Effects of Social Support on Physical Activity, Self-Efficacy, and Quality of Life in Adult Cancer Survivors and Their Caregivers

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The American College of Sports Medicine (2010) has recommended that cancer survivors participate in at least 150 minutes of moderate-intensity aerobic activity per week. However, evidence reveals that fewer than 20% of cancer survivors are meeting the recommended physical activity (PA) guidelines, which may increase their risk of developing a secondary cancer, disease recurrence, or chronic illness (Branchard, Courneya, & Stein, 2008; Hamer, Stamatakis, & Saxton, 2009). That lack of PA in cancer survivors is consistent with the general population. Only 16% of the U.S. population reported participating in sports or leisure-time PA (Bureau of Labor Statistics, 2008).

Physical inactivity is associated with cardiovascular disease, diabetes, obesity, hypertension, osteoporosis, lipid disorders, depression, anxiety, and increased risk of developing certain cancers as well as cancer recurrence. In addition, physical inactivity has substantial economic consequences for the U.S. healthcare system. For example, physical inactivity costs the U.S. healthcare system about $76 billion a year in direct costs (hospital, physician, drug, institutional, and other expenditures) (American College of Sports Medicine, 2007). The economic impact of physical inactivity represents 16% of the gross domestic product (GDP) in the United States, and these costs are expected to reach 20% of the GDP by 2016 (American College of Sports Medicine, 2007).

From a global perspective, physical inactivity is the fourth leading risk factor for global mortality and is associated with 3.2 million deaths per year, including 2.6 million in low- and middle-income countries (World Health Organization, 2011). More than 30% of cancers worldwide could be prevented by modifying risk factors such as physical inactivity and providing a supportive social environment that is amenable to PA participation (World Health Organization, 2010).

Social support has been identified as a positive determinant of PA participation in cancer survivors (Barber, 2012; McNeill, Kreuter, & Subramanian, 2006; Peterson,

Purpose/Objectives: To explore the relationships between adult cancer survivor and caregiver social support, self-efficacy for physical activity (SEPA), physical activity (PA) behavior, and quality of life (QOL); and to understand cancer survivors' and their caregivers' perceptions of social support in PA participation.

Design: Quasi-experimental.

Setting: Five community-based exercise sites located in East Texas.

Sample: 101 adult cancer survivors and caregivers.

Methods: Participants completed questionnaires, the 8-Foot Up-and-Go test, and open-ended questions. Data analysis included descriptive statistics and frequencies, Spearman's rho, Mann-Whitney U, and Wilcoxon signed-rank test. Qualitative data were analyzed using thematic analysis.

Main Research Variables: Social support, SEPA, PA, and QOL.

Findings: Physical QOL was significantly higher in caregivers than cancer survivors. Spearman's rho identified a negative relationship between physical QOL and PA in cancer survivors; and a significant relationship between PA and PA participation in caregivers with social support from friend. Three themes emerged from the qualitative data regarding the perception of social support: companionship, motivation, and health promotion.

Conclusions: Caregivers have higher QOL despite being the major social support provider to cancer survivors. Social support is essential to PA participation.

Implications for Nursing: Interventions to increase PA in adult cancer survivors may consider encouraging their caregivers to actively participate.

Knowledge Translation: Caregivers play an important role in the PA of cancer survivors. Perceived social support in the form of companionship and motivation may increase PA in cancer survivors and caregivers. Therefore, nurses may consider educating cancer survivors and caregivers on the importance of adopting and maintaining PA throughout the cancer care continuum.

Yates, & Hertzog, 2008; Resnick, Luisi, & Vogel, 2008). Most of the research on social support and PA has focused on cancer survivors, not their caregivers. Unpaid

or informal caregivers are a major source of social support and play a significant role in cancer survivorship. In 2009, more than 65.7 million people in the United States served as unpaid or informal caregivers, with an estimated 4.6 million caring for a cancer survivor (AARP, 2009).

The synergistic or counteractive effects of social support on self-efficacy for PA (SEPA), PA, and quality of life (QOL) of adult cancer survivors and their caregivers are unclear. Self-efficacy is a person's belief about his or her capacity to perform a certain behavior (Bandura, 1997). Cancer survivors may have a desire to participate in PA; however, key social network members such as caregivers may undermine PA or reinforce physical inactivity. In contrast, caregivers may influence SEPA adaptation and maintenance in cancer survivors by serving as PA role models, offering to exercise with the cancer survivor or driving the cancer survivor to a PA program. Conversely, caregivers may not participate in PA or other healthy behaviors secondary to the demands of providing social support to cancer survivors. Therefore, caregivers may be at risk for poor mental and physical health because of caregiver burden and insufficient social support (Van Ryn et al., 2011).

