

Factors That Influence Health-Promoting Behaviors in Cancer Caregivers

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OBJECTIVES: To describe cancer caregivers' participation in health-promoting behaviors and to identify factors influencing participation.

SAMPLE & SETTING: 129 informal cancer caregivers at the National Institutes of Health Clinical Center.

METHODS & VARIABLES: Cross-sectional survey methodology using Health-Promoting Lifestyle Profile-II (HPLP-II), PROMIS® Global Physical Health, NIH Toolbox Stress and Self-Efficacy, Caregiver Reaction Assessment, and Family Care Inventory Mutuality subscale.

RESULTS: Caregivers reported the highest HPLP-II subscale scores for spirituality and interpersonal relationships and the lowest for physical activity. Caregivers who were older, with lower body mass indices, in better physical health, and with higher self-efficacy and mutuality participated in more health-promoting behaviors. Sixty percent of the caregivers reported that they exercised less since becoming a caregiver, and 47% reported that their diet was worse.

IMPLICATIONS FOR NURSING: Future research is needed to examine novel interventions to increase health-promoting activities in cancer caregivers, and these interventions might be strengthened by including components that focus on increasing self-efficacy and/or improving the strength of the relationship between the caregiver and care recipient.

KEYWORDS caregiver; cancer; health behaviors; health-promoting behaviors; exercise; nutrition
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Being an informal caregiver (i.e., providing unpaid care for a sick or disabled family member or friend) increases one's risk of all-cause mortality, particularly from lifestyle- and stress-related diseases, such as cardiovascular disease (Schulz & Beach, 1999). Although caregiving can be rewarding, providing care for an individual with cancer is stressful and can take a toll on physical and mental health (Adelman et al., 2014; Gibbons et al., 2014; Kim et al., 2015; Wood et al., 2019). Indeed, changes in physical health in caregivers appear to be associated with the psychological stress of caregiving rather than the physical demands of caregiving (Pinquart & Sorensen, 2007) or the disease severity of the patient (Kim et al., 2015). Participating in health-promoting behaviors such as exercising, eating a healthy diet, and practicing stress-reduction activities provide protection against lifestyle- and stress-related diseases. However, caregivers tend to prioritize the needs of the care recipient over their own needs, including health-promoting self-care (Gibbons et al., 2014). The objectives of this study were twofold: to describe the health-promoting self-care behaviors practiced by informal caregivers of individuals with cancer, and to identify those factors that influence participation in health-promoting behaviors in caregivers.

Background

Providing care for a family member or friend with cancer can be demanding and may include multiple responsibilities, such as preparing meals, driving to medical appointments, maintaining the home, monitoring symptoms, administering medications and treatments, coordinating medical care, and providing emotional and physical support. Caregiver participation in health-promoting activities is important because healthy, prepared caregivers are in a better position to meet the demands associated with cancer

caregiving (Kent et al., 2016). Caregivers who participate in more health-promoting self-care activities may cope better (Litzelman et al., 2018) and/or be better prepared/more effective caregivers (Dionne-Odom et al., 2017). In addition, the health and well-being of the caregiver may have a direct impact on the health and well-being of the individual with cancer (Litzelman & Yabroff, 2015).

According to Pender et al.'s (2011) health promotion conceptual model, certain personal factors such as age, socioeconomic status, physical and mental health, and levels of self-efficacy influence participation in health-promoting behaviors. Interpersonal factors, such as social support, and situational/environmental factors, such as employment status, caregiving demands, and time for/access to health promotion resources, may also influence participation in health-promoting self-care. However, factors that influence participation in health-promoting behaviors in cancer caregivers have received little research attention (Kim & Given, 2008; Ross et al., 2013).

Cuthbert et al. (2017) found that cancer caregivers who were older, in poorer physical health, and who provided more hours of care per week were less likely to engage in physical activity. Mazanec et al. (2011) found a relationship between caregiver burden, but not caregiving hours, and physical activity. Other researchers found no relationship between caregiving hours or caregiver burden and caregiver physical activity (Dich et al., 2016; Rha et al., 2015). Dionne-Odom et al. (2017) found that the health behaviors practiced most frequently by caregivers included engaging in spiritual practices and interpersonal relationships, whereas physical activity was practiced the least; caregivers who practiced fewer health-promoting behaviors were less prepared and had lower decision making self-efficacy (Dionne-Odom et al., 2017).

