Published in final edited form as:

Psychooncology. 2009 March ; 18(3): 267–275. doi:10.1002/pon.1394.

Hopelessness as a predictor of depressive symptoms for breast cancer patients coping with recurrence

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Abstract

Objective—The Hopelessness Theory of Depression provides the framework to test feelings of hopelessness and social support as predictors of depressive symptoms in women recently diagnosed with a recurrence of breast cancer.

Methods—Patients ($N = 67$) were assessed within weeks of receiving their recurrence diagnosis (initial) and again 4 months later (follow-up).

Results—Controlling for their current physical and depressive symptoms, hopelessness at diagnosis was a significant predictor of the maintenance of depressive symptoms among patients. A corollary of the theory was also confirmed: social support (i.e. the presence/absence of a romantic partner) interacted with hopelessness.

Conclusions—Women who reported feelings of hopelessness and who were alone (i.e. without a partner) were especially vulnerable to later depressive symptoms. The data provide support for the Hopelessness Theory and suggest factors conferring risk for depressive symptoms for those coping with a worsened cancer prognosis.

Keywords

hopelessness; hope; depression; social support; breast cancer recurrence; oncology

The diagnosis of cancer is a significant stressor, leading to psychological stress [1] and poor quality of life for many patients [2–4]. Upwards of 50% of patients may meet criteria for mood, anxiety, and/or adjustment disorders [5,6], with depression being common [7]. Depressive symptoms are estimated to be significant for 22–29% in patients with early stage disease [8] and 18–40% for patients with advanced disease [9]. Notably, rates of depression in cancer patients are consistently higher than rates found among patients with other medical conditions [10]. For some, depression is fatal. Among those diagnosed with breast cancer, there is a small but statistically significant increased risk of suicide for as long as 30 years following diagnosis [11].

One circumstance that may engender not only depression but also hopelessness is recurrence. In correlational studies, feelings of hopelessness in recurrence patients are associated with psychiatric morbidity and other emotional difficulties [12–16], poorer quality of life [17], and less social support [15]. In the study of suicide noted above [11], the subgroup with the highest

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risk are patients with distant metastases (2.11), compared to those with local (1.38) or regional (1.55) disease.

The Hopelessness Theory of Depression by Abramson and colleagues [18] is an important theoretical contribution to the understanding of clinical depression. They propose that some individuals have a 'depressogenic inferential style' that influences one's attributions when faced with a negative life event. Rather than perceiving an event in isolation, individuals make specific negative attributions about the cause of the event, its consequences, or even oneself. According to the theory, only one attribution is needed to develop hopelessness, the belief that the outcome of an event will be negative and that nothing can be done to change it. In turn, feelings of hopelessness are thought to lead to symptoms of hopelessness depression.

Cancer recurrence may elicit hopelessness, as it is presently an incurable diagnosis. It brings more treatment [19], fatigue, declining health [3,20], and the potential for lowered quality of life [21]. Patients fear and worry about what will happen as the disease progresses. Recurrence may be perceived to be substantially unique to the patient (e.g. 'I have recurred, but I know others who have not. '), congruent with similar situations (e.g. 'I knew this would happen because my chemotherapy did not go well. '), or consistent with prior events (e.g. 'I have always had poor health. '). Previous research suggests that those individuals who attribute the cause of their cancer diagnosis to themselves (through feelings of self-blame [22,23] and personal responsibility [24]) and those who attribute multiple reasons [25] report more depressive symptoms. In addition, it has been found that beliefs about the reasons why physical symptoms occur during chemotherapy treatment are related to depressed mood [26]. A patient's perspective can quickly shift from that of a survivor to one likely to die from the disease.

