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Impact of multiple caregiving roles on elevated depressed mood in early-stage breast cancer patients and same-age controls

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Abstract

The effect of caregiving roles on risk of elevated depressed mood over 12 months was examined in early-stage (0–IIA) breast cancer patients and same-aged women without breast cancer. Women were interviewed 4–6 weeks, 6 months, and 12 months following definitive surgical treatment (patients) or routine screening mammogram (controls). The Center for Epidemiologic Studies-Depression Scale was administered at each interview and dichotomized for analysis (<16 [little/no depressed mood] vs. ≥16 [elevated depressed mood]). Participants were categorized as having no caregiving responsibilities, care-giving for children or other persons, or caregiving for both children and others (multiple caregiving roles). Two multivariable marginal logistic regression models with repeated measures were fit (one each for patients and controls) to examine the effect of caregiving roles on elevated depressed mood, using generalized estimating equations to account for intra-individual correlations. Of 1096 participants (mean age 58; 76% white), 1019 with caregiving data were included in the analysis. Compared with baseline, patients with multiple caregiving roles (23/521

patients) were at increased risk of elevated depressed mood at 6 months (adjusted odds ratio [aOR], 7.20; 95% confidence interval [CI], 1.17–44.46; $P = 0.034$), and controls with multiple caregiving roles (15/498 controls) were at decreased risk of elevated depressed mood at 12-month follow-up (aOR, 0.12; 95% CI, 0.02–0.97; $P = 0.047$). Patients with multiple caregiving roles were more likely while controls were less likely to report elevated depressed mood over time, suggesting a need to identify patients with multiple caregiving roles early during their treatment.

Keywords

Breast cancer survivors; Caregiving roles; Depressed mood; Early-stage breast cancer; Employment status; Social support

Introduction

Breast cancer remains the most frequent cancer diagnosis in American women with an estimated 178,480 new invasive cases and another 62,030 in situ cases found in 2007 [1]. Due to more widespread screening, many breast cancers are found early when treatment can be offered with curative intent [2]. Survival rates among women with early-stage breast cancer have improved with the development of newer adjuvant therapies [3]. Although breast cancer survivors are living longer, a diagnosis of breast cancer and the ensuing therapy can have an impact on their psychological well being [4]; 10% [5] to 30% [6] of patients have been reported to experience symptoms of depression. The prevalence of depression in early-stage breast cancer patients is twice as great as that seen in the general female population, especially during the first year after diagnosis [7]. If untreated, depression in breast cancer patients has been associated with poorer adherence to treatment [8,9] and poorer survival [10].

The purpose of the present study was to examine trends in breast cancer patients' depressed mood over a 12-month follow-up period in the context of their caregiving roles at time of diagnosis. In a literature review, we found studies reporting that caregivers with serious health conditions exhibited more difficulty providing care to their dependents [11] and that caregivers of cancer patients experience psychological distress [12,13]. A qualitative study examined concerns of women with caregiving responsibilities after a breast cancer diagnosis [14]. Breast cancer patients who feel a need to resume their "normal" family roles may experience feelings of depression if they have difficulty regaining a sense of normalcy after treatment [15]. In addition, lack of social support is known to be associated with depression in general [16] as well as in breast cancer populations [7,17–19]. However, we were unable to find published studies examining the effect of breast cancer patients' caregiving roles (i.e., having responsibility for caring for and providing support to other people) on their risk of elevated depressed mood.

Ancillary to a longitudinal quality-of-life study, we sought to examine whether having multiple caregiving responsibilities at time of study enrollment (i.e., for both children and other people) was a risk factor for elevated depressed mood in women with early-stage breast cancer and an age-matched comparison group of women without breast cancer (controls). Understanding the impact of caregiving responsibilities on patients' experience of depressed mood over time can help healthcare providers better counsel and care for women with breast cancer during and after treatment.

Methods

Participants

Participants were recruited prospectively between October 2003 and June 2007 at the Sitleman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine and at Saint Louis University School of Medicine in Saint Louis, Missouri. Patients were eligible if they had first primary ductal carcinoma in situ (DCIS, Breast Carcinoma Stage 0, Tis N0 M0), Stage I (T1 N0 M0), or Stage IIA (T0 N1 M0, T1 N1 M0, or T2 N0 M0) determined by surgical pathology using American Joint Committee on Cancer staging [20]. Controls were identified 2 weeks following a normal/benign routine screening mammogram at the Siteman Cancer Center's Breast Health Center and were frequency matched by age group (40–50, 50–69, ≥70) to patient participants. We limited our sample to women aged 40 and older as screening mammography is recommended for women in this age group. Women were eligible for participation if they had completed their definitive surgical treatment (patients) or routine screening mammogram (controls), had not received neoadjuvant chemotherapy, had no prior history of *any* breast cancer, spoke English, and did not demonstrate cognitive impairment on the Orientation–Memory–Concentration Test [21].

