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# Activity Disruption and Depressive Symptoms in Women Living With Metastatic Breast Cancer

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## Abstract

**Objective—**Women with breast cancer are at increased risk of depression, and the extent to which valued activities are disrupted by one's illness has been correlated with depressive symptoms in women with early stage breast cancer. This association has not been examined in women with Stage IV (metastatic) cancer, and the temporal directionality of this relationship remains unclear. The goal of the current study was to examine longitudinal, reciprocal relationships between illness-related disruption of social and recreational activities and self-reported symptoms of depression in a sample of women living with Stage IV breast cancer.

**Method—**Participants were 103 women diagnosed with metastatic breast cancer. Women completed measures of depressive symptoms and activity disruption at study entry (T1) and at 3-month follow-up (T2).

**Results—**Activity disruption at study entry did not significantly predict changes in total depressive symptoms or in negative affective or somatic symptoms but did predict reductions in positive affect. Total depressive symptoms at study entry predicted increases in activity disruption, as did negative affective symptoms.

**Conclusions—**Depressive symptoms, specifically negative affective symptoms such as sadness, may exacerbate social and recreational activity disruption in women with metastatic breast cancer. Cancer-related activity disruption may, in turn, result in reductions in positive affect. These results highlight the importance of examining specific constellations of depressive symptoms and suggest that maintaining valued activities may help to preserve enjoyment of life for patients with Stage IV cancer.

### Keywords

breast cancer; depressive symptoms; coping; behavioral activation

Women with breast cancer are at increased risk of depression, and women with Stage IV metastatic breast cancer, who face the likelihood of a foreshortened future, may be

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particularly at risk for poor mental health (Caplette-Gingras & Savard, 2008). The activity restriction model posits that stressors result in depressive symptoms to the extent that they interfere with one's normal social and recreational activities (Williamson & Shaffer, 2000), and a recent meta-analysis of 32 studies revealed a strong relationship (mean $r = .45$) between activity restriction and depressive symptoms in medical patients (Mausbach et al., 2011). Although activity restriction has been correlated with depressive symptoms in women with early stage breast cancer (Williamson, 2000), this association has not been examined in women with Stage IV cancer. Because a Stage IV diagnosis often results in a progressive loss of functional abilities and roles, activity disruption and concomitant depression may be particularly profound among women with metastatic disease.

With few exceptions, the activity restriction literature has been limited by cross-sectional study design. In one study of mixed cancer outpatients, activity disruption predicted depressive symptoms 8 months later (Williamson & Schulz, 1995), as the activity restriction model suggests. In another, heightened distress predicted activity disruption six months later, but activity disruption did not predict distress (Carver, Lehman, & Antoni, 2003). These longitudinal relationships warrant study in the context of Stage IV cancer, in which there may be greater variability in the course of both activity disruption and distress than in early stage disease.

Finally, depression is a heterogeneous condition and may include lack of enjoyment of life, sadness, and somatic and interpersonal symptoms. Whether associations with activity disruption vary across these subsets of symptoms has not been tested. Examining longitudinal relationships with specific symptoms of depression could inform theories of depression in the context of cancer as well as the development and delivery of interventions.

The goal of the current analyses was to examine longitudinal relationships between illness-related disruption of social and recreational activities and self-reported symptoms of depression in a sample of women living with Stage IV metastatic breast cancer. We hypothesized a reciprocal relationship, such that activity disruption at study entry would predict increases in depressive symptoms three months later and that depressive symptoms at study entry would predict subsequent increases in activity restriction. In exploratory analyses, we also examined whether these longitudinal relationships differed across the different subsets of depressive symptoms.

## Method

### Participants

Participants were 103 women diagnosed with Stage IV meta-static breast cancer (i.e., cancer spread to other parts of the body beyond the breast and axillary lymph nodes). All participants were ambulatory with a life expectancy of at least 6 months in the assessment of the referring physician and were able to complete assessments in English.

At study entry (T1), participants were on average 57.20 years old ($SD = 10.84$, range = 33–91 years), college educated ($M$ years = 15.70, $SD = 2.96$), married or living as married (67%), and not currently employed (64%). Most (82%) were Caucasian. Participants

reported an average of 1.44 (*SD* = 1.58) comorbid medical conditions (e.g., arthritis, hypertension). On average, women had been diagnosed with breast cancer nearly 8 years previously (*M* = 7.88 years, *SD* = 5.55) and had been living with metastatic breast cancer for more than 2 years (*M* = 2.75 years, *SD* = 2.48; range = 1–126 months). The most common metastatic sites were liver (41%), lung (37%), and bone (22%). Most women were receiving medical treatment when they entered the study (e.g., 51% chemotherapy; 28% endocrine therapy). At 3-month follow-up (T2), 53% had learned of some indication of advancing disease (i.e., tumor growth or new metastatic site) since study entry.