In a review of the literature, no studies were identified that specifically evaluated the effects of social support on SEPA, PA, and QOL in adult cancer survivors and their caregivers, representing a significant knowledge gap. Given the disproportionate rates of PA in cancer survivors and the general population and the complexity of social support, an understanding must be gained of the relationships among social support, SEPA, PA, and QOL to develop supportive strategies or interventions that may increase PA participation and improve the QOL of adult cancer survivors and their caregivers. Therefore, the purposes of this quasiexperimental study were to explore the relationships between adult cancer survivors' and caregivers' social support, SEPA, PA, and QOL; and to understand cancer survivors' and caregivers' perceptions of social support in PA participation.

Theoretical Framework

Social cognitive theory (SCT) was used to guide this study. In SCT, human behavior is considered a product of triadic reciprocal causation, which is the interaction between personal factors, the environment, and behavior (Bandura, 1986).

Factors that may influence the initiation of and adherence to PA participation by cancer survivors and their caregivers include age, gender, cancer diagnosis, comorbidities, physical limitations, ethnicity, socioeconomic factors, and psychological factors such as self-efficacy. These factors were explored in the current study.

Environmental determinants refer to the concept that behavioral change will not occur unless the environment supports the new behavior (Bandura, 2002). FitSTEPS for Life® (FSFL) is an individually tailored and supervised community-based exercise program for cancer survivors and their caregivers established by the not-for-profit Cancer Foundation for Life®. FSFL served as the supportive physical environment.

Behavior is defined as a product of an individual's self-efficacy, perceptions of the environment, and individual factors (Bandura, 2004). According to Bandura (1997), individuals who are more self-efficacious believe that a behavior can be completed and are more likely to maintain a specific behavior. The desired behavior in the current study was an increase in PA.

Methods

Sample and Setting

A convenience sample of adult cancer survivors and their caregivers was recruited from five FSFL program sites located throughout East Texas and Dallas across a 12-month period. Participants in the PA program were expected to exercise at least three times a week at the center so that a log could be kept to monitor their progress. The cancer survivor needed a referral from their oncologist to participate in the FSFL program.

Inclusion criteria for cancer survivors included being (a) aged 18 years or older; (b) able to read, write, and comprehend English; (c) diagnosed with cancer, stage I–IV; (d) referred to the FSFL program by a physician; (e) able to ambulate eight feet; and (f) able to identify a caregiver willing to participate in the study. Exclusion criteria included cancer survivors who were enrolled in a research study involving PA or exercise at the time of the current study, and cancer survivors who were restricted to a wheelchair.

The caregiver sample included individuals identified by participating cancer survivors as a source of support. Inclusion criteria for the caregiver included being an adult caregiver (family member, friend, or significant other) aged 18 years or older who did not have a diagnosis of cancer; was able to ambulate eight feet; and was able to read, write, and comprehend English. Paid caregivers were excluded.

Measures

Demographic questionnaire: Demographic data were obtained from a **self-report questionnaire**. Cancer survivors and caregivers completed separate demographic questionnaires.

Social support: The **Social Support and Exercise Survey** (Sallis, Grossman, Pinski, Patterson, & Nader, 1987) is a self-report survey that measures family and friend support with 13 items assigned to each category

of support. In each category (family or friend support) are two subscales: (a) family participation (items 1–6 and 10–13), (b) family rewards and punishment (items 7–9), (c) friend participation (items 1–6 and 10–13), and (d) friend rewards and punishment (items 7–9). Internal consistency with Cronbach alpha coefficients was reported as 0.91 and 0.84 for all four family and friend subscales, and one to two week test-retest stability was 0.79 and 0.79, respectively (Sallis et al., 1987).

Self-efficacy for physical activity: The **Exercise Confidence Survey** is a 12-item scale developed to evaluate self-efficacy for exercise behavior adoption and maintenance in the general population (Sallis, Pinski, Grossman, Patterson, & Nader, 1988). It contains two subscales, the six-item self-efficacy–resting relapse and the six-item self-efficacy–making time. Internal consistency with Cronbach alpha coefficients has been reported as 0.83 and 0.85 for the two subscales. Test-retest reliabilities were 0.68 for both subscales.

Physical activity participation: The **8-Foot Up-and-Go** functional fitness test is a composite measure of power, speed, agility, and balance (Rikli & Jones, 1999). The test involves getting out of a chair, walking eight feet to and around a cone, and returning to the chair in the shortest time possible. Psychometric property testing was completed on a sample of people with fibromyalgia, reflecting convergent validity ($p < 0.05$) (Shibata, 2008). Overall test-retest reliability for the 8-Foot Up-and-Go was 0.95 (Rikli & Jones, 1999). Lower scores indicate the best performance (time) in completing the test.

