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Personality, coping, and social support as predictors of long-term quality-of-life trajectories in older breast cancer survivors: CALGB protocol 369901 (Alliance)

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Abstract

Background—To determine long-term quality-of-life (QOL) trajectories among breast cancer survivors aged 65+ (older) evaluating the effects of personality and social support.

Methods—Older women (N = 1280) newly examined with invasive, nonmetastatic breast cancer completed baseline assessments. Follow-up data were collected 6 and 12 months later and then annually for up to 7 years (median 4.5 years). Quality of life was assessed using EORTC-QLQ-C30 emotional, physical, and cognitive scales. Optimism (Life Orientation Test), Coping (Brief COPE), and social support (Medical Outcomes Study) were assessed at baseline. Group-based trajectory modeling identified QOL trajectories; multinomial regression evaluated effects of predictors on trajectory groups. Age, education, systemic therapy, comorbidity, and reported precancer function (SF-12) were considered as controlling variables.

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SUPPORTING INFORMATION

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Results—Three trajectories were identified for each QOL domain: “maintained high,” “phase shift” (lower but parallel scores to “maintained high” group), and “accelerated decline” (lowest baseline scores and steepest decline). Accelerated decline in emotional, physical, and cognitive function was seen in 6.9%, 31.8%, and 7.6% of older survivors, respectively. Maladaptive coping and lower social support increased adjusted odds of being in the accelerated decline group for all QOL domains; lower optimism was only related to decline in emotional function. Chemotherapy was related to physical and cognitive but not emotional function trajectories.

Conclusions—Personality and social resources affect the course of long-term emotional well-being of older breast cancer survivors; treatment is more important for physical and cognitive than emotional function. Early identification of those vulnerable to deterioration could facilitate clinical and psychological support.

Keywords

cancer; long-term quality-of-life trajectories; older breast cancer survivors; oncology; personality; social support

1 INTRODUCTION

Cancer and its therapies can have substantial and potentially long-lasting impact on different domains of the quality of life (QOL) of the 15.5 million cancer survivors.¹ Among women, breast cancer survivors are the largest group of survivors,¹ and many, but not all, develop clinically meaningful QOL problems. Quality-of-life outcomes have been noted to be associated with demographic, clinical, and psychological factors.^{2–4}

Theories of stress and coping, self-regulation, personality, and social processes have shaped the theoretical framework for identifying determinants of psychosocial adjustment to cancer.⁵ Higher perceived social support has been consistently associated with better psychological adjustment to cancer and higher QOL.^{6,7} Use of active and engagement coping strategies by breast cancer survivors is also positively associated with better QOL, while passive and avoidance strategies seem to be associated with lower QOL.^{8–12} Personality characteristics such as optimism have also shown a positive association with better QOL in breast cancer survivors.^{13–15}

However, most longitudinal studies have studied change at the group level and were not able to identify underlying trajectories in QOL or predictors of subgroups at risk for poor QOL. Further, the few studies examining trajectories have generally only assessed a single aspect of QOL, mostly emotional distress^{16–23} or acute stress symptomatology,²⁴ and shown distinct trajectories of distress following a breast cancer diagnosis that are consistent with patterns of adjustment to traumatic life events suggested by Bonanno.²⁵ Some of these studies have also examined the psychological predictors of membership in a trajectory group, concluding that personal and social resources distinguish the different trajectories of the distress of breast cancer patients over time: Women with less self-esteem and less personal control,¹⁹ lower sense of mastery,²⁰ less optimism,^{20,21,23} higher trait and state anxiety or neuroticism,^{18,20} higher focus on symptoms and use of anxious preoccupation

and cognitive avoidance as coping strategy,^{17,24} and less social support^{16,22,23} were more likely to be classified in the higher distress groups.

Moreover, most prior investigations have not focused on cancer survivors 65 and older (“older”), who constitute two-thirds of survivors²⁶; this group will represent 75% of survivors by 2040. We know little about the trajectories of QOL in older breast cancer patients, although there seems to be considerable variability in QOL in this group.^{27,28} One study examined trajectories of self-reported cognitive function in older breast cancer survivors²⁹ and found trajectories consistent with ageing theory³⁰: mild decline seen in normal aging; decline shifted below but parallel to normal aging; and steeper slopes of decline seen with accelerated aging.

