

Rural and urban breast cancer patients: health locus of control and psychological adjustment

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Abstract

Objective: This study examines the moderating influence of rural residence on the associations between health locus of control (HLC) beliefs and psychological well-being.

Method: Two hundred and twenty-four breast cancer patients were surveyed.

Results: The results revealed that rurality interacted with HLC beliefs in predicting psychological adjustment. The pattern indicated that, whereas endorsing external forms of locus of control can be detrimental to the psychological well-being of urban breast cancer patients, the same is not true for rural breast cancer patients. For rural breast cancer patients, powerful others locus of control was beneficial for and chance locus of control was unrelated to well-being.

Conclusions: Implications for future research and medical care are discussed.

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Introduction

Women diagnosed with and undergoing treatment for breast cancer experience psychological distress [e.g. 1–6]. Psychological distress is subjectively painful and decreases the quality of one's life [7–12]. Moreover, this distress is associated with deficits in immune functioning, which can have negative implications for survival [13–17].

The overwhelming majority of studies of psychological adjustment among breast cancer patients and survivors, however, focus on women living in urban areas. Researchers have largely ignored rural women's psychological adjustment to breast cancer. Our review of the literature [18] identified only 27 studies of psychological adjustment among rural breast cancer patients and survivors. This dearth exists despite that rural people have been identified as an understudied population for cancer care and mental health. Whereas some of the findings derived from studies of urban women may generalize, rural breast cancer patients are likely to have distinct beliefs and experiences that influence their adjustment [19–27].

Our research program seeks to understand psychological well-being among rural breast cancer patients. A key question for this research is, 'Which specific psychosocial variables are likely to be important for understanding psychological adjustment among rural breast cancer patients?' To answer this question, we reviewed the literature on rural women with breast cancer as well as the

general literature on rural people and health. Several of these studies pointed to health locus of control (HLC) (e.g. [28,29]) as potentially important for understanding rural breast cancer patients' adjustment. The purpose of the present study was to examine the influence of HLC on psychological well-being among rural breast cancer patients.

Rurality

Traditionally, definitions of rurality were based on the predomination of a set of 'rural values' [30]. Contemporary theorists (i.e. [31,32]), however, suggest that describing the exact nature of rural life is difficult because rural culture is constantly changing. Nevertheless, rural communities are considered highly autonomous, integrated, and cohesive: ideals that are likely to remain even as rural culture merges with the larger culture [33]. Consistent with this, Cloke and Milbourne [31] argue that a regional circulation of ideas sustains rural culture.

Moreover, those living in rural areas value their identity as 'rural people' and their beliefs in a 'rural way of life' [30]. Cloke and Milbourne [31] argue that rurality is best understood as a socially constructed term that describes the social, moral, and cultural values endorsed by rural people. Melton [32] noted that, compared with their urban counterparts, rural people are said to be more religious, conservative, work-oriented, intolerant,

fatalistic, and familial. Halfacree [34] found that rurality was strongly associated with relaxation, a slower pace, independence, non-materialistic lifestyles, strong communities, traditional values, and a sense of nature. That 'rural life' continues to be important is evidenced in the veracity with which rural residents attempt to protect cultural characteristics through a variety of efforts and organizations (i.e. [35–37]).

Literature on rural breast cancer patients

Lazarus and Folkman [9] explain that environment and culture influence people's beliefs, emotions, and behavior. We [18] have argued that rural cultural and environmental factors interact with rural women's lives in ways that affect their subjective experiences with breast cancer. Research supports this supposition. For instance, the type of treatment breast cancer patients choose and receive appears to be influenced by whether they live in rural or urban areas. Compared with their urban counterparts, rural breast cancer patients are more likely to undergo mastectomy and receive chemotherapy and are less likely to undergo lumpectomy and receive radiation [38–43]. Also, Girgis *et al.* [40] revealed that rural breast cancer survivors were more likely to report needing help with physical and daily-living needs compared with their urban counterparts. Similarly, Gray *et al.* [41] showed that rural women with cancer undergoing treatment felt that taking care of the home and children was more difficult in rural areas.

Although our literature review [18] reveals some intriguing findings that advance our understanding of rural women's psychological adjustment to breast cancer, the extant studies are limited in a number of ways. The majority have relatively small samples (less than 100), have not included an urban comparison group, and have a variety of conceptualizations of rurality that are less than definitive. Most important for the current work, few studies focus on understanding which variables predict psychological adjustment among rural breast cancer patients.

