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Rural breast cancer patients, coping and depressive symptoms: A prospective comparison study

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Many studies have revealed that individual differences in coping responses to the diagnosis and treatment of breast cancer are associated with psychological adjustment. The vast majority of these studies, however, focus exclusively on urban breast cancer survivors despite that rural breast cancer survivors are likely to have distinct experiences both in general and in relation to breast cancer. The current study quantitatively examined the coping strategies employed by both rural and urban breast cancer patients while they were undergoing radiation therapy. Further, the influence of these coping behaviours on concurrent as well as subsequent depressive symptoms (3 and 6 months later) was examined. The results revealed that the rurality of breast cancer patients was unrelated to the ways in which they coped, but did influence the relationships between some coping responses and depressive symptoms. Specifically, active coping and positive reinterpretation were negatively related to depressive symptoms for more rural breast cancer patients, but not their relatively urban counterparts. Similarly, behavioural disengagement was more strongly related to depressive symptoms for more rural patients. Possible reasons for this pattern of results and implications are discussed.

Keywords: breast neoplasms; rural population; coping behaviour; depression

Introduction

A diagnosis of breast cancer signals a number of future challenges such as a surgery, chemotherapy and radiation treatment. Many survivors experience changes in psychological well-being resulting from their cancer diagnosis (e.g. Epping-Jordan et al., 1999). A relatively large number of studies suggest that individual differences in coping responses to the diagnosis and treatment of breast cancer is one factor which contributes to psychological well-being during that time and after (e.g. Carver et al., 1993; Epping-Jordan et al., 1999; Stanton et al., 2000). The vast majority of these studies, however, include samples of either mostly or exclusively urban women. Although some of the findings derived from these studies may generalise to rural women, rural breast cancer patients are likely to face distinct experiences which warrant research focused specifically on them (e.g. Bettencourt, Schlegel, Talley, & Molix, 2007). Little is known about how

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rural women cope in general, and even less is known about how rural women cope with breast cancer.

The purpose of the current study was to examine the potential moderating influence of geographic residence (rural vs. urban) on the association between coping and depressive symptoms. The idea that geographic residence might moderate the association between coping and depression is supported by Folkman, Lazarus, Dunkel-Schetter, DeLongis, and Gruen's (1986) suggestion that the effectiveness of any coping strategy cannot be completely understood without reference to the environment in which it is used. Although this assertion by Folkman et al. has received relatively little attention, two studies in the breast cancer literature have provided support for this possibility. Culver, Arena, Wimbley, Antoni, and Carver 2004 (see also Culver, Arena, Antoni, & Carver, 2002) conducted a study of coping and psychological adjustment among African American, Hispanic and white non-Hispanic breast cancer patients. The results revealed differences between racial groups in coping, psychological adjustment and the association between the two. In another study, Alferi, Culver, Carver, Arena, and Antoni (1999) document differences in coping and the impact of coping on psychological distress depending on breast cancer survivors' religious group-membership (i.e. Catholic or Evangelical Christians).

Theoretically, the geographic residence of a breast cancer patient may create another distinction which has important implications for coping. More specifically, the relative fit between specific coping strategies and the surrounding cultural milieu (i.e. rural or urban) in which breast cancer survivors live may be an important factor in determining the efficacy of coping responses.

What does it mean to be rural?

It is difficult to define exactly what it means to be rural (e.g. Woods, 2005). This problem is evidenced in the literature on rural breast cancer patients in which the definitions of rurality are highly variable between studies, with most being non-specific (e.g. a rural area; see Bettencourt et al., 2007). Most of these studies have also dichotomised their samples into groups of rural and urban participants despite recommendations that rurality is probably not a discrete distinction (Melton, 1983; Woods, 2005). We aimed to address these issues by creating a clearly defined continuous variable that would capture varying degrees of rurality by combining information about the population of a participant's town with information about the rurality of the surrounding county (i.e. rural-urban continuum codes; Economic Research Service, 2000). This operationalisation was premised on the idea that more information than the size of a community may be necessary to accurately represent rurality. In other words, a town with a small population does not necessarily constitute a rural community because a small town located in an otherwise densely populated area is probably less rural than a town of similar size in a sparsely populated area. Arguably, this rural-urban continuum should be more representative of the underlying nature of rurality and urbanity than a simple dichotomy of the sample. Considering what it means to be both a rural woman and a breast cancer patient, we believe it is important to consider both the environmental and cultural factors that exist in rural areas.