Abramson *et al.* [18] suggest that other factors, along with hopelessness, may be influential in depression. These include developmental factors, genetic factors, and, importantly, interpersonal factors, such as social support. Johnson and colleagues [27] found that increases in hopelessness mediated the relationship between initial social support and increases in depressive symptoms 6 months later in men who were human immunodeficiency virus (HIV) positive. Other research, not testing the Hopelessness Theory yet examining the same variables, has shown social support to be inversely correlated with hopelessness and depressive symptoms in healthy individuals (e.g. [28,29]) as well as those with health conditions including HIV/AIDS [30], spinal cord injuries [31], or cancer [32]. To summarize, cancer patients' perceptions of social support are associated with better adjustment and fewer emotional difficulties as is the case for other patient groups. It is unclear if this would be the case for other measures of social support, such as number of supportive relationships. Finally, it is not known if social support interacts with hopelessness to increase vulnerability to depression as suggested [18].

The study's aim is to understand cancer patients' struggle with depressive symptoms as they cope with recurrence. Consistent with the theory, we hypothesize that hopelessness measured in the weeks after diagnosis will predict patients' depressive symptoms months later. Assessments are conducted shortly after diagnosis of recurrence and again 4 months later. We are uncertain if interpersonal factors—social support—will play either a direct role or a moderating one, as the theory is not specific, nor does it differentiate between types of social support that may or may not be relevant. Therefore, we include both structural (e.g. presence of a significant other (SO), numbers of family members and friends) and functional (e.g. patients' perceptions of support from others) aspects. Analyses also include relevant control variables, with the most important being the patients' current symptoms/signs, illnesses, and any toxicities from cancer treatments as they covary with distress [33,34]. Poor health alone might lead to perceptions that the illness is uncontrollable and, thereby, engender hopelessness. Sociodemographic and disease variables are also considered along with initial levels of

depressive symptoms in this repeated measures test of hopelessness as a predictor of depressive symptoms.

Method

Procedures and patients

Patients in medical and surgical oncology clinics of a university-affiliated, National Cancer Institute-designated Comprehensive Cancer Center were sought. New, consecutive cases with breast cancer recurrence (i.e. previously diagnosed with Stage I, II, or III breast cancer) were identified. Recurrence refers to the clinical detection of metastatic breast disease in the same area, adjacent to, or distant from the original site. Patients excluded were those diagnosed with a prior or current second primary tumor (e.g. contralateral breast, endometrial), prior or current refusal of any cancer treatment, mental retardation, severe or untreated psychiatric diagnoses (e.g. schizophrenia, bipolar or borderline personality disorder), or neurological disorders (including dementia).

One hundred and six patients were eligible and, of these, 86 (81%) were accrued. All were provided, in person, with oral and written informed consent in keeping with institutional guidelines and in accordance with an assurance approved by and filed with the US Department of Health and Human Services. For the non-participants ($n = 20$; 19%), common refusal reasons (of 10 reasons surveyed) were 'not interested' (40%) and 'do not have time' (20%). Analyses of variance and chi-square analyses, as appropriate, found no significant differences ($p > 0.15$) between participants ($n = 86$) and non-participants ($n = 20$) in age, racial group membership, absence/presence of an SO, menopausal status, or disease stage at initial diagnosis.

Following informed consent, two assessments were conducted in the clinic and lasted approximately 1.5 h. Patients completed the initial assessment on an average of 75 days ($SD = 44$; median = 60) post-diagnosis, and a follow-up on an average of 132 days ($SD = 32$; median = 126), approximately 4 months, later. With the assistance of a female research assistant, women completed a structured interview and questionnaires. A female research nurse conducted a health assessment with the patient (see Physical Functioning below), abstracted data from the medical chart, and consulted with the patient's oncologist as needed. Participants were compensated \$50.00 per assessment.

Of the 86 participants, 19 (22%) did not complete the follow-up for reasons of rapid disease progression and death ($n = 5$), study dropout ($n = 6$), or patient illness ($n = 8$). There were no significant differences ($p > 0.17$) between patients completing the 4-month follow-up assessment ($N = 67$) and those not ($n = 19$) on sociodemographic or disease characteristics, physical functioning, or initial scores of hopelessness, social support, or depressive symptoms. Table 1 provides descriptive data for the sample ($N = 67$).