This study extends prior research with up to 7 years of prospective data from a large extant longitudinal cohort of older disease-free breast cancer survivors (“survivors”) to determine trajectories of self-reported QOL in 3 domains (physical, emotional, and cognitive function) and tests the effects of optimism, coping strategies, and perceived social support on these trajectories. The results are intended to identify subgroups of survivors at risk for accelerated declines in QOL and inform interventions to prevent functional decline.

2 METHODS

2.1 Setting and population

The study was conducted at 78 Cancer and Leukemia Group B (CALGB) sites (now part of the Alliance for Clinical Trials). The research protocol (CALGB 369901) was approved by CALGB, the National Cancer Institute, and all site institutional review boards. This paper reports on survivors newly examined with breast cancer that were registered to between January 1, 2004 and April 1, 2011 with follow-up data to June 30, 2015.

Eligible participants were 65 years or older, examined with invasive nonmetastatic breast cancer (tumors ≤ 1 cm), spoke English or Spanish, passed a cognitive screen using the Blessed Orientation-Memory-Concentration test (“Blessed”),³¹ and were within 20 weeks after their definitive surgery. Among eligible participants, 83.7% ($n = 1280$) completed baseline interviews (Figure 1). Those who completed baseline interviews (vs refused) were slightly younger (72.7 vs 74.7 years, $P = .09$), had earlier stages (45.6% vs 39.2% stage 1, $P = .01$), and were more likely to be white than nonwhite (88.1% vs 81.3%, $P = .005$).

Most baseline interviews were conducted prior to initiation of systemic therapy. However, mean times from last surgery to enrollment and enrollment to baseline interview were 8.4 (SD 4.9) and 3.9 (SD 3.0) weeks, respectively, so that baseline interviews could have occurred during chemotherapy for those who received this modality. Data from those with recurrences ($n = 132$, 10.4%) were excluded at recurrence. Recurrence, death, and follow-up interview data are summarized on Table S1.

Enrollment and data collection was managed by the Alliance Statistics and Data Center. Interviews were conducted via telephone by centralized staff; follow-up interviews occurred 6 and 12 months after baseline interview and then annually for up to 7 years. The median

follow-up time was 4.1 years (range 0.5–7). Table S2 shows numbers of follow-up assessments available for analysis.

2.2 Variables and instruments

Health-related QOL was measured at all time points using the Quality of Life Questionnaire Core 30 developed by the European Organization for Research and Treatment of Cancer—EORTC QLQ-C30.³² This instrument includes 5 functional scales that evaluate self-reported Physical, Role, Emotional, Cognitive, and Social Functioning through several Likert-scaled items each of them. Because of the low variability of our sample on the Social and Role subscales, only *Emotional function* (4 items assessing feeling tense, worried, irritable, and depressed; $\alpha = .74$), *Physical function* (5 items assessing trouble doing strenuous activities, taking a long walk, taking a short walk, need to stay in bed or chair during the day, and need help with eating, dressing, washing, or using the toilet; $\alpha = .66$), and *Cognitive function* (2 items assessing difficulty in concentrating on things and remembering things; $\alpha = .52$) were included as outcome variables in this analysis. Reliability was similar across all time points. Scores for each domain are normalized to 0 to 100, where higher scores represent better functional QOL.

Dispositional Optimism was assessed at baseline with the 12-item Life Orientation Test ($\alpha = .70$).³³ Respondents indicated their degree of agreement with statements such as “In uncertain times, I usually expect the best,” using a 5-point Likert scale ranging from *strongly disagree* to *strongly agree*. Higher scores indicate greater optimism.

Coping Strategies were assessed at baseline by the Brief COPE³⁴ that assesses 14 conceptually different coping strategies in response to stress. Participants rate the extent to which they usually use each strategy when dealing with cancer-related stress using a 4-point Likert scale ranging from 1 (“I haven’t been doing this”) to 4 (“I’ve been doing this a lot”). Each subscale has 2 items and are scored by summing responses, with high scores indicating greater use of that type of coping strategy. The intent of the original instrument was to use subscales separately or to combine them to create second order factors, but there is no consensus on approach since the factor structure may differ by population.¹⁴ We considered 9 of the original 14 subscales and grouped them based on the results of a recent theory-based meta-analysis of coping with breast cancer.¹⁴ Active Coping, Instrumental Support, Emotional Support, Acceptance, and Positive Reframing were combined to assess *Engagement Coping* ($\alpha = .83$). The Behavioral Disengagement and Denial subscales were combined as *Disengagement Coping* ($\alpha = .66$). *Venting* ($\alpha = .61$) and *Self-Distraction* ($\alpha = .65$) were considered as separate subscales.