Health locus of control

Lazarus and Folkman [9] not only argue that culture influences people's locus of control beliefs but also explain that these beliefs influence coping and emotional responses to stress. Consistent with this, cultural differences between the lives of rural and urban women may influence their beliefs about the sources of control over their lives. Moreover, the relationships between locus of control beliefs and psychological well-being may be distinct for rural breast cancer patients, compared with their urban counterparts.

With respect to health-related outcomes, one can believe that health is controlled by the self (internal), that health is due to chance or luck (external), and that health is influenced by powerful others, such as doctors (external; [44]). Studies (e.g. [45,46]) suggest that rural people may be more likely to perceive that their lives are controlled by external factors. For example, in a study that used a general measure of perceived internal versus external control, rural adults reported greater feelings of external control over their behavior than did their urban counterparts [45]. Also, using a HLC measure, Speake *et al.* [46] revealed that, compared with urban elderly, rural elderly endorsed higher levels of chance and powerful others health locus of control.

A few studies point to the possibility that rural women's beliefs about who or what has control over their health may be associated with their experiences with breast cancer. Winstead-Fry *et al.* [29] revealed that rural women who believed that powerful others had control over their health had greater breast cancer knowledge; no such relationship was found for internal HLC. This finding is in contrast to studies (e.g. [47]) of urban samples that show a positive association between internal locus of control and knowledge about disease. Only one study has examined the relationship between HLC and psychological adjustment among rural breast cancer patients. In her dissertation, Kirkland [28] revealed that only powerful others and chance had any relationships with mood disturbance and emotional adjustment. Meyers' dissertation study [48] of urban breast cancer patients showed findings opposite to those of Kirkland: only internal HLC predicted lower levels of depression. Several other studies [49–51] have revealed no relationships between the different types of HLC and psychosocial functioning for urban breast cancer patients.

Taken together, these findings for HLC and psychological adjustment are equivocal. It may be that to understand the relationship between these variables, it is important to consider possible moderators. Kirkland's [28] and Winstead-Fry *et al.*'s [29] findings suggest that rurality may be one such moderator. That the relationship between HLC beliefs and emotional responses to breast cancer might be moderated by contextual variables, such as rurality, is consistent with Lazarus and Folkman's theorizing that culture influences beliefs about locus of control and that these beliefs, in turn, influence people's reactions to stress.

Present study

The aim of the present study was to examine the relationships between the three types of HLC and their influences on psychological well-being among rural and urban breast cancer patients. The sample

included breast cancer patients from a range of rural and urban communities. On the basis of our review of the available literature, we hypothesized that powerful others and chance HLC beliefs would be associated with rural breast cancer patients' psychological adjustment, but there would be no such associations for urban women. For internal HLC beliefs, one of two possible outcomes seemed tenable; either these beliefs would be positively associated psychological adjustment for rural and urban breast cancer patients, or these beliefs would be more strongly associated with adjustment for urban breast cancer patients [28,49].

Method

Procedure

Nursing staff provided survey packets to eligible patients during a regularly scheduled appointment.¹ The packet included a letter that described the study, a survey, a payment form, and two envelopes. Each survey was identified only by a code number and could not be linked to the respondent, except by the researchers. Of those patients who received a packet from a nurse, 60% elected to return the survey. This rate of participation though ideal is fairly consistent with that of other studies that report these recruitment rates [six studies]. Participants were paid \$25 upon the receipt of their survey. A university institutional review board approved the study materials and procedures for compliance with the ethical review guidelines.

Participants

Two hundred and twenty-four female breast cancer patients from rural and urban areas were recruited from nine radiation clinics in Missouri.² Approximately 95% of the participants were white; 5% were ethnic minorities. The average age was 56.79 (SD = 12.14). Two percent indicated that they were diagnosed with carcinoma *in situ* (Stage 0), 40% indicated Stage I breast cancer, 22% indicated Stage II, 13% indicated Stage III, and 2% indicated Stage IV. Consistent with prior research (e.g. [52]), 25% of the sample either did not know their stage of breast cancer or left this item blank. There was no association between the cancer stage and residency status, $\rho = 0.12$, $n = 176$. Approximately 9% of the sample did not graduate from high school, 30% graduated from high school, 22% attended some college, and the remaining 39% obtained at least a college degree. The majority were married (63%; 8% were single, 8% were widowed, 12% were divorced, and 8% did not indicate relationship status). Finally, 36% had

experienced the death of a close friend or relative within the year.