Quality of life: The **Medical Outcomes Survey Short Form 8 (SF-8)** is a multipurpose eight-item measure of physical and mental health status. The SF-8 measures eight concepts: physical functioning, role limitations because of physical health problems, bodily pain, general health, vitality (e.g., energy, fatigue), social functioning, role limitations because of emotional problems, and mental health (psychological distress and psychological well-being), which are summed into two component scores: the Physical Component Score and the Mental Component Score. Reliability of the SF-8 using Cronbach alpha for internal consistency was reported as 0.7 or greater (Ware, Kosinski, Dewey, & Gandek, 2001). The SF-8 was licensed to the principal investigator (PI) for use in this study.

Qualitative assessment: At baseline and one month after baseline, cancer survivors and their caregivers were given the opportunity to provide a written response to the open-ended question, "Please tell us how social support affects your PA each day." Participants were permitted to write as much or as little as they chose in response to the question. In addition, selected participants who agreed were interviewed at FSFL or via telephone about their perceptions of social support. Interviews were based on a semistructured interview guide so that each participant responded to the same set of questions. All interviews were audio recorded and transcribed verbatim.

Data Collection Procedure

A trained research assistant or FSFL clinical staff member approached potential participants during their initial visit to FSFL. Potential participants were screened for inclusion and exclusion criteria. If eligible, the research assistant or FSFL staff member explained the study purposes and procedures, potential risks and benefits, time requirements, protection of confidentiality, and the participant's rights to participate or to refuse participation without jeopardizing medical care. Individuals who were interested in participating in the study signed an informed consent that explained study procedures and assured confidentiality.

After obtaining informed consent, participants were asked to complete the self-report questionnaires and the 8-Foot Up-and-Go test at the initial (baseline) visit to the FSFL program. All patients who completed the baseline self-report questionnaires and the 8-Foot Up-and-Go test were asked to return to FSFL to complete the questionnaires and the 8-Foot Up-and-Go test one month from their baseline FSFL visit. Previous research demonstrated that four weeks is an adequate amount of time to see a difference in balance and aerobic activity (Han, Richard, & Fellingham, 2009; Mustian et al., 2009). Study participants who did not return to FSFL to complete their one-month self-report questionnaires and the 8-Foot Up-and-Go test were called by the research assistant or FSFL staff to evaluate their status and remind them of the study.

Analysis

Quantitative data were analyzed using SPSS®, version 18.0, for Windows®. Descriptive statistics and frequencies were analyzed and examined for all study variables. The Kolmogorov-Smirnov and Sharpiro-Wilk were significant for all variables except for mental QOL, indicating that the scores were significantly different from a normal distribution. Therefore, nonparametric tests were used to test all variables. The Mann-Whitney U test was used to analyze hypothesis 1, which predicted cancer survivor reported levels of social support, SEPA, PA, and QOL will be higher than those reported by their caregivers. Spearman's rho was used to analyze hypothesis 2, which predicted a significant positive correlation among social support, SEPA, PA, and QOL in adult cancer survivors and their caregivers. The Wilcoxon signed-rank test was used to analyze cancer survivors and caregivers differences one month after participating in the exercise program. The Mann-Whitney U Test, Spearman's rho, and Wilcoxon signed-rank tests used one-tailed significance at a priori alpha level of 0.05, with an alpha of 0.013 with the Bonferroni correction. Qualitative data were

Table 1. Cancer Survivor Characteristics (N = 62)

Characteristic	$\overline{X}$	SD
Age (years)	65.2	10.8

Characteristic	n
Gender	
Female	49
Male	13
Cancer diagnosis[a]	
Breast	32
Lung	8
Cervical or endometrial	5
Colorectal, liver, or gastric	5
Lymphoma, myeloma, or leukemia	5
Melanoma, skin, or sarcoma	5
Head or neck	4
Kidney or prostate	4
Brain	2
Cancer stage (N = 42)	
I	12
II	10
II	15
IV	5
Cancer status (N = 42)	
In remission or cured	26
Active	16
Cancer treatment[a]	
Chemotherapy	34
Radiation	31
Comorbidity[a]	
Hypertension	34
High cholesterol	20
Arthritis	17
Diabetes	14
Heart disease	14
Lung disease	6
Income ($) (N = 49)	
Less than 20,000	8
20,001–40,000	19
40,001–60,000	9
60,001–80,000	7
80,001–100,000	4
100,001–150,000	2
Education (N = 59)	
Less than high school	5
High school	12
Some college	23
College graduate, professional, or postgraduate	19
Race (N = 61)	
Caucasian	50
African American	6
Hispanic or Latino	3
Asian or other	2
Employment status (N = 57)	
Retired	29
Working full-time	10
On sick leave from work	6
Working part-time	6
Unemployed, seeking work, or homemaker	6
Marital status	
Married or living with another adult	49
Single	13
Physical mobility (N = 60)	
No, do not use mobility device	56
Yes, use mobility device	4

[a] Participants could choose more than one.

analyzed using thematic analysis as described by Braun and Clarke (2006).