Measures

Predictor variables

Hopelessness: The Beck Hopelessness Scale (BHS) [35] contains 20 true-false items. Beck and Steer [36] score the measure as follows: 0–3, normal; 4–8, mild hopelessness; 9–14, moderate hopelessness; and 15 and above, severe hopelessness. Previous normative data suggest a range of scores from 1.70 to 4.45, with a mean of 3.06 for non-illness populations ($SD = 3.11$ [37]). Internal consistency was 0.89.

Social support: Two structural measures are used. (1) Presence of SO/romantic partner is determined. (2) The Social Network Index (SNI) calculates total support as a function of the number of an individual's social ties and community involvement [38]. The main elements of

the SNI are number and frequency of contact with close friends and relatives, church group membership, and other group membership (e.g. social or service-oriented). Marital status is included but was excluded from the calculation of the score. SNI scores ranged from 1 to 12.

Two functional measures are used. The Perceived Social Support from Family (PSS-Fa) and Friends (PSS-Fr) Scales [39] measure the degree to which one perceives that one's family or friends fulfill one's need for support, respectively. Both contain 20 items and scores range from 0 to 20 for each. For the analyses, the scales were combined for a total score. Internal consistency was 0.92 and 0.87, respectively.

Outcome variable—The Center for Epidemiological Studies Depression Scale (CES-D [40]) contains 20 depression symptom items, each scored with a 4-point Likert scale with scores ranging from 0 to 60. A cutoff score of 16 is used as an indicator of clinically significant depression [41,42]. For the regression analyses, one item, 'I feel hopeful about the future', was removed due to its similarity with BHS, resulting in the scoring of 19 items for the regression analyses. Internal consistency was 0.92.

Control variables

Physical functioning: Two measures were completed by a research nurse. (1) The types and severity of symptoms, signs, and toxicities from cancer treatments were assessed (SymS/Tox [43]). Twenty-two body systems (e.g. hematologic, gastrointestinal, immunologic) each sampled four to seven common signs/symptoms and treatment toxicities (e.g. alopecia). Items are rated on individualized, 5-point scales, summed, and averaged for a total score. Total scores range from 0 to 4 with higher scores indicating symptoms/signs of greater severity and life threat. (2) The Karnofsky Performance Scale (KPS [44]) rates patient functional status using an 11-point Likert scale ranging from 100 (normal, no complaints, no evidence of disease) to 0 (dead). Higher scores indicate better functional status (e.g. 80 = normal activity with effort, some signs/symptoms of disease). Inter-rater reliability ranges from 0.70 to 0.97 [45,46] and the KPS is predictive of cancer endpoints [47].

Analytic strategy

Descriptive statistics are provided (see Table 1). Correlational analyses examined the relationship between predictor and control variables (i.e. sociodemographic, disease, and physical functioning) and follow-up CES-D scores. Hierarchical multiple regression models were used. Following entry of control variables and baseline CES-D, analyses tested the relationship between initial levels of hopelessness (BHS), social support (structural or functional), and their interaction, and depressive symptoms (CES-D) at follow-up. As it was unclear if structural and functional social support measures would perform similarly, separate regression analyses were used. All variables were standardized by rescaling each mean to 0.0 with a standard deviation of 1.0 before entry into the regression analyses. This standardization creates the same metric for each variable and facilitates testing the unique contribution of any one independent variable. As recommended by Preacher [48], the interaction term multiplies the standardized hopelessness variable with the standardized social support variable.

Results

Preliminary analyses

At the initial assessment, 28% (19 of the 67) of the patients scored at or above the clinical cutoff for the BHS. Specifically, 15, 10, and 3% of the sample had mild, moderate, or severe levels of hopelessness symptoms. Also, 36% (24 of the 67) of the women scored above the CES-D cutoff at the initial assessment and 30% (20 of the 67) at the follow-up. The 6%

reduction in the number of cases was not significant ($\chi^2_{1,N=67}=0.61, p>0.05$). Overall, there was a 2-point reduction in the CES-D group means from 14 (SD = 10) at initial assessment to 12 (SD = 10; $F_{1,66} = 4.45, p<0.05$; Cohen's $d = 0.20$). Correlations were examined (see Table 2). Of the control variables, only measures of physical functioning (SymS/Tox and KPS) were significantly associated with depressive symptoms at follow-up ($r = 0.25$ and -0.31 , respectively, $p's < 0.05$; see Table 2) and, thus, are included in the primary analyses.

