

Rural Living as Context: A Study of Disparities in Long-Term Cancer Survivors

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Twenty-one percent of the U.S. population lives in rural areas, defined as sparsely populated counties a long distance from comprehensive healthcare centers (U.S. Census Bureau, 2010). Defining rural elements are the vast distance between individuals and a low population density with limited face-to-face contact, both of which influence human networking (Giles, Glonek, Luszcz, & Andrews, 2005) and affect health outcomes (Fassio, Rollero, & De Piccoli, 2012; Strasser, 2003).

Rural Americans suffer disproportionately from chronic illnesses such as cancer (Gamm, Hutchison, Dabney, & Dorsey, 2003). Not only are they at risk for poor health outcomes, such as increased mortality and morbidity, but they also report poor health-related quality of life (HRQOL) (Gamm et al., 2003; Weaver, Geiger, Lu, & Case, 2013). HRQOL is a multidimensional, subjective, evaluative construct that describes how individuals judge their lives based on current health status (King et al., 1997). For cancer survivors, that includes an individual's perceived quality of survival. Persistent, long-term, distressing late effects from diagnosis and treatment of cancer can diminish HRQOL (Mah, Bezjak, Loblaw, Gotowiec, & Devins, 2011; Weeks, Wallace, Wang, Lee, & Kazis, 2006). Those effects contribute to the vulnerability of rural long-term (at least five years postdiagnosis or treatment) cancer survivors. Weaver et al. (2013) reported that, from 2006–2010, about 21% of cancer survivors resided in rural areas. The effects of diseases such as cancer on rural dwellers' HRQOL are poorly understood. Rurality (i.e., the degree or extent to which an area can be considered rural), however, has been a key metric in determining access to cancer treatment and a predictor of mortality and cost of care (Bettencourt, Schlegel, Talley, & Molix, 2007; Eberhardt & Pamuk, 2004; Gamm et al., 2003). Therefore, an examination of the impact of rurality on HRQOL can provide relevant information in evaluating rural dwellers' HRQOL outcomes following cancer treatments.

Purpose/Objectives: To explore the impact of rurality on health-related quality-of-life (HRQOL) disparities in rural long-term cancer survivors.

Design: Cross-sectional survey.

Setting: Rural-Urban Continuum Codes (RUCC) 7, 8, and 9.

Sample: 91 adults at least five years post-treatment.

Methods: Mailed surveys measured HRQOL, self-esteem, and social support. Regression models were estimated to isolate (from self-esteem and social support) the effect of level of rurality on HRQOL.

Main Research Variables: HRQOL, self-esteem, social support, and rurality.

Findings: No differences in demographic characteristics existed among RUCCs. Survivors residing in RUCCs 7 or 8 tended to be similar in several dimensions of HRQOL. Survivors living in RUCC 7 reported significantly lower social function and greater financial difficulty and number of symptoms compared to survivors in RUCC 9 (the most remote). Self-esteem and social support strongly correlated with HRQOL.

Conclusions: The significant impact of rurality on HRQOL beyond self-esteem and social support suggests its role in explaining cancer survivorship disparities and directing practice. Until additional exploration can identify mechanisms behind rurality's impact, consideration of level of rurality as a potential factor in evaluating survivors' HRQOL outcomes is reasonable.

Implications for Nursing: Survivor context (e.g., level of rurality) influences HRQOL outcomes. Context or culture-relevant risk minimization and HRQOL optimization nursing practices are indicated.

Key Words: survivorship; quality of life; care of the medically underserved; rural issues; health policy

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Investigating rural dwellers' HRQOL necessitates understanding the effect of context (i.e., rurality) on health outcomes: lack of understanding about context (i.e., how rurality affects circumstances) confounds isolation of the true impact of cancer on the rural survivor. A circumstantial marker such as "rurality" is not monolithic:

individuals living in different rural areas differ in living experiences, care-access challenges, and use of often limited community health resources. A clearer understanding of the rural setting and its effect on HRQOL can inform care delivery, healthcare policy, and resource allocation, thereby minimizing rural survivor vulnerability.