## Procedure

As approved by the UCLA Institutional Review Board, women were recruited from a university-based oncology clinic and a community breast cancer clinic (65% response rate). Consenting women completed questionnaires at T1 and T2 and participated in a structured interview at T1. Women who completed both assessments (103 of 115; 90%) did not differ significantly from women who did not complete the T2 questionnaire on any demographic or medical variable or on T1 self-report measures. Additional details about study procedures are available in Stanton and Low (2012) and Thompson, Stanton, and Bower (in press).

## Measures

**Activity disruption—**At T1 and T2, participants completed items from the Sickness Impact Profile (SIP; Bergner, Bobbitt, Carter, & Gilson, 1981). To reduce participant burden, the short-form SIP (de Bruin, Mancuso, Branigan, & Tugade, 1994) was shortened from 12 to six yes/no items by selecting the items most reflecting disruption of social and recreational pursuits as a result of “illness and treatment.” This brief measure of activity disruption demonstrated good internal consistency (α = .85 at T1).

**Depressive symptoms—**The 20-item Center for Epidemiologic Studies – Depression Scale (CES-D; Radloff, 1977) was administered at both timepoints to assess depressive symptoms in the past week. Internal consistency for the total scale was adequate (α = .71 at T1). The CES-D also yields four subscales: negative affect (NA; seven items, e.g., “I felt sad,”; α = .87 in the current sample); positive affect (PA; 4 reverse-scored items; e.g., “I enjoyed life,”; α = .70 in this sample), somatic symptoms (Som; 7 items, e.g., “I felt that everything I did was an effort”; α = .77 in this sample), and interpersonal symptoms (2 items, e.g., “People were unfriendly”; α = .48 in this sample). Given weak internal consistency for the interpersonal symptom subscale, exploratory analyses focused only on the NA, PA, and Som subscales.

**Demographic and medical covariates—**Demographic variables were age, ethnic group, years of education, employment status, and marital status. Medical variables assessed via questionnaire or interview at study entry were months since original breast cancer and Stage IV cancer diagnoses, number of metastatic sites, current cancer treatment (chemotherapy, endocrine therapy), and number of comorbid chronic conditions. At T2, women also were asked to indicate whether they had undergone any additional diagnostic tests or scans and to describe the findings (i.e., no indication of advancing disease vs. indication of advancing disease, such as tumor growth or a new metastatic site).

## Results

Regarding activity disruption, 60% of women reported that they had changed at least one aspect of their social or recreational activity because of their illness or its treatment at T1 (54% at T2). The most commonly endorsed change was doing hobbies/recreation for shorter period of time (endorsed by 60% at T1), followed by going out for entertainment less often (47%), doing fewer social activities with groups of people (46%), doing fewer community activities (46%), cutting down on usual recreation and pastimes (29%), and cutting down the length of visits with friends (26%). There was no significant change in activity disruption from T1 to T2. Regarding depressive symptoms, 39% of participants reported symptoms suggestive of clinical depression at T1 (CES-D ≥ 16; 25% at T2). CES-D scores, including the total score as well as NA and PA subscales, showed significant improvement from T1 to T2 (Total $M$ ($SD$) = 14.74 (10.24) to 12.55 (8.85)).

In bivariate correlations, activity disruption was significantly related to depressive symptoms assessed concurrently ($r$s = .55 to .59, $p < .001$), as well as depressive symptoms both three months prior ($r = .54$, $p < .001$) and three months later ($r = .32$, $p < .001$). Change in SIP was significantly correlated with change in total CES-D ($r = .27$, $p = .007$) and Som ($r = .31$, $p = .002$), but not PA or NA.

Of 12 potential demographic and medical covariates, four were significantly ($p < .05$) related to activity disruption and/or depressive symptoms. Greater depressive symptoms were significantly associated with younger age, T1; $t(101) = -.24$, $p = .02$, number of chronic conditions, T2; $t(101) = .27$, $p = .006$, not using endocrine therapy, T2; $t(99) = -2.46$, $p = .016$, 9.09 vs. 13.79, and worsening disease, T2; $t(100) = -2.33$, $p = .022$, 14.50 vs. 10.49. Greater activity disruption was related significantly to number of chronic conditions, T2; $t(101) = .22$, $p = .03$, endocrine therapy use, T2; $t(98) = -2.61$, $p = .011$, 2.60 vs. 1.39, and marginally to worsening disease, T2; $t(99) = -1.95$, $p = .054$, 2.63 vs. 1.81. These four variables were included as covariates in all subsequent analyses.

To test the hypothesis that activity disruption predicts worsening depressive symptoms over time, we conducted multiple regression analyses with depressive symptoms (total CES-D and subscales) at T2 as dependent variables and activity disruption at T1 as the predictor, after adjusting for covariates and CES-D at T1. Sample sizes vary slightly across analyses due to missing data on some self-report measures for some participants. Contrary to hypotheses, activity disruption did not significantly predict changes in total CES-D or in NA or Som symptoms ($p$s > .34). Activity disruption at T1 predicted significant reductions in PA, $B(SE) = -.21(.10)$, $\beta = -.20$, $p < .05$, $\Delta R^2 = .03$.