Primary analyses

Three regression analyses were conducted (see Table 3) and all models were significant. Physical functioning and baseline depressive symptoms accounted for 47% of the total variance and hopelessness added an additional, significant 7% of the variance in the prediction of follow-up depressive symptoms. The remaining steps of the regression analyses tested the contribution of interpersonal factors and their interaction with hopelessness.

For the analysis with presence of an SO, the model was significant ($F_{6,60} = 17.12, p < 0.001$; see Table 3, Model 1), accounting for 63% of the total variance (total adjusted $R^2 = 0.59$). SO was a significant predictor ($\beta = -0.26, p < 0.01$) and, further, patient's level of hopelessness interacted with partner status ($\beta = -0.19, p < 0.05$). Figure 1 provides a representation of the interaction. For the purposes of illustration, hopelessness scores are dichotomized, using the recommended cutoff score of 4 and higher [36]. The outcome variable, depressive symptoms (CES-D scores) at follow-up, is provided for four groups defined by level of hopelessness at the initial assessment (high vs low) and SO status (present vs absent). The interaction indicates that the women at greatest risk for later depressive symptoms were those who reported greater feelings of hopelessness at diagnosis *and* who were alone (without an SO) as they faced cancer recurrence. In the model with SNI as the social support indicator (see Table 3, Model 2), SNI was not a significant predictor of depressive symptoms ($p = 0.76$). The interaction term was also not significant ($p = 0.88$).

Regarding patients' perceptions of support, neither the PSS-Fa nor the PSS-Fr scales were correlated with depressive symptoms at follow-up. For the regression analysis, the PSS-Fa and PSS-Fr scales were combined (see Table 3, Model 3). PSS was not a significant predictor of depressive symptoms ($p = 0.89$) nor did it interact with hopelessness ($p = 0.66$).

Follow-up analyses

As the levels of depressive symptoms and hopelessness for the sample were notable, it would not be unexpected that some patients might seek psychological treatment at diagnosis. Analyses were conducted to test the robustness of the findings and determine the effect, if any, of receiving therapy on the depressive symptom findings. At the time of the initial assessment, four patients indicated that they were receiving individual therapy. All four patients exceeded the cutoff for hopelessness. Interestingly, two of the four exceeded the CES-D cutoff at both assessments, but the remaining two did not at either assessment. The three regression analyses reported above (hopelessness and its interaction with SO, SNI, and PSS) were repeated with psychological therapy status (0 = not in psychological treatment, 1 = in treatment) as a control variable and the results were unchanged.

Discussion

In the current study, feelings of hopelessness in women recently diagnosed with a recurrence of breast cancer predicted more depressive symptomatology 4 months later. This result is significant as analyses controlled for physical functioning, a known correlate of depressive symptoms [49]. In addition, partner status interacted with hopelessness to predict subsequent

depressive symptoms. Specifically, those women without a partner and feeling hopeless were at greatest risk for depressive symptoms at follow-up.

The central thesis of the Hopelessness Theory of Depression [18] was supported. That is, results showed that feelings of hopelessness contribute to changes in depressive symptoms. We extend previous research by providing prospective, rather than concurrent, assessments. In this case, control for the patients' physical symptoms and functional status is necessary, and doing so provided a rigorous test. Importantly, physical status was assessed independently by research nurses, who were unaware of the patients' depression and hopelessness ratings. Physical status was correlated with depressive symptoms and contributed significantly (12% of the variance) to the prediction of depressive symptoms.