Survivors in predominantly urban areas report psychological and social HRQOL concerns; they report self-esteem and social support as HRQOL-influencing factors (Pedro, 2001; Wyatt & Friedman, 1996). Self-esteem is reported to influence the cancer adjustment process (Bettencourt, Molix, Talley, & Westgate, 2007; Pedro, 2010; Weinert, Cudney, Comstock, & Bansal, 2011), and social support and self-esteem correlate positively (Dirksen, 2000; Evans, Thompson, Browne, Barr, & Barton, 1993; Pedro, 2010). Research examining the impact of social support and self-esteem on rural survivor HRQOL can extend understanding of these variables in the survivor population.

A better grasp of rural residents and their response to diseases such as cancer is necessary to construct rural survivor-centered interventions. Rural health research on cancer survivorship has used rural residence primarily as a participant descriptor (Andrykowski & Burris, 2010; Weeks et al., 2004) and not as an investigatory focus or HRQOL predictor. Research has relied mainly on existing datasets and focused on rural and urban comparisons. Those studies do not capture the complexity of rural survivor HRQOL.

One framework for exploring HRQOL-related complexities is Ashing-Giwa's (2005) Contextual Model of HRQOL. This conceptual framework adds cultural and socioecological dimensions to the study of HRQOL and cancer survivorship. It incorporates macro (systemic) and micro (individual) level contextual dimensions in understanding and measuring HRQOL. The model was predicated on cancer survivors in general. Three assumptions supported an adaptation of this model for rural cancer survivors: (a) rurality is a defining factor of HRQOL for rural cancer survivors at the macro and micro levels, (b) HRQOL predictors vary across levels of rurality, and (c) rurality as culture must be factored into health outcomes among rural cancer survivors (Pedro, 2010). The current study explored aspects of those theoretical assumptions and HRQOL for rural cancer survivors. The study aims were to (a) describe the HRQOL of rural survivors, (b) compare HRQOL across levels of rurality, and (c) explore the impact of self-esteem and social support on HRQOL among rural cancer survivors.

Methods

Study Participants and Procedures

Participants were recruited from the Colorado Central Cancer Registry (CCCR). Potential participants

were then abstracted using a random, stratified, rural sampling strategy based on the 2003 Rural-Urban Continuum Codes (RUCCs) (U.S. Department of Agriculture, 2003). Rurality, for the current study, was operationally defined as those living in Colorado non-metro counties coded as 7 (urban population of 2,500–19,999, not adjacent to a metro area), 8 (complete rurality or less than 2,500 urban population, adjacent to a metro area), or 9 (complete rurality or less than 2,500 urban population, not adjacent to a metro area) (U.S. Department of Agriculture, 2003). In addition to residing in a county within one of the three designated RUCCs, participants met the following criteria: (a) 21 years of age or older; (b) five years beyond diagnosis of any form of cancer and treatment; (c) recurrence-free (no active disease needing treatment by self-report); (d) able to speak, write, and understand English; and (e) no known cognitive disabilities.

The Colorado Multiple Institution Review Board approved the study. Mailed invitation letters and a self-addressed, stamped postcard (to indicate interest in participating) were sent to 340 survivors whose names had been abstracted by the CCCR. If the invitation postcard indicating interest in participating was not received within two weeks, the principal investigator (PI) placed a reminder call to the potential participant. Following receipt of the postcard affirming a desire to participate, the PI called the cancer survivor to verify willingness to complete the surveys, confirm mailing address, and answer any questions regarding study participation. Those who returned postcards were mailed a study packet. The study packet included (a) a cover letter describing the study and outlining the participants' rights, (b) the survey instruments, and (c) a postage-paid envelope to return completed surveys. Estimated survey completion time was 30–40 minutes. Two steps made up the consent process, a verbal telephone consent (during the initial call made by the PI to verify address and answer questions) and return of completed surveys. If the completed surveys were not returned within three weeks of mailing, the PI called participants to remind them to return completed surveys. Upon receipt of the survey from participants, if large data sections were missing, the PI called participants, and missing sections were completed by phone.