Rurality

To characterize the rurality of the participants, a continuous rural variable was created. This was done to more accurately portray the varying degree of rurality in the sample. The rural variable was created using a combination of the rural-urban continuum codes for the county the participant resided in and the population of her town. The county continuum codes were developed by the United States Department of Agriculture [53] and form a classification scheme that distinguishes counties by population size, degree of urbanization, and adjacency to a metropolitan area. The codes range from 1 ('Counties in metro areas of 1 million population or more') to 9 ('Completely rural or less than 2500 urban population, not adjacent to a metro area'), with increasing numbers corresponding to increasing rurality. The population of each participant's town or city was recorded using 2000 census data. The sample's county codes ranged from 1 to 9, and populations ranged from 40 to 945344 persons. The population data were reverse coded so that increasing numbers corresponded to increasing rurality; the reverse-coded variable and the county code variable were standardized and averaged.

Measures

The survey included measures of HLC, life satisfaction, and depression. In addition, participants were asked whether they had experienced a death of a close other during the last year as well as their age, educational level, and marital status.³

The Multidimensional Health Locus of Control (MHLC) assessment [45] was included in the survey. The MHLC included the internal HLC (e.g. 'My physical well-being depends on how well I take care of myself'; $\alpha = 0.80$), chance HLC (e.g. 'When I become ill, it's a matter of fate'; $\alpha = 0.68$), and powerful others HLC (e.g. 'Health professionals keep me healthy'; $\alpha = 0.76$) subscales. Participants responded to the statements using a 1 ('strongly disagree') to 6 ('strongly agree') scale.

To measure depression, items from the Center for Epidemiologic Studies-Depression Scale [54] were included; this scale is often used in studies of breast cancer patients [55-57]. Respondents answered the items with respect to how they felt during the last week (e.g. 'I could not get going'; $\alpha = 0.89$), using a 4-point scale (1 = 'rarely or none of the time/less than 1 day' and 4 = 'most or all of the time/5-7 days').

As has been done in recent studies of breast cancer patients [58-60], we included the Satisfaction with Life Scale because it provides

Table 1. Correlations and descriptive statistics

	Rurality	Powerful others	Chance	Internal	Depression	Life satisfaction
Powerful Others	0.04					
Chance	0.13 [†]	0.05				
Internal	-0.10	0.09	0.14 [*]			
Depression	-0.06	-0.01	0.31 ^{***}	-0.10		
Life satisfaction	0.04	0.04	-0.08	0.07	-0.49 ^{***}	
<i>M</i> ^a	0.00	3.60	2.46	3.54	1.54	5.07
Median	0.06	3.67	2.40	3.60	1.45	5.40
SD	0.86	1.12	0.83	0.88	0.40	1.36

^aRurality is a combination of two standardized variables.

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; [†] $p < 0.10$.

a theoretically different assessment of well-being and it asks participants to think about their life as a whole [61]. The scale [62] assesses people's cognitive evaluations of life and includes five statements; the scale ranges from 1 ('strongly disagree') to 7 ('strongly agree'; $\alpha = 0.90$).

Results

The outcome variables were depression and life satisfaction, and the predictor variables were rurality and the three HLC subscales. Table 1 reports the means, standard deviations, and correlations for these primary variables. To test our hypotheses, we conducted a series of hierarchical regression analyses, separately for each type of HLC and each index of well-being.⁴ This analysis approach allowed us to test whether rural residence moderated the association between HLC and well-being, while controlling for demographics. The HLC scores was centered prior to regression analyses [63]. The demographic/control variables were entered in the first step of each regression; the health locus of control variable and the rurality variable were entered in the second step; and the corresponding interaction term was entered in the final step. Other studies of breast cancer patients have identified age [64], education [65], marital status [66], and the experience of the death of a close other [67] as demographics that influence well-being among breast cancer patients; therefore, these were entered as control variables. The data were inspected for the presence of extreme outliers; less than 3% of the cases were multivariate outliers and these were removed from subsequent analyses [68]. When plotting significant interactions, models were constrained to include the criterion and the predictor variables of interest and the moderator levels represented the full range of values in the data [68].