Rural environment

Rural breast cancer patients often live many miles from medical treatment and support services; this seems to influence their experiences with breast cancer. For instance,

studies (e.g. Davis, Williams, Redman, White, & King, 2003; Girgis, Boyes, Sanson-Fisher, & Burrows, 2000; Gray, James, Manthorne, Gould, & Fitch, 2004; McGrath et al., 1999) document that rural and urban breast cancer patients receive different types of treatment; rural women are more likely to have mastectomies, whereas urban women are more likely to have breast conserving surgery and radiation therapy. Davis et al. (2003) suggest that these treatment differences are not based on differences in physical health, but instead on the greater difficulties that rural women have with transportation, lack of accessible health care services and other distinct events occurring at home. Also, rural breast cancer survivors are more likely to report needing help with daily-living needs than their urban counterparts (Girgis et al., 2000) and to acknowledge that running a home and taking care of children during diagnosis and treatment is more difficult in rural areas (Gray et al., 2004).

Rural culture

People living in rural areas place importance on their identity as 'rural people' and their 'rural way of life' (Woods, 2005). Consistent with this, Cloke and Milbourne (1992) argue that rurality may be best understood as a socially constructed term developed to describe a world of social, moral and cultural values endorsed by rural dwellers. Compared to their urban counterparts, rural people are found to be more religious, conservative, work-oriented, intolerant, fatalistic and familial (Flax, Wagenfeld, Ivens, & Weiss, 1979; Melton, 1983). Rural dwellers report that, to them, being rural is associated with relaxation, a slower pace, independence, simple and non-materialistic lifestyles, strong communities, traditional values and a sense of nature (Halfacree, 1995).

This emphasis on rural culture is evidenced by the fact that rural areas were traditionally defined by an assessment of whether the values of the area were predominantly rural (Woods, 2005). Historically, rural communities have been highly autonomous, cohesive and integrated; ideals which are likely to remain even as rural culture merges with the larger American culture (Photiadis & Simon, 1983). Consistent with this, Cloke and Milbourne (1992) argue that a regional circulation of ideas still exists that sustains the rural culture and that rural might be best defined as a 'state of mind.'

Rural breast cancer patients and coping strategies

According to Lazarus and Folkman's (1984; Folkman et al., 1986) stress and coping theory, mismatches between coping behaviour and culture can lead to stress and therefore compromise well-being. The pressure to cope in culturally accepted ways may be amplified in rural communities because of the degree of cohesiveness and lack of anonymity in rural communities. Consistent with this, Slama (2004) notes there are strong pressures to conform in small rural communities.

A handful of studies (Lopez, Eng, Randall-David, & Robinson, 2005; McGrath et al., 1999; Wilson, Anderson, & Meishke, 2000) have sought to understand the coping strategies adopted by rural breast cancer survivors. However, almost all of these studies have used qualitative methods, none have included urban comparison groups, and none have examined the influence of coping responses on psychological well-being. Thus, assessing the importance of the cultural fit of coping strategies on psychological adjustment among rural breast cancer patients has remained an unexplored issue.

Nonetheless, the previous qualitative literature offers some insight into which coping responses might be culturally relevant for rural women. Wilson et al. (2000) reported that a commonly used coping strategy of rural breast cancer survivors was 'trying to maintain a positive attitude.' Specifically, these women reported feeling lucky or fortunate, trying to see the positive outcome of their breast cancer, being grateful they had better choices for treatment than those a generation ago and appreciating life more since diagnosis. Similarly, rural women in other studies have reported feeling that they should adopt a positive attitude in response to their cancer (Lopez et al., 2005; McGrath et al., 1999; Wilson et al., 2000). For example, McGrath et al. found that rural breast cancer survivors reported that they felt they should 'keep on going for the sake of others' and maintain a positive attitude to prevent close ones from worrying.

Rural women may also be particularly predisposed to use religion as a means of coping with breast cancer. Religion plays an important role in the lives of many rural women (England & Finch, 1991), and rural women are also more likely to be religious than their urban counterparts (e.g., Mitchell & Weatherly, 2000). However, a few qualitative studies suggest that the rates of religious coping in rural women diagnosed with breast cancer are relatively low. Specifically, Wilson et al. (2000) reported that just over 10% of their sample mentioned that relying on religious beliefs was helpful. Only 8 of the 36 women in Heishman's (1999) study reported using religion to cope.

Finally, it might be particularly important for rural women to adopt action-oriented coping responses. Slama (2004) notes that greater distances between rural people and resources make values such as independence and self-reliance important and practical. This tradition of self-reliance likely makes active coping a part of the 'rural state of mind' (Halfacree, 1995; Photiadis & Simon, 1983; Slama, 2004). Because they are less readily available, it might be more important for rural women to take a more active role in obtaining health information, support services and treatment for breast cancer (Girgis et al., 2000; Gray et al., 2004). Also, the rural values for taking action suggests that coping through behavioural disengagement, which is the theoretical opposite of active coping (Carver, Scheier, & Weintraub, 1989), would likely be particularly detrimental because of the likely mismatch with rural culture.