Of the 340 mailed letters and postcards, 74 inadvertently went to individuals who did not fit the study criteria for rural residents. Of the 266 postcards mailed to eligible rural residents, 98 (37%) came back undeliverable. The CCCR provided updated addresses for the undelivered postcards, and a second mailing was conducted. The response rate was 35% for RUCC 7, 31% for RUCC 8, and 41% for RUCC 9. Of the 98 individuals who completed the questionnaires, seven reported not

residing in a rural community as stipulated for the study, resulting in a final sample size of 91.

Measures

Participants completed a seven-page survey packet comprised of four self-administered instruments: a **demographic profile**; the **Rosenberg Self-Esteem Scale (RSES)** (Rosenberg, 1989); the **Personal Resource Questionnaire (PRQ) 2000** (Weinert, 2003), a measure of social support; and the **European Organisation for the Research and Treatment of Cancer Quality of Life Core 30 (EORTC QLQ-C30)** questionnaire (Aaronson et al., 1993), a measure of HRQOL. The demographic profile elicited basic information of age, gender, marital status, and income. Table 1 provides descriptive statistics, reliability information, and an example of items from self-esteem, social support, and HRQOL instruments. Measures have been tested in rural populations (Damodar, Smitha, Gopinath, Vijayakumar, & Rao, 2013; Puskar et al., 2010; Weinert et al., 2011).

The RSES measures the self-acceptance aspect of self-esteem (i.e., the sense of being capable, worthwhile, and competent) (Rosenberg, 1989). It uses a Likert-type scale with four-point responses ranging from 1 (strongly disagree) to 4 (strongly agree). Scores were calculated as the mean of the 10 items. For the

five negatively phrased items, scores were reversed so that a higher score indicated higher self-esteem. Reliability of this scale has been high (Cronbach alpha = 0.92) among adult patients with cancer (Curbow & Somerfield, 1991).

The PRQ 2000 was developed to measure multidimensional characteristics of social support (Weinert, 2003). The PRQ 2000 is a self-administered instrument containing 15 positively worded items on a seven-point Likert-type scale, designed to tap into perception of level of social support. The item responses range from 1 (strongly disagree) to 7 (strongly agree). The total score was calculated as the mean of all 15 items, with higher scores indicating more support. Reliability estimates have been high (Cronbach alpha = 0.9 and 0.91) in previous studies (Weinert, 2003; Weinert & Tilden, 1990).

The EORTC QOL-C30 (Aaronson et al., 1993) is a validated cancer-specific, multidimensional, self-administered HRQOL measure. The EORTC QLQ-C30 includes an overall measure of global health status, nine symptom items, and five functional scales. The nine symptom items assess fatigue, nausea and vomiting, pain, dyspnea, insomnia, appetite loss, constipation, diarrhea, and financial difficulties. For analytic purposes, all of the symptom items (except for overall pain and financial difficulty items) were combined into a single

Table 1. Study Measures and Sample Descriptive Statistics

Dimension	Items	Cronbach Alpha	\bar{X}	SD	Observed Range	Example Item
EORTC QLQ-C30^a						
Global health status	2	0.85	79.49	17.05	25–100	How would you rate your overall QOL during the past week?
Physical functioning	5	0.79	85.64	17.79	20–100	Do you have any trouble taking a short walk outside of the house?
Role functioning	2	0.82	84.63	21.96	0–100	Were you limited in pursuing your hobbies or other leisure time activities?
Emotional functioning	4	0.83	82.88	20.65	16.7–100	Did you feel tense, worried, irritable, or depressed?
Cognitive functioning	2	0.69	80.77	20.63	16.7–100	Have you had difficulty concentrating on things like reading a newspaper or watching television?
Social functioning	2	0.76	84.25	25.98	0–100	Has your physical condition or medical treatment interfered with your family life?
Symptom QOL	10	0.83	14.18	13.69	0–63.33	Were you tired? Did you lack appetite?
Pain QOL	2	0.82	18.68	21.92	0–100	Have you had pain?
Financial difficulties	1	–	18.15	28.77	0–100	Has your physical condition or medical treatment caused you financial difficulties?
PRQ 2000^b						
Social support	15	0.91	5.93	0.87	3.33–7	There is someone I feel close to who makes me feel secure.
RSES^c						
Self-esteem	10	0.91	3.35	0.53	1.3–4	I feel that I have a number of good qualities.