To test the alternative hypothesis that depressive symptoms predict increased activity disruption, we conducted regressions similar to those described above but with SIP at T2 as the dependent variable and depressive symptoms (total CES-D and sub-scales) as predictors, adjusting for covariates and SIP at T1. As hypothesized, higher total scores on the CES-D at T1 predicted increases in activity disruption at T2, $B(SE) = .06(.02)$, $\beta = .30$, $p < .01$, $\Delta R^2 = .05$. When CES-D subscales were examined, only NA significantly predicted increased activity disruption, $B(SE) = .15(.04)$, $\beta = .32$, $p < .001$, $\Delta R^2 = .07$; $p$s > .11 for PA and Som.

## Discussion

The goal of the current study was to examine longitudinal associations between illness-related activity disruption and depressive symptoms among women living with metastatic breast cancer. Contrary to hypothesis, the activity restriction model (Williamson & Shaffer, 2000), and results of one longitudinal study with mixed cancer patients (Williamson & Schulz, 1995), cancer-related disruption in social and recreational activities did not predict increases in total depressive symptoms 3 months later. Perhaps the 3-month follow-up interval was insufficient to capture these relationships, or other factors (e.g., physical symptoms, Turner, Kelly, Swanson, Allison, & Wetzig, 2005; broader goal disengagement, Thompson et al., in press; coping processes, Stanton & Low, 2012) are more important predictors of depressive symptoms in the metastatic cancer context.

Activity disruption did predict a significant decrease in positive affect specifically, suggesting that the interruption of social and recreational activities by a metastatic cancer diagnosis may reduce a woman's enjoyment of life, happiness, and feelings of hopefulness without concomitant increases in sadness, fearfulness, loneliness, or somatic symptoms. Positive affect may affect morbidity and, in some cases, mortality independent of negative emotions (Pressman & Cohen, 2005) and has been hypothesized to "undo" the physiological consequences of psychological stress (Fredrickson, Mancuso, Branigan, & Tugad, 2000). Consequently, positive affect may be particularly important to cultivate and sustain in the context of a chronic, uncontrollable stressor such as metastatic breast cancer.

Consistent with our second hypothesis and one longitudinal study with early stage breast cancer patients (Carver et al., 2003), T1 depressive symptoms predicted significant increases in activity disruption over three months. There was no significant association between positive affective or somatic symptoms and subsequent activity disruption, but level of negative affective symptoms at T1 accounted for 7% of the variance in T2 activity disruption, even after adjusting for covariates and T1 disruption. This finding is consistent with Lewinsohn & Graf's (1973) behavioral theory of depression, which suggests that depressed people experience less reinforcement from their environments, leading to avoidance and withdrawal behavior. In the context of metastatic breast cancer, negative affect may manifest in less motivation to maintain regular social and recreational activities. Cutting back on activities may, in turn, lead to reduced happiness and enjoyment of life, leading to a vicious cycle of activity disruption and depressive symptoms.

These results suggest that behavioral activation and related interventions aimed at helping patients to increase and maintain valued, rewarding activities have the potential to enhance happiness and positive affect in cancer patients (Hopko et al., 2011). For women living with Stage IV breast cancer, this may involve adapting activities to accommodate physical limitations or identifying activities to replace those given up because of illness or treatment (Duke, Leventhal, Brownlee, & Leventhal, 2002; Thompson et al., in press). Alternatively, treating depressed affect with cognitive–behavioral therapy and/or pharmacotherapy may help cancer patients to minimize the effect of their illness on social and recreational activities.

Several limitations of this study should be noted. First, women who elected to participate may have been less depressed with less activity restriction than those who refused; however, 60% of the sample reported activity restriction and 39% clinically significant depressive symptoms. In addition, we used a brief measure of social and recreational activity disruption, which may not have captured the full range of valued activities. Both activity disruption and depressive symptoms were relatively stable over the 3-month follow-up; longer follow-up is needed to capture greater fluctuation over the cancer trajectory. We did not assess cancer-related physical symptoms or whether patients received treatment for depression and could not adjust for these potential confounds. Finally, although our sample was homogeneous with respect to demographic characteristics, there was significant variability in time since Stage IV diagnosis and disease status. Future research in this area might focus on patients closer to the time of diagnosis or at other times when physical symptoms and limitations are more uniform (e.g., following surgery).

Despite these limitations, this article addresses central questions in the literature on activity restriction and depression in the context of chronic illness. To our knowledge, this is the first study to examine the temporal relationships between activity disruption and depressive symptoms over time in women with Stage IV breast cancer. Findings provided more support for an effect of depressive symptoms on activity disruption three months later than for an effect of activity disruption on depressive symptoms, although relationships differed across CES-D subscales, highlighting the importance of examining specific constellations of depressive symptoms. For women living with incurable metastatic breast cancer, maintaining valued activities for as long as is feasible, as well as cultivating new attainable goals (Thompson et al., in press), may help to preserve enjoyment of life and a sense of hope, purpose, and control.

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