Study overview and hypotheses

The purpose of the current study is to examine the moderating influence of geographic residence (i.e. rurality, urbanity) on the association between particular coping strategies and psychological adjustment among breast cancer survivors. To accomplish this goal, we assessed coping strategies and depressive symptoms during radiation treatment as well as depressive symptoms at two later time points. This was based on previous research which suggests that the coping mechanisms employed during treatment may have lasting implications on psychological adjustment (e.g. Alferi et al., 1999; Carver et al., 1993; Culver et al., 2002).

We hypothesised that some of the associations between coping strategies and depressive symptoms would be moderated by the rurality of breast cancer patients. In particular, we hypothesised that those coping responses which reflect an appropriate fit with rural culture (positive reinterpretation, religious coping, active coping and behavioural disengagement) would have different influence on the psychological well-being of rural breast cancer patients, compared to their urban counterparts.

Method

Participants

Two hundred and thirty-two breast cancer patients were recruited for participation. Six participants were missing data on the rural variable and three filled out the first survey incorrectly; as such, these women were not included in the analyses. This resulted in a final sample of 223 women. Participants were recruited by oncology nurses at nine radiation clinics in Missouri. All female breast cancer patients who were scheduled to undergo radiation treatment at the participating clinics were considered eligible to participate.

Participants in the study were primarily White (95%) and ranged in age from 31 to 91 years ($M = 59.19$, $SD = 12.72$). The average reported income category was 35,000–45,000. The majority of the sample was married or living with a significant other ($n = 162$), 23 were widowed, 30 were divorced and 8 were single. About 10% of the sample ($n = 24$) had not graduated high school, 68 had graduated from high school and the remaining 131 had attended or graduated from college. Less than half of the sample ($n = 100$) were working either full or part time during treatment. Most of the participants were diagnosed with early stage breast cancer, Stage 0 ($n = 32$), Stage I ($n = 103$), and Stage II ($n = 42$), whereas as a minority of participants were diagnosed with Stage III ($n = 33$) or Stage IV ($n = 4$). We were unable to obtain cancer stage information for nine participants.

The first survey (Wave 1) was given while participants were undergoing radiation treatment. Two follow-up surveys were administered ~3 (Wave 2) and 6 months later (Wave 3). Participants were paid \$25 for each completed survey. Two hundred and ten participants returned the second survey, and 208 returned the third survey (~93% of the original sample). Each survey included a number of measures which will not be discussed in the current report.

Rurality

A continuous rural variable was created by combining the rural–urban continuum code for the county with the population of the town in which the participant resided. The county continuum codes were developed by the United States Department of Agriculture (Economic Research Service, 2002) and form a classification scheme that distinguishes counties by the population size, degree of urbanisation and adjacency to a metropolitan area. The codes range from 1 to 9, and Table 1 shows the frequency of participants residing in counties characterised by these codes. The population of each participant's city was recorded using 2000 census data. Both indices of rurality (county code and city population) were then standardised. The standardised population variable was then reversed so that both indices of rurality would be scaled with greater numbers indicating greater rurality. Finally, the two variables were averaged to create the rurality variable used in all analyses.

Those women who were the most rural lived in a county with a rural–urban code of 9 and in a town with a population of 145. The most urban women lived in a county with a rural–urban code of 1 and a city of 441,545. Women at the median of the rurality variable lived in counties that were coded 5 and in a town with a population of 17,757.

Analyses were conducted to determine whether there was any association between clinic site and participant's level of depressive symptoms. This was done to help ensure that any differences found were driven by the rurality of the participants and not differences between the clinics they attended. The clinics were assigned a rurality value based on the

Table 1. Definitions of the USDA rural–urban county continuum codes and number of participants residing in each type of county.

Code No.	Description	Frequencies
1	Counties in metro areas of 1 million population or more	34
2	Counties in metro areas of 250,000 to 1 million population	1
3	Counties in metro areas of fewer than 250,000 population	51
4	Urban population of 20,000 or more, adjacent to a metro area	21
5	Urban population of 20,000 or more, not adjacent to a metro area	27
6	Urban population of 2500–19,999, adjacent to a metro area	29
7	Urban population of 2500–19,999, not adjacent to a metro area	24
8	Completely rural or less than 2500 urban population, adjacent to a metro area	2
9	Completely rural or less than 2500 urban population, not adjacent to a metro area	39

population of the city in which they were located. Correlation analyses indicated that this variable was unrelated to reports of depressive symptoms at any of the waves (r 's = 0.10, 0.04 and 0.05).