Procedures

Following Institutional Review Board approval at each recruitment site and obtaining participants' informed consent, specially trained interviewers administered computer-assisted telephone interviews at 4–6 weeks (T1), 6 months (T2), and 1 year (T3) following definitive surgical treatment (patients) or routine screening mammogram (controls). Clinical data, including cancer staging by pathology (DCIS, Stage I, or Stage IIA) [20] and receipt of adjuvant treatment, were obtained from patients' medical records. Participants' demographic information and validated measures of depressed mood and social support were collected by interview. For this ancillary study, we began interviewing all participants in the summer of 2006 about their caregiving roles at the time of enrollment (questions described below), including participants who had completed participation in the parent study.

Depression—We used the validated 20-item Center for Epidemiologic Studies Depression (CES-D) survey [22] to measure depressed mood "during the past week." After reverse scoring four items, a total score was computed, with higher scores indicating greater depressed mood. Since CES-D scores ≥16 indicate moderate–severe depressed mood [22,23], we dichotomized CES-D scores for analysis (<16 vs. ≥16).

We also determined participants' history of depression at study enrollment using two questions: "Has a doctor ever told you that you had depression?" and "Have you ever been treated for depression with medication or psychotherapy?" An affirmative response to either or both questions was coded as having a history of depression.

Caregiving—To examine the extent of participants' caregiving roles at study enrollment, we asked about total number of children, total number of children for whom the participant was the primary caregiver, total number of people living in the participants' household, and their caregiving roles for someone other than their own child, and if any, for whom. We defined "primary caregiver" as the person primarily responsible for the care and well being of another person. Primary caregiving roles were categorized as having no primary caregiving responsibilities, caregiving to either children or other persons, or caregiving to both children and other persons.

Covariates—Covariates of depressed mood were selected based on the literature and included perceived availability of social support [24], history of depression (yes, no), age at

diagnosis, race (white, non-white), employment status (employed, homemaking, retired, unemployed/unable to work), and annual household income(<$25,000, $25,000–$75,000, > $75,000) [18,19,25–30]. For breast cancer patients only, we included stage at diagnosis (DCIS, I, IIA) [20] as a covariate as well.

Data analysis

We sought to determine whether caregiving roles at the time of study enrollment were associated with risk of elevated depressed mood over the course of 1 year in both patients and controls. We used Mann–Whitney *U*-test, chi-squared test or analysis of variance (ANOVA), as appropriate, to identify variables associated with elevated depressed mood in all participants. Variables associated with elevated depressed mood at each interview in bivariate tests at $P < 0.05$ were included as covariates in the multivariable models.

Since depressed mood was measured for an individual at each of three interviews, two separate logistic regression models (a patient model and a control model) with repeated measures (PROC GENMOD in SAS version 9.1) were fit to determine whether caregiving roles were significantly associated with elevated depressed mood, using the generalized estimating equations (GEE) approach to account for the intra-individual correlations [31]. Adjusted odds ratios (aOR) and 95% confidence intervals (CI) were calculated to measure the strength of associations between factors of interest and risk of elevated depressed mood. To determine whether risk of elevated depressed mood was differentially experienced over time by caregiving roles in women of the same age with or without early-stage breast cancer, we added a Caregiving Roles × Time interaction term to the multivariable logistic regression models.

Results

We enrolled and interviewed 549 patients (71% of 772 invited to participate) and 547 controls (58% of 946 invited to participate) between October 2003 and July 2007. Among patients, participants were more likely than non-participants to be white (79.3% vs. 68.3%; $P < 0.001$) and younger (mean age 58.3 vs. 60.6; $P = 0.011$) but were not significantly more likely to be married (60.8% vs. 53.7%; $P = 0.072$) or to differ by cancer stage at diagnosis ($P = 0.835$). Among controls, participants were more likely than non-participants to be white (73.1% vs. 56.3%; $P < 0.001$) and married (61.4% vs. 47.9%; $P < 0.001$) but did not differ significantly from non-participants by age (mean age 57.2 vs. 57.7; $P = 0.462$).