Results

Participants

From October 1, 2011, to October 1, 2012, a total of 126 cancer survivors and caregivers who attended the FSFL program were approached about participating in the study. Completed or partially completed surveys were returned by 101 participants. Ninety-seven participants completed the baseline 8-Foot Up-and-Go. Twenty-three participants completed or partially completed the one-month follow-up surveys, and only 18 one-month post-baseline 8-Foot Up-and-Go tests were completed. Seventy-three percent of cancer survivors reported physical inactivity three months prior to participating in the current study. Unfortunately, the caregivers did not disclose their PA prior to starting the study. Tables 1 and 2 list the basic characteristics of the cancer survivors and caregivers.

Quantitative Data

Hypothesis 1, which stated that cancer survivors' reported levels of social support, SEPA, PA, and QOL would be higher than those reported by their caregivers (58% were spouses), was not supported. A Mann-Whitney U test revealed that physical QOL was significantly higher in caregivers (median = 52, n = 38) than cancer survivors (median = 46, n = 57, U = 613, z = –3.57, p = 0.00, r = 0.37). A Wilcoxon signed-rank test revealed no significant differences in social support, SEPA, PA, or mental QOL in cancer survivors or their caregivers at the one-month follow-up visit. Although the Wilcoxon signed-rank test found a nonsignificant change in functional fitness for cancer survivors (z = –1.52, p = 0.13, r = 0.18) and their caregivers (z = –1.83, p = 0.068, r = 0.28) following participation in the exercise program, a decrease occurred in functional fitness scores, indicating an improvement in the two groups. For example, cancer survivor median functional fitness scores decreased from baseline (median = 6.5) to one month post-program (median = 4.84). Similarly, caregiver median functional fitness scores (median = 5.99) decreased one month post-FSFL exercise program (median = 4.22).

Hypothesis 2, which stated that significant positive correlation would occur among social support, SEPA, PA, and QOL in adult cancer survivors and their caregivers, was partially supported. For cancer survivors, Spearman's rho identified a significant relationship between social support–family PA participation and social support–family rewards (r = 0.33, p = 0.007). Mental QOL was associated with physical QOL (r = 0.31, n = 57, p = 0.01). In addition, a negative relationship occurred between physical QOL and PA as measured by the 8-Foot

Up-and-Go (r = –0.31, n = 56, p = 0.011) (one-tailed), indicating that cancer survivors reporting higher physical QOL scores had better PA performance scores (see Table 3). No other significant relationships were identified in cancer survivors.

Similarly, in caregivers, Spearman's rho identified a significant relationship between family–PA participation and family rewards (r = 0.47, n = 34, p = 0.003). self-efficacy–making time for PA was significantly related to self-efficacy–relapse (r = 0.81, n = 28, p = 0.00), and PA was significantly related to friend–PA participation (r = 0.45, n = 33, p = 0.004) (one-tailed) (see Table 4). No other significant relationships were identified in caregivers.

Qualitative Data

Interview data and responses to open-ended question from 20 participants were analyzed using thematic analysis as described by Braun and Clarke (2006). In the first step, responses to the open-ended question and interviews were read and re-read by the PI to code and organize the information. That was followed by the PI sorting codes into potential themes. In the final step, the PI selected examples to display in a qualitative narrative to assist in the interpretation or meaning of social support. Three main themes were identified that described cancer survivors' and caregivers' perceptions of social support: companionship, motivation, and health promotion.

Companionship: Some of the participants perceived social support as a source of companionship, or having someone with whom to share the PA experience. Participation in the PA program was perceived as a form of socialization or camaraderie for the participants.

> [I was] living alone, [my] spouse recently passed away, [and I was] having episodes of depression and loneliness. I started the exercise program to meet new friends.

> I think it [was] good to begin exercising with other people that have the same problems, discussing your problems, listening to theirs, and seeing how you can help each other.

Motivation: Many of the participants perceived social support as a source of motivation, or having someone to encourage or motivate them to participate in PA. One participant described motivation as seeing other cancer survivors participating in PA, which subsequently increased her SEPA.

> It's very encouraging to see other people that are going through the same health issues that I am, and to know that, if they can exercise, so can I.

Other participants described social support as family and friends offering words of encouragement, which motivated them to become physically active and adhere to a PA program.

> Well, social support is talking with my friend and the people I met at the exercise program—they encourage you to exercise.