The findings for the first step of the hierarchical regression analyses were consistent with the zero-order correlations. Lower levels of depression and higher levels of life satisfaction were reported by breast cancer patients who were older, ($\beta = -0.26$

and 0.20, respectively, $p < 0.05$), had higher levels of education ($\beta = -0.15$, $p < 0.05$, and 0.12, $p < 0.07$, respectively), were married ($\beta = -0.17$ and 0.39, respectively, $p < 0.05$), and had not experienced the death of a close other in the previous year ($\beta = 0.18$ and -0.14 , $p = 0.05$).

Powerful others HLC

As predicted, powerful others HLC and rurality interacted to predict depression, $b = -0.17$, $t(1, 210) = -2.70$, $p < 0.01$, $f^2 = 0.03$. As shown in the upper panel of Figure 1, for women living in more rural areas, higher levels of powerful others HLC were reliably associated with lower levels of depression. By contrast, this association was reversed for women living in more urban areas, showing that higher powerful others HLC was associated with greater depression. Neither the 'direct' influence of powerful others HLC, $b = 0.06$, $t(1, 211) = 0.81$, $p < 0.20$, $f^2 = 0.00$, nor that of rurality were associated with depression, in the second step of the regression analysis, $b = -0.06$, $t(1, 211) = -0.89$, $p > 0.20$, $f^2 = 0.00$.

Also, rurality interacted with powerful others HLC in predicting life satisfaction, $b = 0.14$, $t(1, 210) = 2.31$, $p < 0.05$, $f^2 = 0.03$. The pattern of the interaction for life satisfaction mirrored that for depression, but the pattern seemed more pronounced (lower panel, Figure 1). The results revealed that powerful others HLC was positively associated with life satisfaction for those women living in more rural areas but was negatively associated with life satisfaction for women living in more urban areas. The unmoderated influences of powerful others HLC and rurality on life satisfaction were unreliable, $b = 0.03$, $t(1, 211) = 0.40$, $p > 0.20$, $f^2 = 0.00$, and $b = 0.03$, $t(1, 211) = 0.50$, $p > 0.20$, $f^2 = 0.00$, respectively.

Chance HLC

The pattern of results for chance HLC was somewhat similar to the results for the other external HLC construct, powerful others. The regression analyses revealed that chance HLC

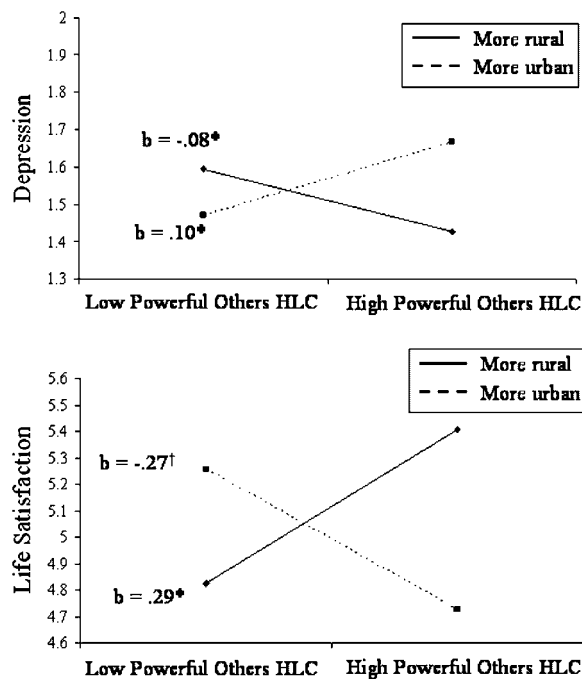


Figure 1. Depression and life satisfaction as a function of rurality and powerful others health locus of control; $^\dagger p < 0.10$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$

interacted with rurality in predicting depression, $b = -0.14$, $t(1, 209) = -2.33$, $p < 0.05$, $f^2 = 0.03$. As shown in the upper panel of Figure 2, for breast cancer patients living in more urban areas, higher levels of chance HLC were associated with a greater endorsement of depressive symptoms, but there was no such relationship for breast cancer patients living in more rural areas. Owing to the strong relationship between higher levels of chance HLC and greater depression for breast cancer patients living in more urban areas, the regression analysis revealed that the unmoderated association between chance HLC and depression was reliable, $b = 0.32$, $t(1, 210) = 5.33$, $p < 0.01$, $f^2 = 0.14$ (rurality: $b = -0.09$, $t(1, 210) = -1.55$, $p > 0.10$, $f^2 = 0.01$).