We were unable to contact and obtain caregiving data for 77 women (28 patients and 49 controls) who had completed the parent study, leaving 1019 (93.0% of 1096 enrolled) who were included in the analysis. Because the GEE method used in the multivariable analysis copes with missing observations by utilizing all available data [32], we included data from seven participants (five patients, two controls) with missing data in the analysis. This method limits the potential for bias associated with including only those participants with complete data.

Descriptive statistics of the 521 patients and 498 controls are shown in Tables 1 and 2, respectively. Mean age at enrollment was 57.9 (SD = 10.5, range 40–91) years. Age differed significantly by caregiving roles in both patients (no caregiving: 61.7, caregiving to either children or others: 52.5, multiple caregiving roles: 51.7; $P < 0.001$) and controls (no caregiving: 61.2, caregiving to either children or others: 51.7, multiple caregiving roles: 54.2; $P < 0.001$). Sixty-one (11.7%) patients and 65 (13.1%) controls reported being primary caregivers to someone other than their own children; of these, 34 patients and 30 controls reporting taking care of at least one parent. On average, patients and controls had two children (SD = 1.5; range 0–13), were primary caregivers to less than one child, and had two people living in their household (SD = 1.2; range 1–11). Mean age of children receiving care from participants was

18 years old in patients (SD = 7.4; range 5–49) and controls (SD = 8.3; range 2–60). The total number of children, number of children to whom participants gave care, mean age of children receiving care, and number of people living in the household did not differ significantly between patients and controls. Having a history of depression, age, and marital and employment status also did not differ significantly between patients and controls. Availability of social support, although relatively high (means > 4.0) for both patients and controls, was reported to be lower for controls than for patients at each interview (each $P < 0.05$). As shown in Tables 1 and 2, a greater proportion of patients than controls reported having multiple caregiving roles (4.4% vs. 3.0%) and no caregiving roles (64.7% vs. 58.2%) at enrollment ($P = 0.023$).

Bivariate analyses

Elevated depressed mood at each interview was significantly associated with younger age and less social support in patients (each $P < 0.001$) and in controls (each $P < 0.05$). Patients and controls who were unmarried ($P < 0.01$), non-white ($P < 0.001$), unemployed/unable to work ($P < 0.001$), and had annual household incomes less than \$25,000 ($P < 0.001$) were more likely to have elevated depressed mood at each interview. As shown in Table 3, a greater percentage of patients with stage IIA than with DCIS or stage I breast cancer reported elevated depressed mood at T1 ($P = 0.01$) and T3 ($P = 0.012$); but the proportion of patients and controls with elevated depressed mood did not differ significantly.

Elevated depressed mood at each interview was not significantly associated with caregiving roles (Tables 1, 2 show T1 comparisons) or with number of children, number of children receiving care, mean age of children receiving care, or number of people living in the household. Both patients and controls who had elevated depressed mood at T1 were more likely to have elevated depressed mood at T2 and T3, and participants with elevated depressed mood at T2 were more likely to have elevated depressed mood at T3 (each $P < 0.001$).

Figures 1 and 2 illustrate the prevalence of elevated depressed mood in patients and controls over the year-long follow-up by caregiving roles. In Fig. 1, a lower proportion of patients with multiple caregiving roles reported elevated depressed mood at T1 compared with the other two groups, but the proportion of these patients with multiple caregiving roles who had elevated depressed mood increased at T2 and T3. Among patients in the other two caregiving groups, however, the prevalence of elevated depressed mood decreased at T2 and T3. In Fig. 2, by comparison, the prevalence of elevated depressed mood was higher at T1 in controls with multiple caregiving roles compared with the other two caregiving groups; but the prevalence of depressed mood decreased over time for controls with multiple caregiving roles and essentially did not change among controls in the other two groups.

Separate logistic regression models were fit to determine if caregiving roles differentially affected depressed mood over time in patients and controls. Variables that were significantly associated with elevated depressed mood in bivariate tests (age, race, social support, employment status, history of depression, and marital status) were included as covariates in the multivariate analysis for both patients and controls. In the patient model, we also controlled for stage at diagnosis (DCIS, I, IIA). We did not include annual household income in the multivariable model due to collinearity between income and each of race and employment status.