^aAll domain scores potentially ranged from 0–100.

^bSocial support scores potentially ranged from 1–7.

^cSelf-esteem scores potentially ranged from 1–4.

EORTC QLQ-C30—European Organisation for the Research and Treatment of Cancer Quality of Life Core 30 questionnaire; PRQ—Personal Resource Questionnaire; QOL—quality of life; RSES—Rosenberg Self-Esteem Scale

Note. Based on information from Aaronson et al., 1993; Rosenberg, 1989; Weinert, 2003.

index of symptom quality of life. Pain quality of life and financial difficulties were treated as separate dimensions because they were of theoretical interest for this rural survivor sample. The five functional scales included physical functioning, role functioning, emotional functioning, cognitive functioning, and social functioning. All HRQOL domains were scaled from 0–100 based on the EORTC QLQ-C30 scoring manual. Consistent with the scoring manual, higher scores on the global health

status and functional domains are desirable because they represent higher functioning and QOL; in contrast, lower scores on the symptom, pain, and financial dimensions are desirable because higher scores represent a higher level of symptomatology or problems.

Analyses

SAS[®], version 9.2, was used for all analyses. Differences between rural categories on the demographic characteristics were examined by using chi-square models for categorical demographic variables and analysis of variance models for continuous variables. The relationships of the demographic characteristics of age, gender, marital status (married versus unmarried), race or ethnicity (Caucasian versus non-Caucasian), employment (full-time versus other), income, and years since diagnosis (5–10 versus 11–20) with the HRQOL dimensions, self-esteem, and social support were examined using Spearman's correlation coefficients. The effects of levels of rurality and self-esteem or social support on HRQOL were examined in a regression framework where separate regression equations were modeled for each domain of HRQOL. Each HRQOL scale was regressed on self-esteem and social support to examine the impact of these two variables simultaneously on HRQOL; RUCC was then included in the model to examine its effect over and above anticipated strong effects of self-esteem and social support. Dummy codes were created from the three RUCCs, using RUCC 9 as the reference category to compare RUCCs 7 and 8 to RUCC 9. The amount of unique variance in HRQOL accounted for by RUCC was assessed by examining the R² change from including RUCC over and above self-esteem and social support. Given

Table 2. Demographic Characteristics Overall and by RUCC (N = 91)

Characteristic	Overall	RUCC 7 (n = 49)	RUCC 8 (n = 28)	RUCC 9 (n = 14)	Difference by RUCC ^a
	\bar{X}	\bar{X}	\bar{X}	\bar{X}	
Age (years)	66.2	66.2	66.4	66.1	F (2, 85) = 0.00
Income ^b	1.9	2.1	1.9	1.4	F (2, 87) = 1.94

Characteristic	Overall	RUCC 7 (n = 49)	RUCC 8 (n = 28)	RUCC 9 (n = 14)	Difference by RUCC ^a
	n	n	n	n	
Gender					χ^2 (2, n = 88) = 1.44
Female	59	29	21	9	
Male	29	18	7	4	
Did not answer	3	2	–	1	
Marital status					χ^2 (2, n = 88) = 0.06
Unmarried	8	6	–	2	
Married	67	36	21	10	
Separated	3	1	2	–	
Divorced	7	4	2	1	
Widowed	6	2	3	1	
Race					χ^2 (2, n = 91) = 0.31
Caucasian	87	47	27	13	
Hispanic or Latino	1	–	–	1	
Other	1	–	1	–	
Did not answer	2	2	–	–	
Income (\$)					–
10,000–50,000	38	19	13	6	
51,000–75,000	30	18	7	5	
76,000–100,000	10	7	2	1	
101,000–150,000	5	2	3	–	
151,000–200,000	1	–	1	–	
Greater than 200,000	3	3	–	–	
Did not answer	4	–	2	2	
Employment					χ^2 (2, n = 91) = 2.16
Full-time	22	14	4	4	
Part-time	12	6	4	2	
Unemployed	5	4	1	–	
Retired	52	25	19	8	
Years since diagnosis					χ^2 (2, n = 82) = 0.26
5–10	41	23	11	7	
11–20	41	21	13	7	
Greater than 20	2	1	1	–	
Did not answer	7	4	3	–	