> Social support to me is my sister, she's there for me no matter what I might need, and she goes to the exercise class with me.

> Social support, well, gives you encouragement to exercise and makes me feel more healthy and fit.

> Social support, oh, it's just a way to be encouraged to attend the exercise program to make sure you improve your life.

Table 2. Caregiver Characteristics (N = 39)		
Characteristic	**X̄**	**SD**
Age (years)	62.1	13.8
Characteristic		**n**
Gender		
Female		29
Male		10
Comorbidity[a]		
Hypertension		17
High cholesterol		15
Arthritis		9
Diabetes		3
Heart disease		3
Lung disease		–
Income ($) (N = 33)		
Less than 20,000		6
20,001–40,000		9
40,001–60,000		8
60,001–80,000		5
80,001–100,000		5
100,001–150,000		–
Education (N = 35)		
Less than high school		1
High school		9
Some college		10
College graduate		9
Professional or postgraduate		6
Race (N = 36)		
Caucasian		30
African American		4
Hispanic or Latino		2
Asian or other		–
Employment status (N = 37)		
Retired		17
Unemployed or homemaker		8
Working full-time		8
Working part-time		4
On sick leave from work		–
Unemployed, seeking work		–
Marital status		
Married or living with another adult		30
Single		9
Physical mobility (N = 24)		
Yes, use device for mobility		21
No, do not use mobility device		3

[a] Participants could choose more than one.

Table 3. Summary of Correlations Among Study Variables in Cancer Survivors

Variable	1	2	3	4	5	6	7	8
1. SS–Family participation	1							
2. SS–Family rewards	0.328*	1						
3. SS–Friend participation	–0.222	–0.005	1					
4. Self-efficacy–Relapse	0.112	–0.172	–0.168	1				
5. Self-efficacy–Making time	0.145	–0.164	–0.24	0.84*	1			
6. Physical quality of life	–0.014	–0.225*	0.018	0.096	0.139	1		
7. Mental quality of life	0.105	0.012	–0.02	0.109	0.309*	0.454*	1	
8. 8-Foot Up-and-Go	–0.131	0.08	0.021	0.006	–0.001	–0.307*	–0.087	1

* Spearman's rho correlation significant at Bonferroni corrected 0.013 level (one-tailed).

SS—social support

Well, it just helps to have somebody to talk to and get encouragement to improve my health.

Health promotion: A theme expressed by some participants was the perception of social support as a link to health promotion. For example, participants expressed that the PA program served as a means to facilitate their engagement in PA, which improved mobility, decreased stress, and improved health.

Exercise makes me feel more mobile and agile; it's something that I need to do, it's just common sense. I think it's good that the community has an exercise program.

Physical activity gets rid of stress, walking, getting up, keeps me from feeling so stressful.

Social support makes me feel better, it's all encompassing. I have more energy throughout the day when I exercise. I can perform more activities on a daily basis.

Discussion

This study investigated differences between adult cancer survivors and their caregivers' social support, SEPA, PA, and QOL, and found no significant differences in the two groups except that caregivers' physical QOL was significantly higher than that of the cancer survivors at baseline. Caregiver reports of higher physical QOL are consistent with previous studies that evaluated QOL in caregivers of patients with cancer and found that not all caregivers perceive caregiver burden as affecting their mental or physical health (Blum & Sherman, 2010). In contrast to the current study, previous research has shown that family caregivers who are actively involved in cancer caregiving during long-term survivorship report worse levels of QOL (Youngmee, Spillers, & Hall, 2012). Surprisingly, no significant differences were observed in social support, SEPA, PA, and QOL over time among cancer survivors and

their caregivers following participation in an exercise program over one month. That was an unexpected finding, particularly for PA, because previous research had demonstrated that four weeks was an adequate amount of time to see a difference in balance and aerobic activity (Han et al., 2009; Mustian et al., 2009).

The current study also investigated the relationships among adult cancer survivors and their caregivers' social support, SEPA, PA, and QOL. In cancer survivors, significant relationships were found among social support in family PA participation and social support in family rewards, mental QOL and physical QOL, and mental QOL and self-efficacy–making time, and a negative relationship was found between physical QOL and PA in cancer survivors. These findings are consistent with previous research demonstrating relationships among social support, self-efficacy, PA, and QOL in cancer survivors (Barber, 2012; Grimmett, Bridgewater, Steptoe, & Wardle, 2011; Haas, 2011; James et al., 2006; Speed-Andrews & Courneya, 2009).

In caregivers, a significant relationship occurred between social support in family PA participation and social support in family rewards; self-efficacy–making time was significantly related to self-efficacy–relapse; and PA was significantly related to friend PA participation. No studies were found specifically evaluating caregiver social support, SEPA, PA, and QOL. However, research evaluating PA, SEPA, and health-related QOL in middle-aged adults found that PA was associated with reduced bodily pain, improved general health, improved vitality, and reduced emotional distress (Imayama et al., 2013).