Multivariate analysis of depressed mood over time in patients and controls

In the patient model, the change in risk of elevated depressed mood over time was different among the three caregiving categories (Table 4). Patients with multiple caregiving roles were more likely to report elevated depressed mood at T2 (aOR = 7.20) and at T3 (aOR = 8.07) compared with T1, although at T3 this association did not reach statistical significance. Risk

of elevated depressed mood did not significantly change over time among patients with caregiving roles to either a child or another person, but patients with no caregiving roles at enrollment were less likely to report elevated depressed mood at T2 compared with T1 (aOR = 0.50).

By comparison, controls with multiple caregiving roles were less likely to have elevated depressed mood at T3 (aOR = 0.12), and the risk for elevated depressed mood did not change significantly over time among controls without caregiving roles or among controls with caregiving roles to either children or other persons.

Discussion

We examined the relationship between the extent of caregiving responsibilities and depressed mood over time (at 6-month and 1-year follow-up) and whether having caregiving responsibilities were differentially associated with depressed mood in early-stage breast cancer patients and a group of age-matched controls. Patients who had multiple caregiving roles were at greater risk and patients without caregiving roles were at lower risk of elevated depressed mood at 6-month follow-up compared with baseline. After 1 year, patients without caregiving roles and patients with multiple caregiving roles were neither more nor less likely to report elevated depressed mood.

Caregiving has been found to be associated with depression, feelings of guilt, stress [12], and "caregiver role strain," defined as having difficulty carrying out caregiving activities; caregivers with chronic or acute illness can experience heightened caregiver role strain [33]. Breast cancer patients in our sample with multiple care-giving responsibilities may have experienced elevated depressed mood due to caregiver role strain heightened by their experiences during breast cancer treatment, especially at the 6-month follow-up. For many of these patients, this second interview would have coincided with a time when they had either just finished chemotherapy and/or radiation or were still undergoing treatment. Cancer therapies can be physically and emotionally demanding leaving patients little time or energy to devote to dependents [34].

In Japan, having multiple family roles was found to be significantly associated with increased level of caregiving worry [35] and coronary heart disease (hypothesized to result from stress from family roles) [36]. In our study, patients with multiple caregiving roles were precisely the group exhibiting elevated depressed mood at follow-up. We did not ask participants about the duration of their caregiving responsibilities, although there was no signifi-cant difference between the numbers or age of children cared for by controls and patients in our study. We did not inquire about particular types of caregiving responsibilities or measure whether caregiving roles changed over time, but our findings that, among patients, having multiple caregiving roles at time of diagnosis was associated with increased risk of having elevated depressed mood 6 months later suggests a need for surveillance of those patients with multiple caregiving responsibilities to ensure that they receive psychological services and social support as necessary.

Results of previous studies have been inconsistent regarding the association between depression and number of children living at home [37,38]. We found that depressed mood, in both patients and controls, was not associated with total number of children, of children receiving care, or of people living in the household. One study, however, found that single women with breast cancer who also had children reported significantly higher rates of depression than their married counterparts [39]. Having a larger social network also has been found to be correlated with better mental health outcomes among younger breast cancer patients [17,29]. Thus, because lack of social support is associated with increased risk of depression in

breast cancer patients [7,17–19], it is especially important that patients with multiple caregiving roles have sufficient social support not only to buffer the stress associated with their caregiving responsibilities but also the additional stress associated with a breast cancer diagnosis and treatment.

The direction of effects of employment status on depression in women, in general, is inconsistent; some research has shown that working protects against depression [40], yet other research has found that working does not reduce and can even increase the experience of depressed mood [41]. Although controls with multiple caregiving roles were less likely to be depressed at the 12-month follow-up compared with baseline, controls, but not patients, who identified themselves as homemakers were twice as likely to report elevated depressed mood as controls who were working at least part time. A recent cross-sectional study found that breast cancer patients 1–4 years after diagnosis who discontinued working during their treatment and did not resume their job had the highest levels of psychosocial distress and the lowest levels of physical and mental functioning and quality of life [42]. The experience of psychological distress in breast cancer survivors and in controls may be due to whether unemployment over the long term is by choice or due to ill health and/or limitations in functioning.

Our study makes a contribution to the paucity of research about the effect of caregiving roles on depressed mood in early-stage breast cancer survivors. A meta-analysis found that depressed patients were three times more likely to be noncompliant with medical treatment [9], which has implications for clinical outcomes. For example, noncompliance with tamoxifen (generic) in the breast cancer patients was significantly associated with increased risk of local or distant recurrence [43]. These results suggest that interventions for patients at risk for depression can have a lasting impact on their long-term disease-free survival [44]. Although treatment of depression may not necessarily improve survival, a population-based prospective study of young breast cancer patients found that treatment for depression positively impacts patients' quality of life [45].