Social Support was assessed at baseline by the Medical Outcomes Study³⁵ subscales for the perceived availability of *Emotional Support* (7 Likert scale items; $\alpha = .95$) and *Tangible Support* (4 Likert scale items; $\alpha = .93$). Higher scores indicated more support.

Several factors were considered as potential confounders of the relationships between QOL functional domains, optimism, coping strategies, and social support, including age at baseline, education (high school vs >high school), surgery (breast conservation vs mastectomy), systemic treatment type (chemotherapy $\pm$ hormonal therapy vs hormonal

therapy), comorbidity (≤ 2 vs >2 noncancer conditions), and precancer physical and mental functioning assessed retrospectively for the 2 months prior to diagnosis by the Mental Health Component Score and Physical Health Component Score of the Medical Outcomes Survey Short-Form General Health Survey.³⁶ Stage was not included since it was highly correlated with receipt of systemic therapy.

2.3 Statistical analysis

Group-based trajectory modeling was used to identify trajectories for emotional, physical, and cognitive functional scales.³⁷ This approach fits a discrete, semiparametric model to longitudinal data using maximum likelihood methods to estimate probabilities for multiple trajectories, rather than using a single group mean as in traditional regression or growth-curve models. This method allows use of all observed data, even if missing for some time points. The Bayesian information criterion (BIC) was used to select the number of trajectories that best fit the data (Table S3). Since the default model is to have all of the data treated equally and following the same trajectory, the model that has the greatest change in Bayesian information criterion from the default model gives the number of trajectories that best fit the data. Within the chosen models, the individual trajectories were examined to see if an adequate number of participants were assigned to each group, if the individual trajectories within the model were significant within the model ($P \leq 0.05$) and the groups had face validity in ageing theory. After the number of trajectories was identified, the shape of each individual trajectory within the model was tested to find the best fit. Bayesian information criterion testing was done with intercept-only models, but subsequent testing looked at linear, quadratic, and cubic shapes while maintaining that the trajectory stays significant.

Survivors were assigned to a trajectory group based on the highest predicted probability of group membership. Analysis of variance and chi-square tests evaluated the bivariate associations between trajectory group and covariates. Independent variables associated with trajectory group at $P \leq 0.05$ were included in multinomial logistic regression analyses predicting trajectory group. Separate models were constructed for each functional domain. Age, education, systemic treatment, comorbidity, and precancer mental and physical health variables were retained in all models as controlling variables. All analyses were performed using SAS Version 9.4 (SAS Institute, Cary, NC) on a dataset locked on June 30, 2015.

3 RESULTS

Older breast cancer survivors ranged from 65 to 91 years ($M = 72.7$, $SD = 5.9$), with 14.3% aged 80 years and older (Table 1). Most survivors had early stage disease; 43% received chemotherapy with or without hormonal therapy.

3.1 Functional trajectories

The best fit for Emotional, Physical, and Cognitive subscales data (Table S4) was provided by 3 trajectory groups (Figure 2A–C): one beginning with and maintaining near perfect scores over time (“maintained high”); one with baseline scores slightly below and only slightly lower declines over time in parallel to the maintained high group (“phase shift”);

and the last with the lowest baseline scores and the steepest rate of decline (“accelerated decline”). Accelerated decline occurred among 6.9%, 31.8%, and 7.6% of survivors for emotional, physical, and cognitive domains, respectively.

3.2 Predictors of functional trajectories

Bivariate associations between trajectory group and other variables are shown for each functional domain in Table S5.

In multinomial regression (Table 2), the adjusted odds of being in the accelerated emotional decline group (vs maintained high) were 2.43 times higher (95% CI, 1.39–4.26) for survivors who used disengagement coping strategies, 1.41 times higher (95% CI, 1.06–1.88) for survivors who used self-distraction, and 0.43 less (odds ratio [OR] 0.43, 95% CI, 0.30–0.63) for survivors with higher optimism. These variables also increased the probability of being in the phase shift group (vs maintained high) for emotional function, although the magnitude of the association was lower. Higher tangible support decreased the probability of being in accelerated decline group (OR 0.68, 95% CI, 0.50–0.94) versus maintained high emotional function group. Higher comorbidity and lower precancer mental and physical function also increased the probability of being in the accelerated emotional function decline group (vs maintained high). However, systemic therapy regimen was not related to emotional function trajectory group.