Measures

Coping

Coping strategies were measured with the COPE scale (Carver et al., 1989). This scale has 13 subscales that include four items each and one subscale with one item (total of 53 items). The instructions for the COPE direct participants to 'rate the degree to which each of the statements describes the way you typically deal with difficult situations.' The response scale ranges from one to four with the anchors 'I usually don't do this at all' and 'I usually do this a lot', respectively.

The subscales include: active ($M = 3.16$, $SD = 0.62$), planning ($M = 3.29$, $SD = 0.65$), seeking instrumental support ($M = 2.96$, $SD = 0.72$), seeking emotional support ($M = 2.86$, $SD = 0.81$), positive reinterpretation ($M = 3.20$, $SD = 0.66$), acceptance ($M = 2.98$, $SD = 0.65$), religious ($M = 3.33$, $SD = 0.85$), focus on/venting of emotion ($M = 2.28$, $SD = 0.67$), denial ($M = 1.36$, $SD = 0.53$), behavioural disengagement ($M = 1.56$, $SD = 0.55$), alcohol ($M = 1.08$, $SD = 0.43$), restraint ($M = 2.43$, $SD = 0.60$), mental disengagement ($M = 2.08$, $SD = 0.62$) and suppression of competing activities ($M = 2.67$, $SD = 0.60$). The reliabilities were acceptable for the majority of the COPE subscales (i.e. $\alpha > 0.70$; Nunnally & Bernstein, 1994). Nevertheless, the restraint, mental disengagement and suppression of competing activities subscales had unacceptably low reliabilities ($\alpha < 0.60$) and were excluded from the primary analyses. After excluding these three subscales, the alphas ($M = 0.75$) ranged from 0.61 (behavioural disengagement) to 0.92 (turning to religion).

Depression

Depressive symptoms were measured at all three time points using the Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977). On this 20-item scale, participants rated the intensity and frequency of depressive symptoms they had

experienced in the previous week on a 4-point Likert-type scale. Example items include, 'I felt sad' and 'I had crying spells.' The scale evidenced high consistency ($\alpha = 0.87$). Participants were excluded if they were missing more than four items on the scale, and person mean imputation was performed for the participants who were missing between 1 and 3 items (Callahan & Wolinsky, 1994; Ried, Tueth, Handberg, Kupfer, & Pepine, 2005). This excluded 13 participants at Wave 1, 10 from Wave 2 and 7 from Wave 3.

Covariates

A number of potential covariates were also assessed in the study including, income, marital status, age, amount of treatment completed, education and stage of breast cancer. A measure of physical health was also included as a possible covariate. The measure included 18 physical symptoms items derived from several reports according to their appropriateness for the sample (Andersen & Tewfik, 1985; Ganz, Dau, Ware, Redman, & Fisher, 1995). Some example symptoms included fatigue, nausea, appetite loss, breast pain, hair loss, weight gain, hot flashes, itchiness or discomfort of the skin, decreased arm mobility and swelling of the arm. A 7-point scale was used, ranging in severity from '1 = not at all' to '7 = severe' ($\alpha = 0.90$).

Analytic plan

First, preliminary analyses were conducted to determine which potential covariates were important for inclusion in the primary analyses and to examine the pattern of means for depression across waves. We also wanted to determine whether rurality was associated with the propensity to use certain coping responses. Accordingly, correlations between rurality and the coping variables were computed.

The primary analyses consisted of a series of hierarchical multiple regressions which examined the influence of coping, rurality and their interaction on depressive symptoms at Waves 1–3, while controlling for important covariates. In these analyses, covariates were entered in the first step of the regression. In step two, the rurality variable was entered. Each coping variable was entered on the third step, and the corresponding interaction between the respective coping variable and rurality was entered on the fourth step of the regression equation. Due to the large number of coping variables, each coping variable was tested in a separate regression equation. Recall that we were primarily interested only in those coping mechanisms that theoretically may be more important for rural women (i.e. religious coping, positive reinterpretation, active coping and behavioural disengagement). However, because this is among the first quantitative research in this area, and in this sense is somewhat exploratory, we tested the interactions between rurality and each of the coping variables (including those for which we had no specific hypotheses). The rurality and coping variables were standardised before they were entered into the regression and before computing the interaction term. Significant interactions were graphed and simple slope analyses were conducted via recentering at 1 SD above and below the mean of rurality (Aiken & West, 1991).