Strengths of our study include the longitudinal design and inclusion of a comparison group of age-matched women without breast cancer. However, there were limitations which limit the generalizability of our findings. Patients were recruited from a National Cancer Institute (NCI)-designated Comprehensive Cancer Center and another academic medical center in the Midwest, and our inability to contact 77 participants who had completed the parent study could have resulted in bias. Our study also was limited to women 40 years of age and older and did not include younger women who are more likely to be caring for children (especially younger children) at home; the multiple-caregiver group also was very small. In addition, since it was beyond the scope of our study, we did not measure whether caregiving roles changed over time or inquire about particular types of caregiving responsibilities, knowledge of which might have enriched our understanding of why having multiple caregiving roles was a risk factor for elevated depressed mood among the patients in our sample. Additional studies might explore not only how breast cancer treatment impacts breast cancer patients' abilities to maintain their caregiving responsibilities for children and/or other people, but also how various aspects of patients' caregiving roles impact psychological outcomes as well as adherence to treatment and follow-up care recommendations. Moreover, our sample was not representative of all breast cancer patients, since we enrolled only those with early-stage disease; women with more advanced breast cancer can face different treatment regimens, prognoses and stressors than women with early-stage cancer, which may differentially impact their caregiving roles and abilities and ultimately their experience of depression.

The increased risk of elevated depressed mood that we observed in the small subset of patients who, at enrollment, had caregiving responsibilities for both children and others suggests a need to identify these women early during their treatment. Future research might investigate how

caregiving roles in breast cancer patients change over time, how particular caregiving responsibilities impact breast cancer patients' quality of life, and how healthcare providers and others can support breast cancer patients with multiple caregiving responsibilities more effectively.