The findings for life satisfaction were consistent and mirrored those for depression. Rurality interacted with chance HLC in influencing life satisfaction, $b = 0.14$, $t(1, 209) = 2.24$, $p < 0.05$, $f^2 = 0.02$. The results revealed that for more urban breast cancer patients, chance HLC was associated with lower life satisfaction, but there was no such relationship for rural women (lower panel, Figure 2). Neither the unmoderated association between chance HLC, $b = -0.08$, $t(1, 211) = 1.33$, $p > 0.10$, $f^2 = 0.01$, nor that for rurality were reliable, $b = 0.04$, $t(1, 211) = 0.67$, $p > 0.20$, $f^2 = 0.00$.

Internal HLC

The results for internal HLC showed that rurality did not interact with internal HLC, $b = 0.02$, $t(1, 210) = 0.25$, $p > 0.20$, $f^2 = 0.00$. Instead, the

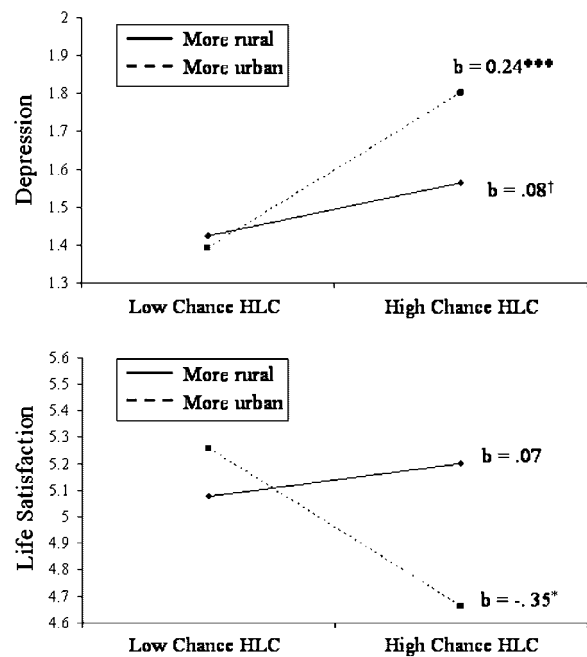


Figure 2. Depression and life satisfaction as a function of rurality and chance health locus of control; $^\dagger p < 0.10$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$

regression analysis revealed that internal HLC predicted lower levels of depression among breast cancer patients regardless of rurality, $b = -0.16$, $t(1, 211) = -2.47$, $p < 0.05$, $f^2 = 0.03$. Rurality itself was unassociated with depression in this step, $b = -0.07$, $t(1, 211) = -1.12$, $p < 0.20$, $f^2 = 0.01$. Similarly, the interaction between rurality and internal HLC did not influence levels of life satisfaction, $b = 0.09$, $t(1, 210) = 1.51$, $p > 0.10$, $f^2 = 0.01$. The analysis showed that, regardless of rurality, internal locus of control predicted higher levels of life satisfaction, $b = 0.13$, $t(1, 211) = 2.12$, $p < 0.05$, $f^2 = 0.02$ (rurality: $b = 0.04$, $t(1, 211) = 0.71$, $p > 0.20$, $f^2 = 0.00$).

Discussion

The present findings are among the first to highlight that it is important for researchers to consider whether women live in urban or rural communities toward a better understanding of psychological adjustment among breast cancer patients. The results showed that relative rurality interacted with HLC in predicting depression and life satisfaction. Consistent with our hypothesis, for breast cancer patients who lived in more rural areas, the analyses revealed that greater endorsement of powerful others HLC predicted lower levels of depression and higher levels of life satisfaction. By contrast, for breast cancer patients who live in more urban areas, the results showed that greater endorsement of powerful others HLC predicted higher levels of depression and lower

levels of life satisfaction. The findings for breast cancer patients living in more rural areas are consistent with other studies that suggest that powerful others HLC may be associated with physical and psychological health among rural people (e.g. [28,47]).