The only independent psychosocial variable that decreased the probability of being in the accelerated physical function decline group (vs maintained high) was having high tangible social support (OR 0.73, 95% CI, 0.57–0.93) (Table 2). The use of self-distraction as a coping strategy increased the probability of being in the phase shift group (vs maintained high) (OR 1.23, 95% CI, 1.06–1.42). Older survivors with lower precancer mental or physical function, receiving chemotherapy ($\pm$ hormonal therapy) vs hormonal therapy alone and having more comorbid illnesses, had higher odds of being in the accelerated or phase shift groups (vs maintained high group) for physical function.

The use of disengagement coping strategies increased the odds of being in the accelerated cognitive decline group (OR 2.00, 95% CI, 1.18–3.40) or in the phase shift group (OR 1.52, 95% CI, 1.08–2.14) versus maintained high group. As in the other domains of function, higher tangible support decreased the probability of being in accelerated decline group (OR 0.65, 95% CI, 0.49–0.85) versus maintained high group. The probability of being in the accelerated cognitive decline group (vs maintained high group) was also higher in the case of receiving chemotherapy ($\pm$ hormonal therapy) vs hormonal therapy alone (OR 2.30, 95% CI, 1.33–3.97).

4 DISCUSSION

This is one of the first studies to use trajectory modeling to identify the long-term patterns of various self-reported functional QOL domains in a large cohort of older breast cancer survivors. The results indicate that survivors experience distinct trajectories. Most women maintain their QOL baseline scores; only a small proportion (less than 8%) reported deterioration in emotional and cognitive domains, but one-third reported long-term decline

in physical function. The level of decline in the accelerated decline trajectory was clinically meaningful for the 3 functional domains (more than 6 point decrease score).³⁸ Personality, coping, and social support were significant predictors of QOL trajectories, beyond demographic and clinical factors, although the effects varied across functional QOL domains.

Prior research has noted different trajectories of distress following a breast cancer diagnosis, similar to patterns of adjustment to traumatic life events suggested by Bonanno²⁵: resilience, recovery, continued high distress, and delayed distress. These are similar to our 3 trajectories based on ageing theory of maintained high, phase shifted, and accelerated decline across 3 functional QOL domains, although we did not observe a trajectory with delayed decline.

The result that most older breast cancer survivors maintain good emotional and cognitive function over time is similar to observations in previous studies modelling trajectories with younger survivors.^{16–24} The fact that one-third of older survivors had accelerated physical decline is in contrast to results in younger samples and is likely to represent normal aging processes, increased incidence of noncancer chronic illness with advancing age, and possible interactions between chronic illness and cancer and its therapies.

Several social resources and personality factors were related to increased risk of having declines in functional QOL domains. Having a higher tangible social support decreased the probability of being in the accelerated decline group in all 3 QOL domains: emotional, physical, and cognitive functions. Numerous studies have shown that social support improves psychological adjustment to cancer in younger survivors, reducing distress and improving emotional well-being.^{6,7,16,22,23} This study extends those findings to demonstrate that tangible social support present around the time of cancer diagnosis and initial treatment may also mitigate physical and cognitive decline among older breast cancer survivors. This finding may be a direct result of support for daily activities (help with transportation or obtaining medications and groceries). Alternatively, it may also be capturing indirect effects of social integration, social networks, and/or wealth. The consistent association of tangible support with improved emotional, physical, and cognition functions suggests that this will be an important area for future research and potential intervention to decrease the probability of suffering long-term functional declines.

Personality factors were strongly but differentially related to trajectories of long-term self-reported function. Optimism and coping strategies seem to play a greater role as predictors of emotional functioning than cognitive or physical functioning. The association between high optimism and better psychological adjustment to breast cancer has been reported in previous research on short-term distress trajectories^{20,21,23} or group-level outcomes.¹³ Our results for coping are also consistent with previous cross-sectional and longitudinal studies showing that strategies such as disengagement and self-distraction that focus attention away from the stressor are associated with poorer emotional functioning.^{7–12} The present results extend those findings using group-based trajectory modeling and demonstrate that long-term emotional decline is associated with stable personality traits like lower optimism and a higher use of disengagement and self-distraction strategies among older breast cancer survivors. Since the level of decline observed for those in the accelerated decline trajectory

group was clinically meaningful, interventions tailored to personality traits could be useful to improve outcomes of older survivors.

In contrast to emotional function, for physical and cognitive trajectories, clinical variables like the type of systemic treatment received (chemotherapy $\pm$ hormonal therapy vs hormonal therapy alone) and health status (higher comorbidity and poorer prediagnosis mental and physical function) were better predictors of the long-term decline than personality.