The results from the qualitative data supported the findings of significant relationships between social support, PA, and QOL. For example, the qualitative data demonstrated that social support in the form of companionship (peer support), motivation, or health promotion influences or facilitates PA through modeling of healthy behaviors, providing encouragement, reducing stress, or improving health. These themes

are consistent with previous research that found that older adults who have a resourceful social network are more likely to participate in health-related behaviors (Shiovitz-Ezra & Litwin, 2012).

Several possibilities exist that might explain the nonsignificant findings among adult cancer survivors and their caregivers' social support, SEPA, PA, and QOL in the current study. For example, the small sample size in the current study may have altered the statistical power of the study (Portney & Watkins, 2009). Other methodologic or design problems that may have affected the findings include sample location and a lack of community stakeholder involvement in study conception and design. In general, having community members involved in the design and implementation of a study increases their empowerment and ownership of the research process and outcome (Maiter, Simich, Jacobson, & Wise, 2008). In addition, the social support questionnaire used in the current study was validated in survivors of breast, lung, and head and neck cancers; however, this one-dimensional scale may not have adequately captured the meaning of perceived social support or the questionnaire items were not be relevant to the participants.

Several participant problems were encountered during the current study that might explain a lack of significant findings. Recruiting dyads (i.e., cancer survivors and caregivers) for the current study was a difficult task for the FSFL staff and the research assistant. Only 101 participants (62 cancer survivors and 39 caregivers) were recruited during a 12 month period, and only 23 (15 cancer survivors and 8 caregivers) returned to complete the one-month post-baseline questionnaire. Voils et al. (2011) suggested that researchers should minimize travel time to study site and budget for incentives for participants and staff to increase recruitment efforts.

Finally, many cancer survivors did not return to FSFL to complete the one-month post-baseline survey secondary to illness; conflicting priorities and not being able to identify a caregiver to participate in the current study resulted in a high attrition rate. That is consistent with previous research demonstrating that adult cancer survivors have limited opportunity to participate in PA because of problematic levels of symptoms, stressful life events, and poor social support (Alfano et al., 2009). In addition to the high attrition rate contributing to the poor statistical power of the current study, many of the questionnaires that were returned were missing data or completed incorrectly. According to Bowling (2005), self-report questionnaires are considered the most burdensome mode of obtaining information from participants because self-administration surveys require respondents to be literate, have no visual or dexterity impairments, and may cause easy fatigability.

Limitations

Several limitations existed with this study. First, the use of self-reported questionnaires was subject to recall bias. Second, the use of a convenience sample decreased the potential for generalizing study results to other cancer survivors and caregivers who did not participate in FSFL. Another limitation is the small sample size in the quantitative data, missing questionnaire data, and the high attrition rate, which may impact the study's ability to find significant relationships or differences in social support, SEPA, PA, and QOL in cancer survivors and their caregivers. Finally, the sample consisted mainly of well-educated Caucasian women with breast cancer, which limits generalizing the study findings to men, minority groups, and survivors of other cancer types.

Nursing Implications

Even with its limitations, the present study suggests that social support is an important aspect of PA participation in adult cancer survivors. In planning interventions to increase social support, SEPA, PA, and QOL in adult cancer survivors, nurses may consider strategies that encourage active participation of caregivers. Nurses are in a unique position to offer evidence-based information to cancer survivors and caregivers on the importance of adopting and maintaining a healthy lifestyle that

Table 4. Summary of Correlations Among Study Variables in Caregivers

Variable	1	2	3	4	5	6	7	8
1. SS–Family participation	1							
2. SS–Family rewards	0.47*	1						
3. SS–Friend participation	0.127	–0.079	1					
4. Self-efficacy–Relapse	0.067	0.171	–0.065	1				
5. Self-efficacy–Making time	–0.079	0.042	0.149	0.813*	1			
6. Physical quality of life	–0.034	0.277	–0.173	0.009	0.276	1		
7. Mental quality of life	–0.065	–0.102	–0.182	0.14	0.021	0.137	1	
8. 8-Foot Up-and-Go	0.14	–0.006	0.453*	0.262	0.202	–0.026	–0.015	1

* Spearman's rho correlation significant at Bonferroni corrected 0.013 level (one-tailed).
SS—social support

includes PA. Nurses may consider encouraging cancer survivors and caregivers to openly discuss their social support needs and supporting their participation in strategies that will improve their PA and QOL. Future research should focus on a study evaluating social support, SEPA, PA, and QOL using a multidimensional social support instrument and incentives for participants to minimize low recruitment and high attrition rates. Given the under-representation of minority cancer survivors and caregivers in the current study, future research should focus on strategies to encourage minority recruitment or inclusion in similar studies.

