorship care plan recommendations was motivated by concerns that many cancer patients reported confusion regarding their follow-up care [8, 11, 12]. Care coordination and communication have recently been reemphasized as important goals of care plans [33]. Our results indicate that care plans have realized the goal of enhanced understanding of cancer survivorship care in an older patient population. In younger populations, care plans have improved survivors' knowledge of requisite surveillance [32], the provider responsible for their follow-up care [30], and awareness of the need for survivorship care [32]. If confirmed, the trends toward relationships between experiences of survivorship care and functioning in our exploratory analysis suggest that patient-oncologist communication about function may be one pathway whereby care plans could potentially affect outcomes important to older survivors. Increased knowledge of recommended cancer follow-up care could also enhance adherence to long-term hormonal therapy regimens, surveillance for symptoms of recurrence, and screening for new primary cancers. While we did not have data to measure these outcomes, evaluation of the ability of care plans to impact these additional care components should be a high priority.

Our finding that care plans did not affect the functioning of older women is not surprising since most plans focus on treatment summaries and recommended surveillance [26–28], but do not include instructions directed specifically at improving functioning [57]. This null result is also consistent with two prior randomized controlled trials [29, 30]. For instance, Grunfeld and colleagues found that a care plan intervention for younger breast cancer survivors did not improve physical functioning, mental well-being, or cancer-related distress 12-months postintervention [30, 58]. Hershman and colleagues replicated these null results in a small trial of survivors predominately under age 65 [29].

Table 2 Relationships between receipt of survivorship care plan and experiences of survivorship care among older women with breast cancer

	Overall sample	Survivorship care plan		Odds ratios, 95 % confidence intervals and *p*-values			
	N=328 %	YES, n=114 %	NO, n=214 %	Unadjusted OR(CI)	*p*	Adjusted OR(CI)[ab]	*p*
Patient-oncologist communication							
Low communication	50	44	53	Referent	0.12	Referent	0.16
High communication	50	56	47	1.45 (0.90–2.35)		1.42 (0.87–2.30)	
Communication self-efficacy							
Low self-efficacy	50	44	53	Referent	0.11	Referent	0.11
High self-efficacy	50	56	47	1.45 (0.91–2.31)		1.42 (0.92–2.35)	
Care coordination							
Less than very coordinated	32	27	35	Referent	0.13	Referent	0.23
Very coordinated	68	73	65	1.48(0.8–2.47)		1.38(0.82–2.32)	
Understanding of breast cancer survivorship care							
Less than excellent	60	50	65	Referent	*0.01*	Referent	*0.02*
Excellent understanding	40	50	35	1.84 (1.15–2.9)		1.73 (1.08–2.9)	
Knowledge of next step in your cancer follow-up care							
Less than always	36	28	41	Referent	*0.02*	Referent	*0.04*
Always know	64	72	59	1.86 (1.12–3.1)		1.72 (1.03–2.9)	

N number of participants, *OR* odds ratio, *CI* confidence interval, for *p*-values, where italics indicates $p < .05$

[a] Adjusted models control for age as covariate

[b] The *p* values from the Hosmer-Lemeshow goodness of fit tests for the logistic regression models used to generate the adjusted results ranged from 0.23–0.68, supporting the fit of those models

The intervention in these negative studies was a single, brief nurse-led session reviewing the care plan. Juxtaposed against the null results are findings that cancer patients are more satisfied with information received during treatment than in survivorship [59, 60] and that patients like survivorship care plans but view them as too technical, incomplete, and somewhat limited in scope regarding recommendations for health promotion and prevention [8, 61, 62]. Taken together, these results suggest that a priority for future research is to create and test geriatric-centered care plans specifically targeting late effects, comorbidities, and other symptoms that affect the functioning of older adults [8, 34, 52, 57, 63]. Plans may also need to include explicit guidance on methods to maintain and enhance functioning, such as being physically active and communicating symptoms to providers.