This series of regression equations were conducted separately for depression at Waves 1–3. The analyses for Waves 2 and 3 did not control for depression at earlier waves because we were more interested in the lasting influence of coping strategies utilised during treatment on reports of depressive symptoms at various points in survivorship than the changes in depression from baseline.

Results

Preliminary analyses

Selection of covariates

Of the potential covariates, only age, income, physical health and marital status were associated with either depressive symptoms or rurality (Table 2). Additionally, the week of radiation treatment at which the survey was completed was related to depressive symptoms ($r = -0.19, p < 0.05$) at Wave 1, indicating that those women who filled out the survey later in treatment reported being less depressed. Those variables which were related to depressive symptoms or rurality were included as covariates in the primary analyses. Neither education nor stage of breast cancer was related to rurality or depression. As such, neither of these was included as covariates in the primary analyses.

Depressive symptoms

The results revealed that participants reported higher levels of depressive symptoms at Wave 1 ($M = 13.41, SD = 9.74$) than at Waves 2 ($M = 11.45, SD = 9.74; t = 3.75, p < 0.001$) and 3 ($M = 10.76, SD = 9.87; t = 4.67, p < 0.001$). Depression levels at Waves 2 and 3 were not different from each other ($t = 0.41, p > 0.10$). At Wave 1, 34% of the participants reported clinically significant levels of depressive symptoms (CES-D score ≥ 16 ; Myers & Weissman, 1980), at Waves 2 and 3, 26 and 23%, respectively, reported clinically significant levels of depressive symptoms.

Rurality and coping

The results for the correlations between rurality and the coping variables suggested that rural and urban women engaged in similar levels of coping (Table 2).

Table 2. Correlations among rurality, depressive symptoms, demographics and coping measures.

Variables	Rurality	Wave 1 depressive symptoms	Wave 2 depressive symptoms	Wave 3 depressive symptoms
Demographics				
Income	-0.20**	-0.09	-0.21**	-0.28**
Marital Status	-0.05	-0.16*	-0.19**	-0.24**
Age	0.06	-0.26**	-0.09	-0.04
Symptoms	0.08	0.39**	0.37**	0.36**
Education	0.03	-0.07	-0.10	-0.11
Stage of Breast Cancer	0.05	0.08	0.13	0.07
Coping Variables				
Active	0.09	-0.19**	-0.10	-0.07
Planning	-0.02	-0.13**	-0.08	-0.06
Seeking Instrumental Support	0.06	-0.14 [†]	-0.02	-0.10
Seeking Emotional Support	-0.14	-0.06	-0.03	-0.09
Positive Reinterpretation	0.08	-0.20**	-0.11	-0.21**
Acceptance	0.05	-0.11	-0.08	-0.02
Religious	0.04	-0.13*	-0.06	-0.17**
Focus/Venting of Emotions	-0.09	0.35**	0.27**	0.24**
Denial	-0.03	0.28**	0.24***	0.32**
Behavioral Disengagement	-0.09	0.26**	0.26**	0.34**
Alcohol	-0.01	0.23**	0.12	0.12

Notes: ** $p < 0.01$; * $p < 0.05$.

Primary analyses

Rurality and demographic characteristics

The results indicated that the covariates (entered on the first step of the hierarchical regression) contributed to a significant change in R^2 at all three Waves (R^2 change = 0.20, 0.22, 0.22, respectively, $ps < 0.01$). The most noteworthy pattern of association was that physical health was positively related to depressive symptoms at all three waves ($\beta = 0.34, 0.40, 0.39, ps < 0.01$). Also, lower levels of income were associated with greater depressive symptoms, but only at Wave 2 ($\beta = -0.18, p < 0.05$) and Wave 3 ($\beta = -0.17, p < 0.05$). The week of radiation treatment the participant was in when she filled out the Wave 1 survey was negatively related to Wave 1 depressive symptoms ($\beta = -0.17, p < 0.05$). Neither marital status nor age was significantly related to depressive symptoms at any wave. Notably, rurality (entered on the second regression step), was also unrelated to depressive symptoms at all waves.

Coping

The results showed that three of the four proposed coping responses evidenced relationships with depression that were moderated by rurality. These interaction patterns were revealed for active coping, behavioural disengagement and positive reinterpretation. Religious coping did not interact with rurality. Religious coping did predict decreased depressive symptoms, but only at Wave 3 ($\beta = -0.16, p < 0.05$).