^a Because of low cell counts within specific subcategories, specific cells were collapsed to facilitate meaningful comparisons. The reported chi-square values compared married versus unmarried participants, Caucasian versus other ethnicity participants, full-time employment versus not, and 5–10 years since diagnosis versus 11–20 years since diagnosis across the three RUCCs.

^b In addition to examining income in terms of the six categories, income was assessed on a 1–6 ordinal scale to facilitate income comparisons across RUCCs. A higher scale number indicates greater income totals.

RUCC—Rural-Urban Continuum Code

the small sample size, particularly in RUCC 9, the R^2 change values provided indication of the effect size associated with level of rurality and were interpreted following Cohen's (1988) guidelines for small, medium, and large effects.

Results

Demographic Characteristics

Of the 91 participants, 49 reported residing in RUCC 7, 28 in RUCC 8, and 14 in RUCC 9. The sample included 19 breast cancer survivors, 12 prostate, 4 colon, 3 hematologic, 13 with another form of cancer, and 40 not reporting their cancer type. The average participant age was 66.2 (median = 68 years; range = 27–94), and most were married, Caucasian, and female. No differences were noted between the three RUCCs on any of the demographic characteristics (see Table 2).

The majority of relationships between demographic characteristics and HRQOL, self-esteem, and social support were not significant. Gender, race, and ethnicity were not related to any of the HRQOL dimensions. Younger age, higher income, and full-time employment were related to more favorable self-reported physical functioning ($r_s = -0.36, 0.27, \text{ and } 0.23$, respectively). Lower age related to more favorable reported cognitive functioning ($r_s = -0.21$) and fewer symptoms ($r_s = 0.24$). Those who were 11–20 years since diagnosis showed lower self-esteem relative to 5–10 years ($r_s = 0.26$), and being married was related to greater perceptions of available social support ($r_s = 0.25$).

Impact of Rural Category

Table 3 shows mean values of the HRQOL dimensions by RUCC, and Table 4 shows standardized regression coefficients, t values, and model R^2 change predicting HRQOL from RUCC over and above the impact of self-esteem and social support.

Those residing in RUCC 7 or 8 tended to be similar in global health and several other HRQOL subscales. A significant difference was noted between RUCC 7 and RUCC 9 in social functioning, symptom-related QOL, and financial difficulties. Those residing in RUCC 7 reported lower (poorer) social functioning scores, a higher (worse) symptom score, and greater financial difficulties than those residing in RUCC 9 communities. The differences between RUCC 8 and RUCC 9 followed a similar pattern,

but the differences were statistically significant only for RUCC 8 reporting more symptoms. The amount of variance in HRQOL accounted for by RUCC over and above self-esteem and social support was small (R^2 change values of 0.03–0.05 for the three variables significantly effected by RUCC).

Self-Esteem and Social Support as Predictors

Self-esteem and social support accounted for moderate-to-large amounts of variance in HRQOL. Higher social support predicted greater HRQOL on each of the dimensions and higher self-esteem predicted greater HRQOL on all dimensions except for physical functioning, social functioning, and financial difficulties.

Discussion

Studies have identified poor HRQOL among rural cancer survivors (Singh, 2012; Singh, Williams, Siahpush, & Mulhollen, 2011; Weaver et al., 2013). However, little is known about the disparities based on degree of rurality, particularly for survivors. Research showing poorer rural HRQOL than urban HRQOL among cancer survivors (Miles, Proescholdbell, & Puffer, 2011; Wallace et al., 2010; Weeks et al., 2006) leads one to expect that those living in the most rural settings would

Table 3. Means of Health-Related QOL Domains, Social Support, and Self-Esteem by RUCC