Table 3 Associations between survivorship care plan, functioning and cancer worry among older breast cancer survivors 1-year postactive treatment

	Overall sample	Survivorship care plan		Mean differences (MD) care plan vs. no care plan			
	N=328 Mean±SD	YES=114 Mean±SD	NO=214 Mean±SD	Unadjusted MD (95 % CI)	*p*-value	Adjusted [ab] MD (95 % CI)	*p*-value[b]
Physical function[c]	80.3±22.5	82.8±21.3	79.0±23.0	3.9 (−1.5, 9.2)	0.16	2.7 (−2.3, 7.6)	0.29
Role function[c]	89.8±20.5	91.4±16.14	89.0±22.5	2.4 (−2.5, 7.3)	0.33	0.8(−3.7, 5.3)	0.72
Emotion function[c]	88.8±15.1	90.5±15.2	87.9±15.0	2.6 (−1.0, 6.2)	0.15	2.2(−1.4, 5.9)	0.22
Cancer worry[d]	1.4±0.6	1.3±0.5	1.4±0.7	−0.1(−0.2, 0.1)	0.25	−0.1(−0.2, 0.1)	0.21

MD mean differences, *SD* standard deviation, *CI* confidence interval, *P p*-value

[a] Adjusted in a linear regression for age as well as pre-cancer functioning (a priori control variable)

[b] The *R*-squared values ranged from .02 (worry) to .18 (physical function). Pre-cancer function was measured by the physical and mental function summary component scores of the MOS SF-12 [52, 53]. Thus, QLQ-C30 Physical Function was adjusted for age and physical component summary score(PCS, SF-12); QLQ-C30 Emotion Function was adjusted for age and the emotional component summary score(MCS, SF-12); QLQ-C30 Role Function was adjusted for age and one item on the SF-12 of pre-cancer role function. Cancer Worry was adjusted for age and emotional component summary score(MCS, SF-12)

[c] Physical, role, and emotion function subscales of the Quality of Life Questionnaire from the European Organisation for Research and Treatment of Cancer (EORTC-QLQ-C30). Scores range from 0–100, where higher scores indicate better functioning in the specific functional domain [45–49, 54]

[d] Higher scores indicate greater worry on the Worry Subscale of the CARES [50]

Strengths of this study include the unique focus on a large sample of older breast cancer survivors. However, there are several caveats that should be considered in evaluating our results. First, we did not have data on the delivery mode and content of survivorship care plans. A related concern is that we relied on self-report of care plan receipt, and as such, misclassification was possible. If non-systematic, this could have biased toward the observed null result. However, we have no data to determine if misclassification of care plans existed. Next, our sample was relatively healthy with limited variability in baseline functioning, so that our measures may not have been sensitive enough to capture small differences [45, 46]. However, we did have power to detect minimally clinically meaningful changes in function [54]. Another limitation of this analysis is that our sample included a significant proportion of well-educated survivors treated in cooperative group settings, which limits generalizability. Additionally, it is difficult to estimate the impact of loss to follow-up in the subsample. However, the women in the analysis were similar to those enrolled but lost to follow-up, decreasing the probability of systematic biases affecting results.

Overall, the results of this study suggest that while care plans may be having the intended positive effect on experiences of survivorship care for older breast cancer patients, the promise of benefits in terms of functioning has yet to be realized. However, care plans continue to be promoted to improve the quality of survivorship care in the absence of a strong empirical evidence base [20, 21, 33] and will soon be required for accreditation by the American College of Surgeons Commission on Cancer [20]. Given the projected dramatic increases in the number of older cancer survivors, additional research developing and testing geriatric-specific survivorship care plans is urgently needed to provide the knowledge base to meet the health needs and maximize functioning of this growing population.

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Author Contributions Conception and design: Leigh Anne Faul, Jeanne S. Mandelblatt

Collection and assembly of data: Jeanne S. Mandelblatt, Claudine Isaacs, Michelle Tallarico, Hyman B. Muss, Eric Winer, Harvey J. Cohen, Clifford Hudis

Data analysis and interpretation: Leigh Anne Faul, Jeanne S. Mandelblatt, Gheorghe Luta, Jonathan Clapp, Vanessa B. Sheppard, Claudine Isaacs

Manuscript writing: All authors

Final approval of manuscript: All authors

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