Despite the use of a large cohort, long-term follow-up, and novel trajectory analyses data, there are several study limitations. We relied on self-reported health-related QOL data and did not have objective information on functional ability. Moreover, EORTC QLQ-C30 reliability was moderate, especially in the case of the cognitive subscale; however, it was similar to the original validation of instrument.³² Likewise, the reliability of some of our theoretically based coping scales was only moderate; however, they were similar and in some cases higher than in the original instrument validation.³⁴ Next, recruitment procedure may also have generated some limitations: (1) our sample was recruited from centers participating in a national clinical trial and may not be representative of all older breast cancer survivors; (2) the small number of women having the full number of assessments is due in part to some women entering into the study later than others; however, a comparison between early and late recruits in baseline characteristics (Table S6) showed no major differences and controlling for year did not change results; (3) some baseline assessments could have been conducted during chemotherapy treatment; however, we conducted a secondary analysis examining trajectories beginning with the posttreatment assessment at 6 months and the results were comparable; and (4) the data of survivors with recurrence was from the moment of recurrence not considered in the analyses; however, comparative analyses of those with and without recurrence on baseline characteristics showed that there were not wide differences among those who ultimately experience recurrence (Table S7). Finally, despite the fact that personality and social support were measured at baseline and used to predict long-term trajectories, this was a secondary analysis and the temporality of effects should be confirmed in future research. Future studies should include a control group to understand how aging over time affects outcomes beyond effects of cancer. Moreover, we did not have longitudinal measures of fatigue or pain, but the associations of the psychosocial and other variables with functional QOL trajectories were independent of premorbid depression, anxiety, physical ability, vitality, and pain as measured by the Short-Form General Health Survey summary scores. Although this later measure was obtained retrospectively, there is research showing that patient's retrospective report of their pre-event health status is fairly accurate.³⁹

Despite these limitations, this study provides unique data and fills clinically important gaps in our knowledge about the long-term self-reported functional QOL trajectories of older breast cancer survivors. Previous studies analyzing trajectories of adjustment to breast cancer have focused on younger women or used sample with a wide age range. Moreover, these studies have generally only assessed a single aspect of health-related QOL (mostly emotional distress) within a cross-sectional framework or across shorter periods than our study. Overall, this study indicates that personality and social resources affect the course of long-term emotional well-being of older breast cancer survivors, while clinical factors are

more important for physical and cognitive functional outcomes. Although only a small percentage of older breast cancer survivors suffered accelerated declines in functional QOL domains over time, early identification of those who are vulnerable to deterioration could facilitate targeting of early clinical and psychological support, including promotion of adaptive coping strategies and provision of tangible support.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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FIGURE 1.
Consort flowchart

FIGURE 2.

A, Emotional functioning. B, Physical functioning. C, Cognitive functioning

TABLE 1

Demographic and clinical characteristics of participant (N = 1280)

Age at baseline, y	
Mean (SD)	72.7 (5.9)
Range	(65–91)
65–69	474 (37.0%)
70–74	356 (27.8%)
75–79	267 (20.9%)
>80	183 (14.3%)
Education	
High school or less	539 (42.1%)
Some college or more	740 (57.9%)
Marital status	
Married or living as	708 (55.3%)
Other marital status	572 (44.7%)
Race	
Nonwhite	152 (11.9%)
White	1128 (88.1%)
Insurance coverage	
Medicare with or without Medicaid	315 (24.6%)
Private & Medicare	965 (75.4%)
Recruitment site	
Comprehensive Cancer Center	366 (28.6%)
Community Care	914 (71.4%)
Blessed Orientation-Memory-Concentration test score ^a	
Mean (SD)	3.1 (3.4)
Recurrence of breast cancer	132 (10.3%)
SF-12 Physical	
Mean (SD)	51.2 (7.7)
SF-12 Mental	
Mean (SD)	56.7 (5.3)
Stage of cancer	
Stage 1	584 (45.6%)
Stage 2a	399 (31.2%)
Stage 2b or higher	297 (23.2%)
Most extensive surgery	
BCS	864 (67.6%)
Mastectomy	415 (32.4%)
ER status	

Age at baseline, y	
Negative	216 (16.9%)
Positive	1062 (83.1%)
Treatment group	
Hormonal therapy only	687 (57.0%)
Chemotherapy ^b	519 (43.0%)
AC-based chemotherapy ^c	313 (60.4%)
Taxanes ^c	177 (34.1%)
Herceptin ^c	71 (13.7%)
Hormone therapy type ^d	
Tamoxifen	225 (22.2%)
AI	789 (77.8%)

Abbreviations: AI, aromatase inhibitor; BCS, breast-conserving surgery; ER, estrogen receptor; SF-12, Short-Form General Health Survey.