Acknowledgments

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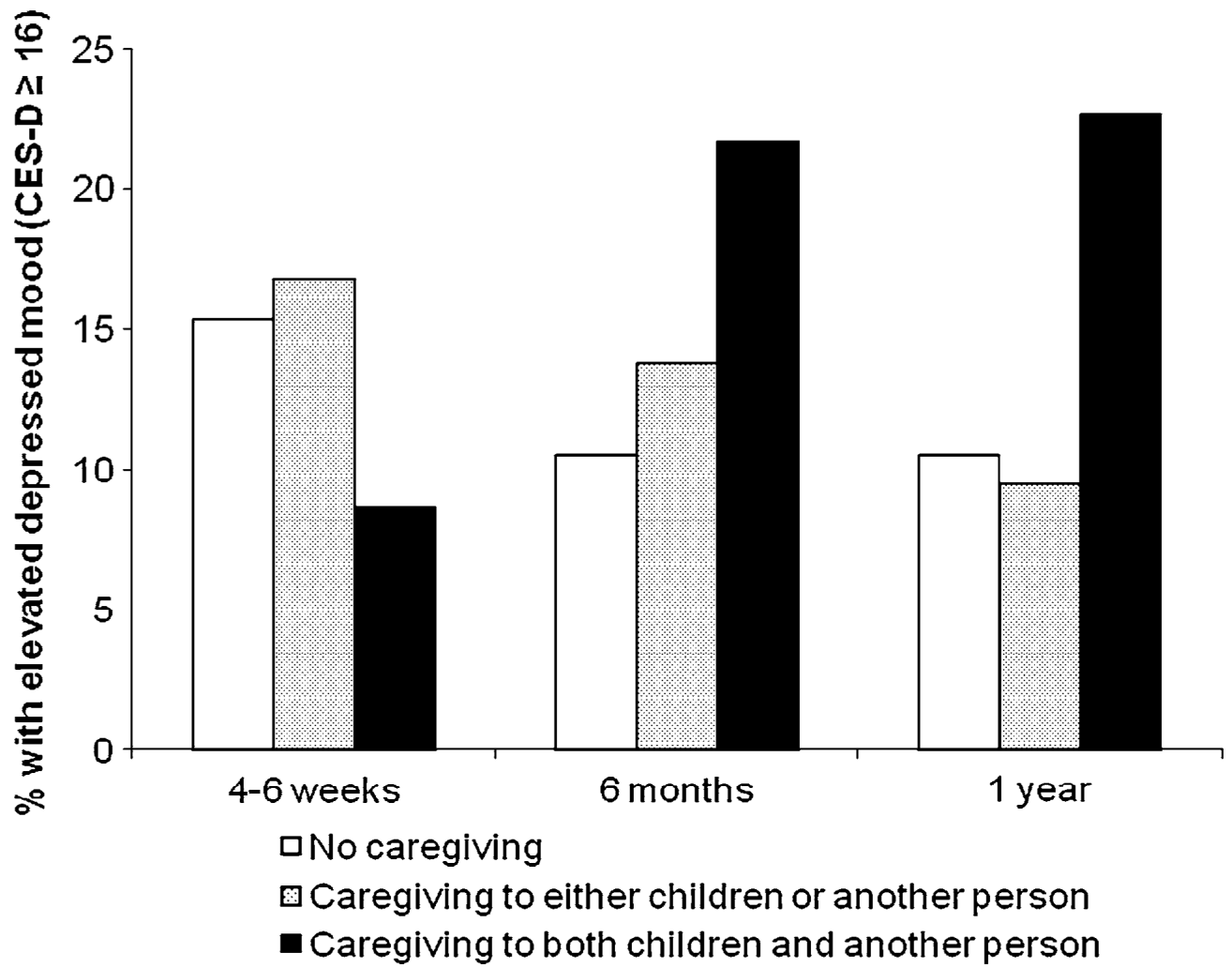
Fig. 1.
The prevalence of elevated depressed mood over time in early-stage breast cancer patients, by the extent of their caregiving roles
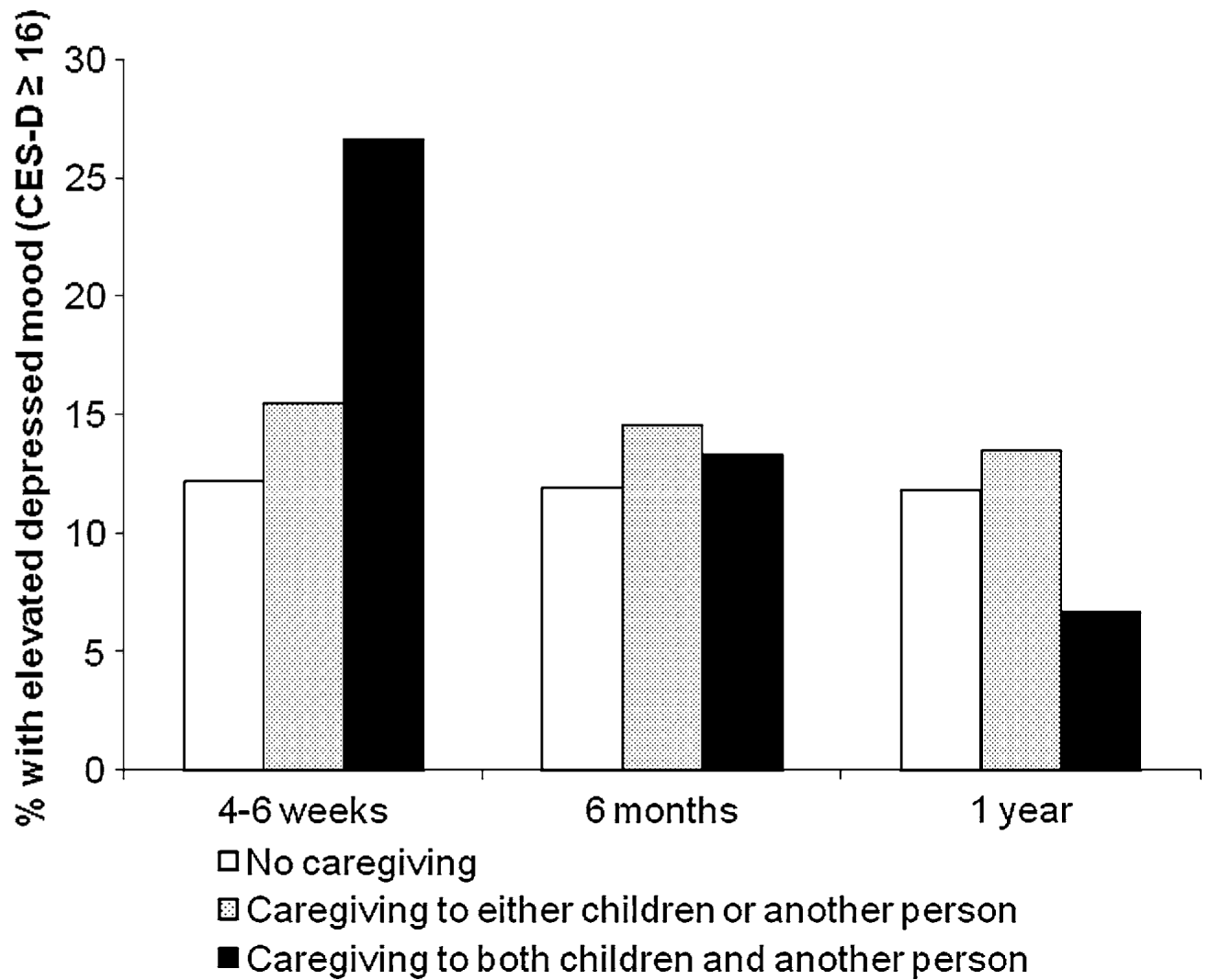
Fig. 2.
The prevalence of elevated depressed mood over time in women without breast cancer
(*controls*), by the extent of their caregiving roles