Measure	RUCC 7 (n = 49)		RUCC 8 (n = 28)		RUCC 9 (n = 14)	
	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD
EORTC QOL-C30^a						
Global health status ^b	78.23	18.7	79.76	16.42	83.33	11.79
Physical functioning ^b	83.45	20.64	86.43	15.23	91.43	9.93
Role functioning ^b	83.68	23.19	85.71	16.8	85.71	27.62
Emotional functioning ^b	81.63	21.72	82.14	21.96	88.69	12.91
Cognitive functioning ^b	78.57	23.57	83.33	18.7	83.33	11.32
Social functioning ^b	80.61	28.13	84.52	26.81	96.43	7.1
Symptom QOL ^c	15.51	14.1	15.24	15.33	7.38	3.96
Pain QOL ^c	17.01	18.16	21.43	25.2	19.05	27.62
Financial QOL ^c	23.13	31.33	17.28	28.3	2.38	8.91
PRQ 2000						
Social support ^d	5.86	0.91	5.98	0.94	6.05	0.54
RSES						
Self-esteem ^e	3.33	0.57	3.42	0.49	3.31	0.44

^a All domain scores potentially ranged from 0–100.

^b Higher scores represent higher functioning and QOL.

^c Lower scores represent a lower level of symptomatology or problems.

^d Social support potentially ranged from 1–7.

^e Self-esteem scores potentially ranged from 1–4.

EORTC QLQ-C30—European Organisation for the Research and Treatment of Cancer Quality of Life Core 30 questionnaire; PRQ—Personal Resource Questionnaire; QOL—quality of life; RSES—Rosenberg Self-Esteem Scale; RUCC—Rural-Urban Continuum Code

Note. Based on information from Aaronson et al., 1993; Rosenberg, 1989; Weinert, 2003.

fare worst on HRQOL metrics; the authors' results, however, run counter to this expectation, with those in the most remote area (RUCC 9) reporting better social functioning, fewer symptoms, and fewer financial difficulties than those in RUCCs 7 and 8.

The significant difference in HRQOL between RUCCs supports Pedro's (2010) theoretical assumption concerning rurality as a defining factor in HRQOL. The HRQOL differences between RUCCs 7 and 9 likely point to the uniqueness (e.g., tight-knit community networks, limited health resources, vast distances) of rural life on cancer survivorship. One explanation for the difference is that RUCC 9 residents' inherent independence and self-sufficiency led them to live in the most remote rural area in the first place, sparking a process in which individual temperament generates a composite contextual temperament. Alternatively, the most rural contexts may promote the most tightly knit communities as supported by the finding that RUCC 9 survivors scored better on social functioning, even when controlling for the effects of social support and self-esteem. Fassio et al. (2012) found that environmental characteristics, such as rural context, influenced the psychological health and relational dimensions of QOL: people living in low-density places (e.g., RUCC 9 residents) showed high levels of psychological health and relational QOL. In addition, similar to the current study, Fassio et al. (2012) reported population density as the strongest predictor of the social relations subscale of QOL.

Leipert and George (2008) and Leipert and Reutter (2005) described a phenomenon called "making the best of the north" and "supplementing the north." Rural

women culturally rely on family and social activities to feel better (Leipert & Reutter, 2005). Viewing culture as a way of life in a group of people with accompanying beliefs, values, and practices (Kagawa-Singer, 2000) permits consideration of rurality as a culture (Eberhardt & Pamuk, 2004; Leipert & George, 2008) and, therefore, a factor to include in HRQOL outcome evaluation, just as ethnic culture is (Pedro, 2010; Vanderboom & Madigan, 2007). Survivors identify family and social support as important to QOL (John, 2010; Pedro, 2001), which may be particularly relevant for rural survivors, serving as partial explanation for better HRQOL in RUCC 9 survivors compared to those in RUCCs 7 and 8. The significant differences in HRQOL among RUCCs are consistent with the rural health literature on the general influence (Bettencourt et al., 2007; Cudney, Sullivan, Winters, Paul, & Oriet, 2005; Leipert & George, 2008; Reid-Arndt & Cox, 2010) of geographic location on aspects of HRQOL in cancer survivorship and other chronic illnesses, reiterating rurality's role as a determinant of HRQOL.