^aThe Blessed Orientation-Memory-Concentration test was used as a screener to determine eligibility for the study; scores 11 or greater were not eligible to participate.

^bChemotherapy is defined as those participants with or without hormonal treatment.

^cChemotherapy treatment distribution is of those participants that received chemotherapy and information available.

^dHormonal treatment distribution is of those participants that received hormonal therapy.

TABLE 2

Multivariate models. Adjusted odds of trajectory group membership by QOL domain among older breast cancer survivors (reference group: maintained high)

Covariates	Accelerated Decline		Phase Shift		Overall P Value
	Odds Ratio	P Value	Odds Ratio	P Value	
Emotional Functioning					
Age at baseline	0.96 (0.90–1.01)	.118	0.98 (0.95–1.00)	.058	.094
Education: high school or less vs some college or more	0.39 (0.21–0.73)	.003	0.94 (0.72–1.24)	.678	.012
Treatment: chemotherapy vs hormone therapy only	1.54 (0.84–2.80)	.161	1.21 (0.91–1.60)	.188	.245
Comorbidities: >2 vs 2	3.09 (1.56–6.12)	.001	1.78 (1.34–2.35)	<.001	<.001
SF-12 Physical	0.94 (0.91–0.97)	<.001	0.99 (0.97–1.01)	.363	<.001
SF-12 Mental	0.88 (0.84–0.93)	<.001	0.95 (0.92–0.98)	<.001	<.001
Optimism	0.43 (0.30–0.63)	<.001	0.69 (0.56–0.86)	<.001	<.001
Coping: Disengagement	2.43 (1.39–4.26)	.002	1.56 (1.07–2.25)	.019	.006
Coping: Self-distraction	1.41 (1.06–1.88)	.017	1.13 (1.00–1.29)	.050	.024
Tangible support	0.68 (0.50–0.94)	.018	0.86 (0.72–1.03)	.102	.046
Physical Functioning					
Age at baseline	1.09 (1.05–1.13)	<.001	1.04 (1.01–1.08)	.010	<.001
Education: high school or less vs some college or more	1.37 (0.92–2.04)	.117	1.55 (1.12–2.15)	.008	.029
Treatment: chemotherapy vs hormone therapy only	2.28 (1.51–3.44)	<.001	1.70 (1.22–2.38)	.002	<.001
Comorbidities: >2 vs 2	2.03 (1.36–3.04)	<.001	1.75 (1.26–2.43)	<.001	<.001
SF-12 Physical	0.72 (0.69–0.77)	<.001	0.83 (0.78–0.87)	<.001	<.001
SF-12 Mental	0.91 (0.87–0.95)	<.001	0.95 (0.91–0.99)	.013	<.001
Coping: Self-distraction	1.05 (0.88–1.26)	.577	1.23 (1.06–1.42)	.006	.012
Tangible support	0.73 (0.57–0.93)	.012	0.91 (0.73–1.14)	.413	.026
Cognitive Functioning					
Age at baseline	1.02 (0.97–1.07)	.425	1.01 (0.99–1.04)	.408	.608
Education: high school or less vs some college or more	0.54 (0.31–0.95)	.031	0.95 (0.73–1.25)	.721	.093
Treatment: chemotherapy vs hormone therapy only	2.30 (1.33–3.97)	.003	1.18 (0.89–1.56)	.241	.011
Comorbidities: >2 vs 2	2.95 (1.60–5.43)	<.001	1.35 (1.02–1.77)	.035	.001
SF-12 Physical	0.94 (0.91–0.98)	<.001	0.95 (0.93–0.97)	<.001	<.001

Covariates	Accelerated Decline		Phase Shift		Overall <i>P</i> Value
	Odds Ratio	<i>P</i> Value	Odds Ratio	<i>P</i> Value	
SF-12 Mental	0.90 (0.86–0.94)	<.001	0.95 (0.92–0.98)	.001	<.001
Coping: Disengagement	2.00 (1.18–3.40)	.010	1.52 (1.08–2.14)	.016	.015
Tangible support	0.65 (0.49–0.85)	.002	0.97 (0.82–1.16)	.748	.005

Abbreviations: SF-12, Short-Form General Health Survey; QOL, quality of life.