Table 1

Characteristics of patients at enrollment, by caregiving roles

	Total N = 521 (%)	No caregiving n = 337 (64.7%)	Caregiving to children or other persons n = 161 (30.9%)	Caregiving to both children and other persons n = 23 (4.4%)	P
Race					0.706
White	421 (80.8)	270 (80.1)	131 (81.4)	20 (87.0)	
Non-White	100 (19.2)	67 (19.9)	30 (18.6)	3 (13.0)	
Marital status					<0.001
Married	322 (61.8)	186 (55.2)	121 (75.2)	15 (65.2)	
Non-married	199 (38.2)	151 (44.8)	40 (24.8)	8 (34.8)	
Employment status					<0.001
Working at least part time	270 (51.8)	157 (46.6)	98 (60.9)	15 (65.2)	
Retired	146 (28.0)	118 (35.0)	27 (16.8)	1 (4.3)	
Homemaker	43 (8.3)	25 (7.4)	17 (10.6)	1 (4.3)	
Unable to work/unemployed	62 (11.9)	37 (11.0)	19 (11.8)	6 (26.1)	
Annual income					0.017
Less than $25,000	133 (25.5)	100 (29.7)	30 (18.6)	3 (13.0)	
$25,000–$75,000	199 (38.2)	126 (37.4)	61 (37.9)	12 (52.2)	
More than $75,000	149 (28.6)	82 (24.3)	60 (37.3)	7 (30.4)	
Refused/Don't know	40 (7.7)	29 (8.6)	10 (6.2)	1 (4.3)	
Pathologic cancer stage					0.142
DCIS	179 (34.4)	104 (30.9)	68 (42.2)	7 (30.4)	
Stage I	268 (51.4)	185 (54.9)	71 (44.1)	12 (52.2)	
Stage IIA	74 (14.2)	48 (14.2)	22 (13.7)	4 (17.4)	
History of depression					0.923
Yes	184 (35.3)	118 (35.0)	57 (35.4)	9 (39.1)	
No	337 (64.7)	219 (65.0)	104 (64.6)	14 (60.9)	
Level of depressed mood					0.604
CES-D <16	440 (84.5)	285 (84.6)	134 (83.2)	21 (91.3)	
CES-D ≥16	81 (15.5)	52 (15.4)	27 (16.8)	2 (8.7)	

CES-D Center for Epidemiologic Studies Depression Scale

Table 2

Characteristics of controls at enrollment, by caregiving roles

	Total $N = 498$ (%)	No caregiving $n = 290$ (58.2%)	Caregiving to children or other persons $n = 193$ (38.8%)	Caregiving to both children and other persons $n = 15$ (3.0%)	P
Race					0.111
White	371 (74.5)	222 (76.6)	141 (73.1)	8 (53.3)	
Non-White	127 (25.5)	68 (23.4)	52 (26.9)	7 (46.7)	
Marital status					<0.001
Married	315 (63.3)	157 (54.1)	147 (76.2)	11 (73.3)	
Non-married	183 (36.7)	133 (45.9)	46 (23.8)	4 (26.7)	
Employment status					<0.001
Working at least part time	291 (58.4)	144 (49.7)	136 (70.5)	11 (73.3)	
Retired	126 (25.3)	103 (35.5)	20 (10.4)	3 (20.0)	
Homemaker	35 (7.0)	20 (6.9)	15 (7.8)	0 (.0)	
Unable to work/unemployed	46 (9.2)	23 (7.9)	22 (11.4)	1 (6.7)	
Annual income					<0.001
Less than $25,000	100 (20.1)	70 (24.1)	26 (13.5)	4 (26.7)	
$25,000–$75,000	189 (38.0)	125 (43.1)	59 (30.6)	5 (33.3)	
More than $75,000	175 (35.1)	78 (26.9)	92 (47.7)	5 (33.3)	
Refused/Don't know	34 (6.8)	17 (5.9)	16 (8.3)	1 (6.7)	
History of depression					0.279
Yes	198 (39.8)	118 (40.7)	77 (39.9)	3 (20.0)	
No	300 (60.2)	172 (59.3)	116 (60.1)	12 (80.0)	
Level of depressed mood					0.192
CES-D < 16	429 (86.1)	255 (87.9)	163 (84.5)	11 (73.3)	
CES-D ≥ 16	69 (13.9)	35 (12.1)	30 (15.5)	4 (26.7)	