RUCC 9 had the smallest sample size, but the highest response rate. Survivors often are eager to tell their stories. They may experience therapeutic physical and emotional effects from the disclosure and validation of their survivorship experiences (Overcash, 2004). Living in the most remote settings may amplify that phenomenon.

The majority of relationships between demographic characteristics and HRQOL dimensions were not significant, underscoring the importance of looking beyond pure demographics to capture fully the complexity of HRQOL for rural survivors. However, a few noteworthy associations were apparent. Younger age, higher income,

Table 4. Standardized Beta Coefficients and t Values in the Regression of Health-Related QOL Dimensions on RUCC, Controlling for Self-Esteem and Social Support

QOL Domain	Self-Esteem		Social Support		R ²	RUCC 7 Versus RUCC 9 ^a		RUCC 8 Versus RUCC 9 ^a		R ² Change
	β	t	β	t		β	t	β	t	
Global health ^b	0.22	2.26*	0.43	4.46***	0.28	-0.11	-0.83	-0.09	-0.7	0.006
Physical functioning ^b	0.15	1.43	0.34	3.26**	0.17	-0.19	-1.35	-0.16	-1.13	0.02
Role functioning ^b	0.26	2.54*	0.26	2.47*	0.17	-0.03	-0.18	-0.04	-0.27	0.001
Emotional functioning ^b	0.34	3.76***	0.4	4.36***	0.34	-0.13	-1.07	-0.17	-1.35	0.02
Cognitive functioning ^b	0.23	2.42*	0.4	4.19***	0.27	-0.07	-0.57	-0.04	-0.3	0.003
Social functioning ^b	0.14	1.56	0.49	5.29***	0.31	-0.25	-1.99*	-0.22	-1.71	0.03
Symptom QOL ^c	-0.22	-2.39*	-0.41	-4.35***	0.26	0.26	1.98*	0.31	2.39*	0.05
Pain QOL ^c	-0.21	-2.01*	-0.22	-2.11*	0.11	-0.07	-0.46	0.09	0.61	0.02
Financial QOL ^c	-0.02	0.22	-0.43	-4.34***	0.19	0.31	2.3*	0.25	1.85	0.05

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

^a Negative beta coefficients and t values indicate higher scores in RUCC 9 relative to RUCC 7 or RUCC 8. Positive coefficients indicate higher scores in RUCC 7 or RUCC 8 relative to RUCC 9.

^b Higher scores represent higher functioning and QOL.

^c Lower scores represent a lower level of symptomatology or problems.

QOL—quality of life; RUCC—Rural-Urban Continuum Code

Knowledge Translation

The circumstances of long-term cancer survivors, such as the geographic factor of a rural setting, influence their evaluation of health-related quality of life (HRQOL).

When addressing disparities in the rural cancer survivor population, degree of rurality matters.

Minimizing risk and optimizing HRQOL outcomes is possible when providers, in collaboration with survivors, account for the influence of rurality via context-relevant approaches to care.

and full-time employment were related to more favorable self-reported physical functioning, whereas older survivors reported less favorable cognitive functioning and more symptoms. It has been suggested that cancer survivorship is an additional vulnerability accompanying the aging process (Aziz & Rowland, 2003; Beck, Towles, Caserta, Lindau, & Dudley, 2009; Clayton, Mishel, & Belyea, 2006). Survivors with a diagnosis greater than 11 years reported lower self-esteem than survivors in the 5–10 year range. The link between HRQOL outcomes, experiences of survivors, and time since diagnosis has gained attention in cancer survivorship literature (Deimling, Kahana, Bowman, & Schaefer, 2002; Hoffman, McCarthy, Recklitis, & Ng, 2009).

Implications for Nursing Practice and Research

The observed difference in HRQOL accounted for by level of rurality (beyond and distinct from self-esteem or social support) urges additional exploration of the impact of rurality on survivor HRQOL. A nuanced understanding of the rural context's effect on health practices can minimize health disparities. Healthcare providers (HCP) cognizant of the impact of rural context on HRQOL increase their capacity to enact targeted, HRQOL-enhanced interventions. For example, HCPs may assume that remote locations preclude survivors obtaining assistance with therapy or education; HCPs who make that assumption may not offer the same array of options they would for urban or less rural survivors or may not employ existing community resources (i.e., health education via faith-based groups). HCPs' knowledge of contextual HRQOL dimensions engenders sensitivity, engagement, and targeted support for context-relevant goals.