The data support the view that hopelessness is a distinct construct and not merely a symptom of depression. Despite the powerful contribution of baseline depression (34% of the variance) and, further, the addition of physical functioning, the 7% additional variance contributed by hopelessness is noteworthy. Abramson and colleagues [18] argue that hopelessness can be a proximal, sufficient cause of depression, triggered by a combination of negative life events and a depressogenic inferential style. Clarke and Kissane [50] also argue for a conceptual difference between hopelessness and depression. They see hopelessness as a key component in feelings of 'demoralization', which also includes the persistent inability to cope and meaninglessness. While demoralization and depression co-occur in the medically ill [51], they see demoralization (aka hopelessness) as characterized by subjective incompetence, whereas depression is characterized by anhedonia.

The data also support the Hopelessness Theory's corollary that interpersonal factors, in this case presence of an SO, play a role in the relationship between hopelessness and depression. Prior studies have demonstrated poor social support concurrent with depression and hopelessness (e.g. [15,32]), but there have been few predictive tests. Abramson and colleagues [18] indicated that the absence of support may be influential in the causal chain between hopelessness and depression but did not specify the exact mechanism. Using the theory as a foundation, Johnson and colleagues [27] examined hopelessness, depression, and social support in HIV-positive men and found that the relationship between social support and depression was mediated by increases in hopelessness.

The repeated measures design enabled study of a possible moderating effect of social support. While both partner status and social network size (SNI) were correlated with depressive symptoms at follow-up, only partner status explained a significant variance (see Figure 1). The impact of partner status follow ample evidence illustrating the importance of the presence of a partner when coping with a serious illness. For example, married individuals have lower mortality rates than all others (e.g. [52–55]). Conversely, unmarried medical patients have higher rates of hospital admissions, more severe illnesses, longer lengths of stay, and higher risk of death following surgery than their married counterparts [56].

For the Hopelessness Theory, the predictive power of partner support is a novel finding, but it may have particular relevance to clinical cancer literatures. Consistent with the discussion above, unpartnered cancer patients have been observed to have significantly shorter survival times than partnered individuals, even when analyses adjusted for stage of disease and treatment received (e.g. [57]). A recent meta-analysis by Chida and colleagues [58] shows an increased risk of, as well as progression of, cancer for those with distress, with depressive symptoms being most influential. With specific regard to hopelessness, Schmale and Iker [59] were the first to suggest the relevance of hopelessness and the development of cancer. More recently, a prospective study by Watson and colleagues [60] with early stage breast cancer patients ($N = 578$) has shown that not only those with high depression scores but with high

hopelessness scores at diagnosis had an increased risk of relapse or death within 5 years. Our data implicate hopelessness as a psychological factor made worse when a person copes with cancer alone. This synergy may serve as an explanatory mechanism linking depression and partner status literatures to disease progression and/or lowered survival.

We consider why the other indicators of social support did not predict depressive symptoms. We first note that the baseline assessment of both the SNI and the PSS measures was a 'snapshot' (unlike the assessment of a variable such as partner status) that may have imposed limitations on their predictive value. For the SNI, scoring is based in part on participation in group activities, which may have already diminished with the impact of diagnosis and treatments. For the PSS scales, they were not correlated with follow-up depressive symptoms and, not surprisingly, not significant in the regression analysis. However, this is not necessarily an evidence for a lack of relationship between perceived social support and depressive symptoms, as there is considerable empirical support for such a relationship. In our case, the mean scores of the PSS were 17 of a possible 20, indicating perceptions of excellent support. Consistent with this, many women acknowledged an outpouring of support from friends and family. Thus, the restriction of range ('ceiling effect') of the PSS may be responsible for the null findings. In the case of breast cancer recurrence, we can speculate why partner status may be beneficial above and beyond perceived support from family and friends. Owing to the health impact of recurrence and cancer treatment, women often report difficulty in accomplishing tasks (e.g. house cleaning, cooking, doing laundry). Unfortunately, patients are often hesitant to ask for task support from friends and family, as they do not wish to be burdensome. When a partner is available, s/he may be the ready source of task support that can be relied upon, which in turn may alleviate some of the associated distress, in addition to that alleviated by the partner's emotional support.