CES-D Center for Epidemiologic Studies Depression Scale

Table 3

N (%) of patients and controls, by level of depressed mood on the Center for Epidemiologic Studies-Depression Scale at each interview

Cancer Stage	T1			T2			T3		
	<16 *n* = 440	≥16 *n* = 81	*P*	<16 *n* = 456	≥16 *n* = 62	*P*	<16 *n* = 460	≥16 *n* = 55	*P*
DCIS	160 (36.4)	19 (23.5)	0.01	156 (34.2)	21 (33.9)	0.695	161 (35.0)	15 (27.3)	0.012
Stage I	225 (51.1)	43 (53.1)		237 (52.0)	30 (48.4)		241 (52.4)	25 (45.5)	
Stage IIA	55 (12.5)	19 (23.5)		63 (13.8)	11 (17.7)		58 (12.6)	15 (27.3)	
Group	*n* = 869	*n* = 150		*n* = 886	*n* = 126		*n* = 895	*n* = 116	
Patients	440 (50.6)	81 (54.0)	0.446	456 (51.5)	62 (49.2)	0.635	460 (51.4)	55 (47.4)	0.419
Controls	429 (49.4)	69 (46.0)		430 (48.5)	64 (50.8)		435 (48.6)	61 (52.6)	

Table 4

Multivariable marginal logistic regression models determining risk of elevated depressed mood in patients and controls

	Patients			Controls		
	aOR	95% CI	*P*	aOR	95% CI	*P*
Caregiving × Time interaction						
No caregiving						
T1	1.00			1.00		
T2	0.50	0.29–0.86	0.0119	0.95	0.57–1.57	0.8349
T3	0.59	0.33–1.05	0.0724	0.87	0.53–1.44	0.5972
Caregiving to a child or another person						
T1	1.00			1.00		
T2	1.14	0.49–2.65	0.7641	1.07	0.51–2.24	0.8659
T3	0.58	0.24–1.42	0.2319	1.04	0.50–2.20	0.9120
Caregiving to both						
T1	1.00			1.00		
T2	7.20	1.17–44.46	0.0336	0.20	0.02–2.01	0.1700
T3	8.07	0.79–82.20	0.0778	0.12	0.02–0.97	0.0468
Age at diagnosis	0.90	0.87–0.94	<0.0001	0.96	0.94–0.99	0.0104
Social support	0.30	0.22–0.40	<0.0001	0.32	0.25–0.42	<0.0001
Marital status						
Married	1.00			1.00		
Non-married	0.88	0.54–1.45	0.6246	0.91	0.54–1.55	0.7334
Employment status						
Working at least part time	1.00			1.00		
Retired	1.18	0.55–2.54	0.6798	1.94	0.97–3.88	0.0610
Unable to work/Unemployed	4.01	2.35–6.84	<0.0001	5.24	2.93–9.36	<0.0001
Homemaker	1.41	0.64–3.14	0.3964	2.61	1.25–5.43	0.0104
Race						
White	1.00			1.00		
Non-white	1.84	1.03–3.32	0.0408	1.33	0.79–2.22	0.2806
History of depression at baseline	4.24	2.74–6.58	<0.0001	3.19	2.03–5.01	<0.0001
Cancer stage						

	Patients			Controls		
	aOR	95% CI	P	aOR	95% CI	P
DCIS	1.00			–	–	–
I	1.55	0.92–2.59	0.0988	–	–	–
IIA	1.82	1.02–3.28	0.0444	–	–	–

aOR adjusted odds ratio, *CI* confidence interval