As shown in the upper panel of Table 3, rurality interacted with active coping in its influence on depressive symptoms at Wave 1. The pattern of this interaction is displayed in Figure 1. The simple slope analysis revealed that greater active coping was associated with lower levels of depressive symptoms at Wave 1 for more rural women ($\beta = -0.30, p < 0.001$), but active coping was unrelated to depressive symptoms for more urban women ($\beta = -0.02, p > 0.10$). This pattern was replicated at Wave 2 (rural $\beta = -0.31, p < 0.001$, urban $\beta = -0.07, p > 0.10$) and Wave 3 (rural $\beta = -0.28, p < 0.01$, urban $\beta = -0.07, p > 0.10$). Because these interaction patterns are very similar across time points, the results for only Wave 1 are depicted in Figure 1.

As shown in the centre panel of Table 3, the results revealed an interaction between behavioural disengagement and rurality. Recall that behavioural disengagement coping is conceptually the opposite of active coping. Consistent with this, most of the patterns of associations for behavioural disengagement mirrored those for active coping. More specifically, as shown in Figure 2, for more rural women, higher levels of behavioural disengagement coping were associated with greater levels of depressive symptoms ($\beta = 0.30, p < 0.01$), but for more urban women this association was weaker ($\beta = 0.13, p = 0.08$). The results were similar for Wave 2, rural women's levels of behavioural disengagement were strongly associated with depressive symptoms at Wave 2 ($\beta = 0.31, p < 0.001$), but urban women's levels of behavioural disengagement were only somewhat associated with depressive symptoms at this same period ($\beta = 0.13, p = 0.06$). Although the pattern of the interaction was similar for depressive symptoms at Wave 3, it was statistically unreliable.

As shown in the bottom panel of Table 3, the association between positive reinterpretation coping and depressive symptoms was moderated by rurality. The nature of this interaction is displayed in Figure 3. More specifically, higher levels of positive reinterpretation were associated with lower Wave 1 depressive symptoms for more rural women ($\beta = -0.25, p < 0.01$), but not for more urban women ($\beta = -0.11, p > 0.10$).

Table 3. Results for coping and rurality \times Coping.

Predictor	Wave 1			Wave 2			Wave 3		
	β	<i>t</i>	ΔR^2	β	<i>t</i>	ΔR^2	β	<i>t</i>	ΔR^2
Step 3			0.02*			0.01			0.00
Active	-0.14	-1.68*		-0.09	-1.23		-0.05	-0.62	
Step 4			0.04***			0.03**			0.02*
Rural \times active	-0.21	-2.71***		-0.18	-2.52**		-0.16	-2.18*	
Step 3			0.04**			0.05***			0.07***
Behavioural disengage	0.20	3.03**		0.23	3.25***		0.27	3.97***	
Step 4			0.02*			0.02*			0.00
Rural \times behavioural disengage	0.12	1.95*		0.14	0.14*		0.03	0.45	
Step 3			0.02*			0.01			0.03**
Positive reinterpretation	-0.14	-2.20*		-0.08	-1.05		-0.18	-2.67**	
Step 4			0.02*			0.02*			0.02*
Rural \times positive reinterpret	-0.13	-1.97*		-0.14	-2.07*		-0.19	-1.94*	

Notes: Steps 1 and 2 were the same for each regression equation.
 *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

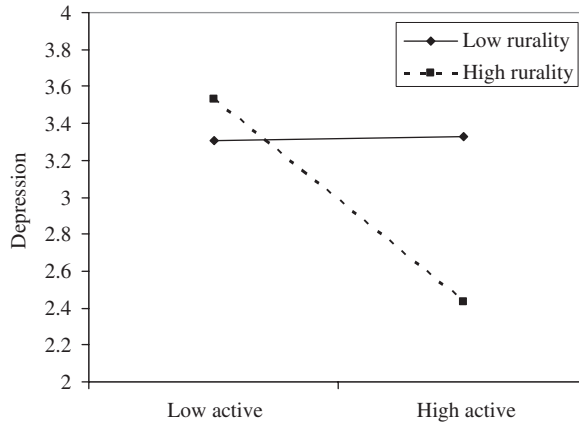


Figure 1. Depression as a function of active coping and rurality at Wave 1. The slopes for rural and urban are plotted at 1 SD above and below the centred rurality variable.