The good news from these data is that not everyone who recurs is or becomes depressed and/or helpless. Indeed, the majority of patients in our sample were not depressed. Approximately one-third had clinically significant depressive symptoms, an estimate consistent with rates of depression found in patients with advanced cancer [9]. If reflective of mood disorders, this is a rate *five times* that found in the general population (approximately 6% as suggested by Sellick and Crooks [61]). The rates of hopelessness found here are comparable to those from other studies of patients with recurrence (e.g. [17,62]). Considering both measures, at the initial assessment, patients who were both depressed and hopeless accounted for 16% of the sample. Of the remainder, some were depressed but not hopeless (19%), and a few (12%) reported hopelessness in the absence of depressive symptoms.

These findings should be considered in the context of their methodological limitations and possible limitations in generalizability. An individual's depressogenic inferential style is thought to be a contributor to depression and is an important component of the Hopelessness Theory was not included. Other research indicates that cancer is a type of event that could elicit attributions sufficient for the development of hopelessness [23]. If included, a test of hopelessness as a mediator between the presence of the inferential style and the development of depressive symptoms would be achieved. The partner status findings are novel and need replication, and future research with couples might include relationship satisfaction, as it too has been related to depressive symptoms [63]. Our findings come from a predominantly Caucasian sample with above-average education and income levels. Research suggests that lower socioeconomic status (SES) is associated with poorer adjustment to illness [64] and financial stressors are predictive of later stress for survivors [2]. By analogy, women of lower SES, and therefore fewer resources, may experience even more hopelessness and higher levels of depressive symptoms than our sample.

The Hopelessness Theory argues that discovery of the etiology of the patient's hopelessness is an important element in providing treatment. If feelings of hopelessness are a proximal, sufficient cause of depression, then those interventions alleviating and/or preventing feelings of hopelessness should prevent or alleviate depressive symptoms. Interventions that target hope have been tested within a cognitive behavioral framework and found to be effective for cancer patients [65]. The Hope Intervention Program of Herth [66] was designed to instill hope in individuals with recurrence. This is done through establishing connectedness with others, identifying threats to hope, encouraging utilization of social support and community resources, reflecting on the meaning of life, and nurturing internal resources such as optimism. Such an intervention may be important for patients, as these data show that hopelessness begets the maintenance of depressive symptoms. Certainly for those facing cancer alone, the burden is great.

In conclusion, feelings of hopelessness in recurrent cancer patients appear to be common and confer risk for depressive symptoms. This is beyond the risk for depression incurred from physical status, which can become increasingly impaired in this population. The scenario is worsened for those feeling hopeless *and* without an SO. From a theoretical perspective, the Hopelessness Theory of Depression provides a framework for understanding mood disorder phenomena for an understudied cancer group. We will continue to follow these patients and test further the theory's relevance for cancer patients with comorbid depression.

Acknowledgments

We thank the participants in the Stress and Immunity Breast Cancer Project and the professional and research staff. The research support was provided by American Cancer Society (PBR-89, RSGPB-03-248-01-PBP), Longaberger Company-American Cancer Society Grant for Breast Cancer Research (PBR-89A), US Army Medical Research Acquisition Activity Grants (DAMD17-94-J-4165, DAMD17-96-1-6294, DAMD17-97-1-7062), National Institutes of Mental Health (1 R01 MH51487), the National Cancer Institute (K05 CA098133, R01 CA92704), the General Clinical Research Center (M01-RR0034), and The Ohio State University Comprehensive Cancer Center (P30 CA16058).

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Figure 1. Depressive symptom (CES-D) scores at follow-up, illustrating interaction of significant other and hopelessness status

Table 1

Sociodemographic and disease characteristics of the sample ($N = 67$) and cancer treatments on-going at initial and follow-up assessments

Category	Mean (SD) or %	
Sociodemographics		
Age (in years)	54 (11)	
Education (in years)		15 (3)
Income (in thousands)		\$68 000 (70)
Employment (% employed)		45%
Race	93% Caucasian 7% African-American	
Extent of disease and treatment		
Disease-free interval	50 (46)	
Metastases		69%
Local-regional		31%
Distant (metastasis site follows) ^a		69%
Viscera		59%
Bone		59%
Lung		39%
Liver		30%
Other		17%
Cancer treatment		
	Initial assessment (%)	Follow-up assessment (%)
Surgery	28	3
Chemotherapy	43	51
Hormonal therapy	39	40
Radiation therapy	19	6
Bone marrow transplant	—	2

^aNumbers do not total as some patients had multiple sites of metastatic disease.