The findings of this study are not intended to minimize the findings from other cancer survivorship studies demonstrating the physical, psychosocial, and financial burdens survivors experience (Aziz & Rowland, 2003; Foster, Wright, Hill, Hopkinson, & Roffe, 2009; Schro-

evers, Helgeson, Sanderman, & Ranchor, 2010). Rather, the study findings of significant differences between RUCCs in the social, symptom, and financial domains of HRQOL emphasize the merit of attention to factors (i.e., allocation of health resources based on population density, placement of primary care providers, and organization and coordination of community resources) present in each RUCC that may distinguish predictors for higher levels of HRQOL for survivors. This exploration can begin with context-driven questions: What do survivors in the various RUCCs think necessary to carry out the recommended plan of care? Who is available to step in and carry out the multiple household and community roles (i.e., school principal, primary wage earner, and county-level responsibilities such as coroner or fire chief) typical for a rural dweller while the survivor attends to health? What distance must they travel to acquire health-monitoring equipment?

In short, an account of the mechanisms behind the impact of rurality on HRQOL would further advance the science of cancer survivorship. Until then, an index capturing level of rurality should be a factor when selecting and evaluating clinical practices to enhance the HRQOL outcomes of rural cancer survivors.

Limitations

The variety of cancers represented in the sample limited the ability to draw definitive conclusions. The authors also were unable to determine the length of time a participant had lived in a specific RUCC. That information would be important to future studies exploring HRQOL responses specific to varying RUCCs and considering transitions from one RUCC to another that influences HRQOL. This study focused on degrees of rurality rather than on comparing HRQOL along the rural-urban continuum; therefore, the results do not generalize beyond a rural setting. The authors used a convenience sample of rural cancer survivors and were dependent on data from those who responded to the mailed invitation. The low response rate is, therefore, a limitation, particularly given that the authors were unable to assess whether those who responded generalize to the broader population of survivors. The low sample size, particularly in RUCC 9, was another limitation in terms of statistical power; however, the authors relied on the observed effects sizes in addition to examining statistical significance.

Conclusion

Little systematic research exists linking geographic factors (i.e., rural context) to HRQOL outcomes in survivors. In addition, the significant difference between RUCCs that indicated that those farthest from contact with others because of vast distances and low

population density (i.e., RUCC 9) did better on certain components of HRQOL implies the need for deeper investigation of the nature of the impact of rural context on cancer survivorship. Level of rurality contributes significantly to the HRQOL disparities observed in rural cancer survivors and should be an explicit variable in the examination and evaluation of HRQOL outcomes for this population. The study findings advance the science of cancer survivorship, if only to pose alternative considerations of how circumstantial factors such as level of rurality influence HRQOL. In addition, the concept of rurality as culture and the implications of that concept on symptom management in cancer survivorship (i.e., how much are symptoms an issue for survivors in varying RUCCs?) deserves more exploration. Most importantly, the study findings emphasize exploring context details to improve the accuracy of interpretation concerning rural survivors' cultural way of life as potential predictors of survivor HRQOL disparities.

The impact of context on HRQOL for rural cancer survivors via the exploration of rurality builds on Kelly's (2003) assessment of the constructs of place and space for rural dwellers. She stated "Place is the local, lived articulation of sense, body, identity, environment, and culture a person is always in and of place" (p. 2,280). Kelly (2003) also proposed that place is central

to rural dwellers' health experience because the nature, quality, and health outcomes associated with this experience reflect the distribution of resources, expertise, and health values of the rural setting. HRQOL for rural survivors does not exist in a vacuum, but rather in a context where health experiences interface with their circumstances. Therefore, to address potential and existing disparities in the rural survivor population, rural health researchers and clinicians must not lose sight of the significant influence of rural context on HRQOL outcomes.

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