Conclusion

Significant gaps exist in the literature regarding the relationships among social support, SEPA, PA, and QOL in adult cancer survivors and their caregivers. More research is needed to gain a better understanding of social support and PA in cancer survivors and their caregivers using different social support measurements and incentives to improve participant accrual rates. A better understanding of these complex relationships will help oncology healthcare providers tailor supportive strategies that will encourage PA in cancer survivors and caregivers and improve QOL.

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References

Alfano, C.M., Day, J.M., Katz, M.L., Herndon, J.E., Bittoni, M.A., Oliveri, J.M., . . . Paskett, E.D. (2009). Exercise and dietary change after diagnosis and cancer-related symptoms in long-term survivors of breast cancer: CALGB 79804. *Psycho-Oncology, 18*, 128–133.

American Association of Retired Persons. (2009). *Caring in the U.S.* Retrieved from http://www.caregiving.org/pdf/research/CaregivingUSAllAgesExecSum.pdf

American College of Sports Medicine. (2007). Physical inactivity and obesity translates into economic impact: Experts profile the cost to U.S. health system. *Medical News Today*. Retrieved from http://www.medicalnewstoday.com/releases/73484.php

American College of Sports Medicine. (2010). New guidelines strongly recommend exercise for cancer patients, survivors. Retrieved from http://www.acsm.org/about-acsm/media-room/news-releases/2011/08/01/new-guidelines-strongly-recommend-exercise-for-cancer-patients-survivors

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York, NY: W.H. Freeman.

Bandura, A. (2002). Social cognitive theory of mass communication. In J. Bryant & D. Zillman (Eds.), *Media effects: Advances in theory and research* (2nd ed., pp. 94–124). Hillsdale, NJ: Erlbaum.

Bandura, A. (2004). Health promotion by social cognitive means. *Health Education and Behavior, 31*, 143–164.

Barber, F.D. (2012). Social support and physical activity engagement by cancer survivors [Online exclusive]. *Clinical Journal of Oncology Nursing, 16*, E84–E98. doi:10.1188/12.CJON.E84-E98

Blum, K., & Sherman, D.W. (2010). Understanding the experience of family caregivers: A focus on transitions. *Seminars in Oncology Nursing, 26*, 243–258.

Bowling, A. (2005). Mode of questionnaire administration can have serious effects on data quality. *Journal of Public Health, 27*, 281–291.

Branchard, C.M., Courneya, K.S., & Stein, K. (2008). Cancer survivors' adherence to lifestyle behavior recommendations and associations with health-related quality of life: Results from the American Cancer Society's SCS-II. *Journal of Clinical Oncology, 26*, 2198–2204.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 77–101. doi:10.1191/1478088706qp063oa

Bureau of Labor Statistics. (2008). Sports and exercise. Retrieved from http://www.bls.gov/spotlight/2008/sports/

Grimmett, C., Bridgewater, J., Steptoe, A., & Wardle, J. (2011). Lifestyle and quality of life in colorectal cancer survivors. *Quality of Life Research, 20*, 1237–1245.

Haas, B.K. (2011). Fatigue, self-efficacy, physical activity, and quality of life in women with breast cancer. *Cancer Nursing, 34*, 322–334. doi:10.1097/NCC.0b013e3181f9a300

Hamer, M., Stamatakis, E., & Saxton, J.M. (2009). The impact of physical activity on all-cause mortality in men and women after a cancer diagnosis. *Cancer Causes and Control, 20*, 225–231.

Han, K., Richard, M.D., & Fellingham, G.W. (2009). Effects of a 4-week exercise program on balance using elastic tubing as a perturbation force for individuals with a history of ankle sprains. *Journal of Orthopaedic and Sports Physical Therapy, 39*, 246–255.

Imayama, I., Alfano, C., Mason, C.E., Wang, C., Xiao, L., Duggan, C., . . . McTiernan, A. (2013). Exercise adherence, cardiopulmonary fitness and anthropometric changes improve exercise self-efficacy and health-related quality of life. *Journal of Physical Activity and Health, 10*, 676–689.

James, A.S., Campbell, M.K., DeVellis, B., Reedy, J., Carr, C., & Sandler, R.S. (2006). Health behavior correlates among colon cancer survivors: NC STRIDES baseline results . . . strategies for improving diet, exercise, and screening. *American Journal of Health Behavior, 30*, 720–730.

Maiter, S., Simich, L., Jacobson, N., & Wise, J. (2008). Reciprocity: An ethic for community-based participatory action research. *Action Research, 6*, 305–325.