Table 2
Correlation coefficients among physical functioning, predictors, and depressive symptoms outcome

Variable	Mean (SD) or %	Range	1	2	3	4	5	6	7	8
1 SymS/Tox	0.27 (.10)	0.08–0.53								
2 Kamofsky Perf. Status (KPS)	78 (9)	60–90	-0.33							
3 Hopelessness (BHS)	3 (4)	0–19	0.24	-0.19						
4 Significant other status (% with partner) ^a	70%	0 or 1	-0.16	0.22	-0.16					
5 Social Network Index (SNI)	7 (3)	1–12	-0.25	0.03	-0.27	0.60				
6 PSS-Family	17 (5)	0–20	0.13	-0.03	-0.20	0.16	0.46			
7 PSS-Friends	17 (4)	0–20	-0.01	0.14	-0.29	0.18	0.46	0.58		
8 Depressive symptoms (CES- D, initial)	14 (10)	0–45	-0.20	-0.35	0.64	-0.25	-0.22	-0.17	-0.15	
9 Depressive symptoms (CES- D, follow-up)	12 (10)	0–39	0.25	-0.31	0.64	-0.44	-0.37	-0.13	-0.13	0.67

Bold, $p < 0.05$; SymS/Tox, severity of symptoms, signs, and cancer treatment toxicities; PSS, Perceived Social Support.

^a0 = no partner, 1 = partner.

Table 3

Hierarchical multiple regression analyses testing hopelessness, three social variables, and their interaction terms as predictors of depressive symptoms at follow-up among breast cancer patients with recurrence ($N = 67$)

Step and predictor	Statistics by step		Statistics by predictor	
	TR^2	R^2 change	β	T
Model 1: Significant other				
1. SymS/Tox	0.12	0.12 [*]	0.02	0.23
KPS			-0.10	-1.09
2. CES-D at initial	0.47	0.34 ^{***}	0.31	2.79 ^{**}
3. Hopelessness (BHS)	0.54	0.07 ^{**}	0.29	2.75 ^{**}
4. Significant other (SO)	0.60	0.07 ^{**}	-0.26	-3.21 ^{**}
5. BHS $\times$ SO	0.63	0.03 [*]	-0.19	-2.14 [*]
Model 2: Social Network Index				
1. SymS/Tox	0.12	0.12 [*]	0.03	0.25
KPS			-0.07	-0.75
2. CES-D at initial	0.48	0.36 ^{***}	0.43	-0.62 ^{***}
3. Hopelessness (BHS)	0.55	0.07 ^{**}	0.35	2.52 [*]
4. SNI	0.55	0.00	-0.03	-0.31
5. BHS $\times$ SNI	0.55	0.00	0.02	0.15
Model 3: Perceived Support from Family and Friends Scales				
1. SymS/Tox	0.12	0.12 [*]	0.06	0.57
KPS			-0.08	-0.83
2. CES-D at initial	0.47	0.34 ^{***}	0.41	-0.43 ^{**}
3. Hopelessness (BHS)	0.54	0.07 ^{**}	0.38	2.85 ^{**}
4. PSS	0.54	0.00	-0.01	-0.14
5. BHS $\times$ PSS	0.54	0.00	0.05	0.44

SymS/Tox, severity of symptoms, signs, and cancer treatment toxicities; KPS, Karnofsky Performance Status; CES-D, Center for Epidemiological Studies Depression Scale; BHS, Beck Hopelessness Scale; SO, significant other; SNI, Social Network Index; PSS, Combined Perceived Social Support from Family (PSS-Fa) and Friends (PSS-Fr) Scales.

*
p<0.05,

**
p<0.01,

p<0.001.