The nature of the interaction between rurality and chance locus of control in predicting psychological adjustment was only somewhat consistent with our predictions. The findings revealed that, for breast cancer patients living in more rural areas, there was no relationship between chance HLC and either depression or life satisfaction. By contrast, the findings showed that, for breast cancer patients living in more urban areas, higher levels of chance HLC were associated with greater depression and less life satisfaction. These findings seem to contradict those of Meyers [49] that revealed no association among chance locus of control and depression for urban women.

Consistent with our hypothesis, higher levels of internal HLC was associated with better psychological adjustment for breast cancer patients, regardless of rurality. This finding is in consonance with that of Meyers, which showed that urban breast cancer patients that endorsed greater internal locus of control reported lower levels of depression [49]. Nevertheless, the present findings are the first to reveal that higher levels of internal locus of control might be equally beneficial for rural breast cancer patients.

The findings for powerful others and chance HLC suggest that rural women may not experience decrements in their psychological adjustment to breast cancer as a function of adopting an external HLC. Indeed, it appears that women living in more rural areas who perceive powerful others (i.e. health professionals) as having control over their health may experience psychological benefits. Also, rural women who perceive that chance factors influence their health may not suffer psychologically. Finally, perceiving internal control over health appears to have benefits for psychological well-being for both urban and rural women.

These findings support Lazarus and Folkman's [9] theorizing that culture influences people's beliefs and that locus of control beliefs influence coping and emotional responses to stress. Our results suggest that cultural differences in the lives of rural and urban women who are facing breast cancer may influence the relationships between HLC beliefs and well-being. These results are also consistent with our review [18] of the literature that suggests that cultural and environmental factors are likely to interact with rural women's lives in ways that affect their subjective experiences with breast cancer.

There are several study limitations. First, the recruitment rate was modest, and therefore, the sample may not represent the population.

Although modest, many studies fail to report recruitment rates, but those that do report recruitment rates show ours to be similar. Second, the study did not record the time that each patient had been undergoing radiation treatment when the survey was completed. Differences in course of the treatment may have influenced the psychological experiences of breast cancer patients. Research should assess or hold constant the course of the radiation therapy. Next, our survey was cross-sectional; the results are limited in their capacity to test plausible causal relationships between HLC and psychological adjustment. Further examinations of these constructs might adopt longitudinal designs. Finally, the breast cancer patients were primarily Caucasian and Missouri residents, and thus, the generalizability of the findings may be limited.

Notwithstanding these limitations, the study is important because it is among a relatively small set of studies focusing on rural women's psychological adjustment to breast cancer. It is among an even smaller set that includes both rural and urban women as a means of understanding the unique ways in which rural breast cancer patients respond to breast cancer. Indeed, to our knowledge, this study is the first to study HLC influence and psychological adjustment among urban and rural breast cancer patients.

Conclusions

The study suggests that researchers and practitioners cannot always assume that the experiences of rural breast cancer patients will be similar to those of urban breast cancer patients. Arguably, health-care providers should be aware that patients' culturally informed values and beliefs may influence their coping with and adjustment to breast cancer. By taking these factors into account, health-care professionals may improve patient rapport and treatment effectiveness, as depression has been shown to influence compliance with cancer health regimens [13,14]. Further, our results suggest that researchers interested in designing interventions aimed at improving the psychological health of rural cancer patients may need to consider the ways in which HLC beliefs influence psychosocial functioning. For example, for rural breast cancer patients, it might be useful to emphasize the positive role of health-care providers in improving the patients' health and well-being. Overall, our findings suggest that practitioners and researchers need to take into account cultural differences and beliefs that have the capacity to influence rural women's adjustment to breast cancer.

Acknowledgements

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Notes

1. Forty-eight participants indicated their interest in study participation by first returning a postcard provided by the medical staff; subsequently a research assistant sent a survey packet to the participants.
2. These clinics were included because they were served by one of the co-authors or his partner-colleagues. That we recruited these radiation patients for the study was a matter of opportunity (i.e. convenience sampling). Of the participants, 40% completed chemotherapy, 34% began chemotherapy but did not complete it, 5% did not have chemotherapy, and for 21% this information was missing.
3. This study is part of a larger survey that includes other variables not relevant to this report.
4. There are minor variations in degrees of freedom across results due to missing data on the outcome variables.

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