McNeill, L.H., Kreuter, M.W., & Subramanian, S.V. (2006). Social environment and physical activity: A review of concepts and evidence. *Social Science and Medicine, 63*, 1011–1022. doi:10.1016/j.socscimed.2006.03.012

Mustian, K.M., Peppone, L., Darling, T.V., Palesh, O., Heckler, C.E., & Morrow, G.R. (2009). A four-week home-based aerobic and resistance exercise program during radiation therapy: A pilot randomized clinical trial. *Journal of Supportive Oncology, 7*, 158–167.

Peterson, J.A., Yates, B.C., & Hertzog, M. (2008). Heart and soul physical activity program: Social support outcomes. *American Journal of Health Behavior, 32*, 525–537.

Portney, L.G., & Watkins, M.P. (2009). *Foundations of clinical research applications to practice.* Upper Saddle River, NJ: Pearson Prentice Hall.

Resnick, B., Luisi, D., & Vogel, A. (2008). Testing the senior exercise self-efficacy project (SESEP) for use with urban dwelling minority older adults. *Public Health Nursing, 25*, 221–234.

Rikli, R.E. & Jones, C.S. (1999). Development and validation of a functional fitness test for community-residing older adults. *Journal of Aging and Physical Activity, 7*, 129–161.

Sallis, J.F., Grossman, R.M., Pinski, P.B., Patterson, T.L., & Nader, P.R. (1987). The development of scales to measure social support for diet and exercise behaviors. *Preventive Medicine, 16*, 825–836.

Sallis, J.F., Pinski, P.B., Grossman, R.M., Patterson, T.L., & Nader, P.R. (1988). The development of self-efficacy scales for health-related diet and exercise behaviors. *Health Education Research, 3,* 283–292.

Shibata, K.N. (2008). *Reliability and validity of the 8-Foot Up-and-Go test as a measure of dynamic balance and functional mobility in persons with fibromyalgia.* (Master's thesis). Available from ProQuest Dissertations and Theses database. (UMI No. 1454813)

Shiovitz-Ezra, S., & Litwin, H. (2012). Social network type and health-related behaviors: Evidence form an American National Survey. *Social Science and Medicine, 75,* 901–904.

Speed-Andrews, A.E., & Courneya, K.S. (2009). Effects of exercise on quality of life and prognosis in cancer survivors. *Current Sports Medicine Reports, 8,* 176–181.

Van Ryn, M., Sanders, S., Kahn, K., van Houtven, C., Griffin, J.M., Martin, M., . . . Rowland, J. (2011). Objective burden, resources, and other stressors among informal cancer caregivers: A hidden quality issue? *Psycho-Oncology, 20,* 44–52. doi:10.1002/pon.1703

Voils, C.L., Yancy, W.S., Jr., Weinberger, M., Bolton, J., Coffman, C.J.,

Jeffreys, A., . . . Bosworth, H.B. (2011). The trials and tribulations of enrolling couples in a randomized, controlled trial: A self-management program for hyperlipidemia as a model. *Patient Education and Counseling, 84,* 33–40. doi:10.1016/j.pec.2010.06.005

Ware, J.E., Kosinski, M., Dewey, J.E., & Gandek, B. (2001). How to score and interpret single-item health status measures: A manual for users of the SF8 health survey. Lincoln, RI: Quality Metric, Inc.

World Health Organization. (2010). 10 facts on physical activity. Retrieved from http://www.who.int/features/factfiles/physical_activity/en/index.html

World Health Organization. (2011). New physical activity recommendations for reducing disease and preventing deaths. Retrieved from http://www.who.int/chp/media/news/releases/2011_2_physicalactivity/en/

Youngmee, K., Spillers, R.L., & Hall, D.L. (2012). Quality of life of family caregivers 5 years after relative's cancer diagnosis: Follow-up of the national quality of life survey for caregivers. *Psycho-Oncology, 21,* 273–281. doi:10.1002/pon.1888

For Further Exploration

Use This Article in Your Next Journal Club Meeting

Journal club programs can help to increase your ability to evaluate literature and translate findings to clinical practice, education, administration, and research. Use the following questions to start discussion at your next journal club meeting. Then, take time to recap the discussion and make plans to proceed with suggested strategies.

1. How often do we as nurses encourage cancer survivors to participate in regular exercise?
   a. What are some of the reasons for this?
   b. Do our own actions influence this?
2. This study clearly showed that caregivers have an important role to play in this. How can we encourage caregivers to be more active and encouraging of the cancer survivors in their families?
3. In this study the quality of life of caregivers was higher than previously reported in the literature. How can we translate this evidence to our patients and their families to encourage greater participation in physical activity?

Photocopying of this article for discussion purposes is permitted.

Author Sheds New Light on Topics Discussed in This Article

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