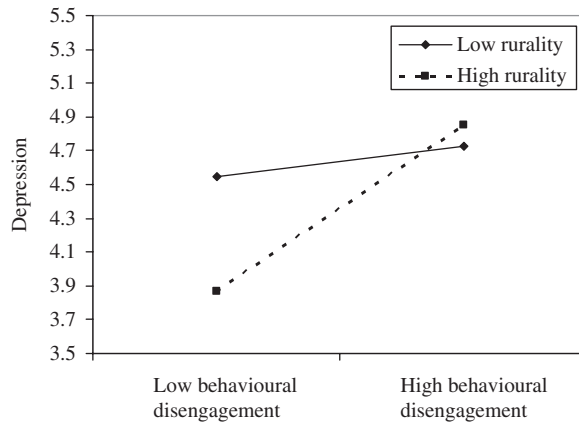


Figure 2. Depression as a function of behavioural disengagement and rurality at Wave 1. The slopes for rural and urban are plotted at 1 SD above and below the centred rurality variable.

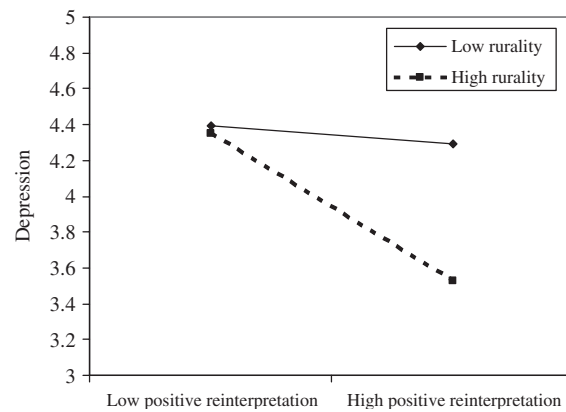


Figure 3. Depression as a function of positive reinterpretation and rurality at Wave 1. The slopes for rural and urban are plotted at 1 SD above and below the centred rurality variable.

These results were essentially replicated at Waves 2 (rural $\beta = -0.26$, $p < 0.01$, urban $\beta = -0.06$, $p > 0.10$) and 3 (rural $\beta = -0.30$, $p < 0.01$, urban $\beta = -0.11$, $p > 0.10$).¹

Of the remaining coping responses, none evidenced interactions with rurality. However, three influenced depressive symptoms. First, venting of emotions predicted greater depressive symptoms at all three Waves ($\beta s = 0.22, 0.15, 0.21$, $ps < 0.05$). Similarly, higher use of denial predicted greater depressive symptoms at all three waves ($\beta s = 0.24, 0.18, 0.23$, $ps < 0.01$). The use of alcohol-drugs also predicted increased depressive symptoms at Waves 1 and 2 ($\beta s = 0.21, 0.15$, $ps < 0.05$). The results showed that there were no reliable influences of the following coping strategies on depressive symptoms: planning, acceptance, seeking support for instrumental reasons and seeking support for emotional reasons.

Discussion

The current study is among the first to quantitatively examine rural as well as urban breast cancer patients' coping strategies and psychological adjustment. The methodology of the study is unique in at least two additional ways. First, whereas most previous studies on rural breast cancer patients have used loose definitions of rurality, we created a continuous index, based on town population and county code to capture the varying degrees of rurality in our sample. Second, the study is longitudinal and assessed participants' coping strategies during radiation treatment and measured depressive symptoms during treatment, as well as 3 and 6 months after treatment. This approach allowed us to determine the reliability of our findings over time.

The results of this study suggested that, although rural and urban breast cancer patients appear similar in some ways, their experiences can be quite different. Although rurality was unrelated to the reported frequency of coping behaviours and to overall levels of depressive symptoms, the extent to which specific coping responses predicted psychological distress depended on the rurality of the patient. Specifically, rurality moderated the influences of three coping responses which were identified as theoretically important for rural people (active coping, behavioural disengagement and positive reinterpretation; Girgis et al., 2000; Gray et al., 2004; McGrath et al., 1999; Photiadis & Simon, 1983; Wilson et al., 2000). The results are consistent with coping and cultural-fit theories (Folkman et al., 1986; Lazarus & Folkman, 1984; Lu, 2006; Ratzloff, Masumoto, Kouznetsova, Raroque, & Ray, 2000) in that rural breast cancer patients who adopt coping strategies that match their culture experience are expected to exhibit better psychological adjustment than their rural counterparts who do not to adopt these coping strategies.

Counter to our predictions, religious coping did not interact with rurality. This seems to support the findings from a pair of qualitative studies which suggest that religious coping may not be as important to rural breast cancer patients as other studies of rural people and religiosity suggest (Heishman, 1999; Wilson et al., 2000). Religious coping was unassociated with depression during treatment and 3 months later, but was negatively associated with depression 6 months later. This pattern is interesting because it suggests that religious coping may be more useful as one transitions from cancer patient to cancer survivor. This is supported by other studies conducted close to diagnosis (e.g., Carver et al., 1993; Culver et al., 2002) which fail to reveal a relationship between religious coping and well-being.

The results of the current study have implications for our more general understanding of coping and how coping may be influenced by the surrounding social context.

The current findings support (Folkman et al., 1986; Lazarus & Folkman's 1984) theorising that adopting a coping strategy which is mismatched with the environment can lead to more stress and compromise well-being. The findings also suggest that the fit between culture and coping may be especially important for people living in rural areas, perhaps because of the pressure to conform and the lack of anonymity in rural areas (Slama, 2004). As such, these findings also make important contributions to our understanding of rural breast cancer patients as well as our understanding of rural people in general.

The current study is limited in at least a couple of ways. First, as is true of most studies of cancer patients, the study utilised a convenience sample. Thus, it is unclear how well these results generalise to rural breast cancer patients in other areas of the country and in other countries. It is important to note, however, that studies suggest that rural breast cancer patients who live in a variety of countries, such as Australia, Canada, China, and Ireland, face issues similar to those that impact their US counterparts (Craft, Primrose, Lindner, & McManus, 1997; Curran & Church, 1998; Davis et al., 1998; Girgis et al., 2000; Goel et al., 1997; Hall & Hollman, 2003; for a review see Bettencourt et al., 2007). As such, we believe that the presented findings are likely to generalise.

Second, we tested a relatively large number of potential interactions. We adopted Carver's assessment of coping, which he and his co-authors have used with cancer patients (Alferi et al., 1999; Carver et al., 1993; Culver et al., 2004). This assessment allowed us to examine the influence of 11 functional and less-functional coping responses. In doing so, we tested the influence of each of these in separate analyses. A different approach would have been to test all potential coping responses and respective interactions simultaneously, the power associated with the current study did not allow us to do so. Thus, the current results are encouraging, but should be replicated with a larger sample.

Third, it may appear that the predicted interactions explained a relatively small proportion of the variance. It is noteworthy, however, that health-related research effect sizes are often small because outcomes are multiply determined (see Pierce, Frone, Russell, Cooper, & Mudar, 2000). Studies suggest that the maximum value of any one effect decreases as the number of potential predictors increases (Adahi & Diener, 1989; Strube, 1991). Considering how many factors are related to depression, especially during times of adverse health, it is perhaps unsurprising that the interactions account for a relatively small amount of variance. It is important to note, however, that the R^2 change tests suggest that the interactions account for a statistically significant amount of variance. Finally, that the interactions were reliable across time points, even after controlling for important covariates, suggests that the effects are relatively robust.

Despite these limitations, our results offer a promising approach for gaining a better understanding of adjustment to breast cancer for a variety of groups. Future research should examine whether these findings generalise to other rural cancer patients and rural people more generally. Additionally, only a few studies (Alferi et al., 1999; Culver et al., 2002, 2004) have examined coping behaviour across other types of groups. Future research should examine how other cultures and group differences might influence coping behaviour and the corresponding relation between coping responses and well-being. Another interesting avenue for future research would be to examine the role of rural culture in coping. For example, future research should investigate whether rural breast cancer patients feel pressured to adopt certain coping strategies, and if so, whether the pressure comes from external sources (i.e. community members), internal sources (i.e. personal standards related to rural identity) or both.

Conclusions

The findings of the current study support Folkman et al. (1986) suggestion that the effectiveness of any coping response cannot be fully understood without attention to the context in which the coping response is used. This study examined the effectiveness of coping responses imbedded in two contexts, breast cancer treatment and rural areas. This study is the first quantitative study of coping to reveal differences between rural and urban breast cancer patients, and suggests that area of residence might be one important contextual variable to be examined in the larger coping literature as well as the more general breast cancer literature.

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Note

1. Because we conducted a relatively large number of regression analyses, we considered correcting the critical alpha within waves for our predicted interactions. One commonly used correction is the Bonferroni test, although some researchers espouse this technique (Bland & Altman, 1995; Tukey, 1977), others have argued that it is overly restrictive and unnecessary for *a priori* hypotheses (Nakagawa, 2004; Perneger, 1998; Rothman, 1990). When we applied the Bonferroni corrected alpha of $p < 0.0125$ the only significant interaction that remained was that between rurality and active coping at Wave 1. Although the uncorrected results could be interpreted as spuriously significant, it is also possible that the issue is simply a lack of power. Indeed, a power analysis suggests that, with this effect size and corrected alpha level, the sample size necessary would be 553 with a one-time only survey. Because the patterns of results replicate across waves, however, we believe this suggests that these interactions are likely reliable and reflect authentic phenomena.

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