Social support and interpersonal relationships appear to play a role in health-promoting self-care in cancer caregivers. Barber (2013) found that levels of social support positively influenced participation in physical activity in individuals with cancer and their caregivers. Ellis et al. (2017) found that caregivers with higher levels of social support were more likely to engage in physical activity and to eat a nutritious diet. Of note, these researchers discovered a partner effect whereby higher levels of social support in both the caregiver and the individual with cancer were associated with the consumption of a healthier diet in their respective partner. Although it makes intuitive sense that living with an individual with cancer may

prompt caregivers to obtain needed cancer prevention health screenings, the evidence regarding this is mixed (Reeves et al., 2012; Rha et al., 2015).

In a literature review examining cancer caregiver interventions, the concentration was primarily on the delivery of information (54%) and/or skill development (31%), with only 15% of the studies focusing on self care (Ugalde et al., 2019). Although some researchers have examined health-promoting behaviors in cancer caregivers, the evidence regarding factors associated with cancer caregiver participation in health-promoting self-care is minimal and sometimes conflicting. Therefore, a better understanding of factors that contribute to health-promoting self-care in family caregivers is warranted. This study describes the health-promoting self-care behaviors practiced by informal caregivers of individuals with cancer, and identifies the personal, interpersonal, and situational factors that influence participation in health-promoting behaviors in caregivers.

Methods

A cross-sectional design was used to collect information about health-promoting activities in informal cancer caregivers at the National Institutes of Health (NIH) Clinical Center in Bethesda, Maryland.

Sample and Setting

This study was approved by the institutional review board (IRB) of the National Heart, Lung, and Blood Institute (NHLBI) at the NIH. All procedures performed in this study involving human participants were in accordance with the ethical standards of the NHLBI IRB and with the 1964 Helsinki declaration. Written informed consent was obtained from caregivers prior to initiating any study procedures. The cancer care recipients were not enrolled as participants but, rather, provided authorization to review their medical records to collect basic demographic, disease, and treatment information. This study took place from March 2014 to July 2016 at the NIH Clinical Center, a federal research facility with a 200-bed inpatient hospital and a full complement of outpatient clinics, dedicated primarily to early-phase clinical trials. Primary results from this study were published previously (Klagholz et al., 2018). Participants were eligible if they were aged 18 years or older, were literate in English or Spanish, had an active informal caregiver, were beginning cancer treatment (plus or minus 14 days) at the NIH Clinical Center, and had access to the Internet. Prior to enrolling participants, a member of the research team introduced the study to

TABLE 1. Caregiver Characteristics (N = 129)

Characteristic	\bar{X}	SD
Age (years)	48.6	11.8
Characteristic	Median	Range
Length of caregiving (months)	18	0.3–276
Hours of caregiving (per day)	9.5	1–24
Characteristic	n	%
Sex		
Female	87	67
Male	42	33
Race (N = 128)		
White non-Hispanic	91	71
Hispanic/Latinx	19	15
Black	18	14
Education level		
High school graduate or less	7	5
Some college/associate degree	43	33
Bachelor's degree	35	27
Postgraduate degree or higher	44	34
Annual household income (\$)		
Less than 50,000	35	27
50,000–89,000	28	22
89,001 or more	57	44
No response	9	7
Employment status^a		
Employed	95	74
Marital status		
Married	107	84
Relation to patient		
Spouse	64	50
Parent	45	35
Other	20	16
Caregiver role		
Sole caregiver	59	46
Part of a team	70	54
Double-duty caregiver^b		
Yes	43	34
Live with the patient?		
Yes	100	78

^aEmployment includes both full-time (n = 74) and part-time (n = 21) employment; caregivers not employed were either unemployed (n = 23) or retired (n = 11).

^bDouble-duty caregivers are those who provide care to 1 or more people in addition to the individual with cancer.

Note. Caregiver ages ranged from 20 to 76 years.

Note. Because of rounding, percentages may not total 100.

the individual with cancer to determine if they would be supported by an active informal caregiver during their study participation and to obtain permission to approach the caregiver to provide study information. Active informal caregivers were defined as someone who would be providing unpaid emotional and/or physical support for at least six months during their cancer treatment.

Demographic Characteristics

The authors collected self-reported information about age, sex, race, ethnicity, education level, annual household income, employment status, marital status, and relationship with patient. The authors also collected information about the amount of caregiving (hours per day and number of months), caregiver role (sole caregiver versus part of a caregiving team), and living situation (lives with/apart from the patient), as well as whether or not the caregiver was a double-duty caregiver. For the purpose of this study, the authors defined a double-duty caregiver as one that provides care for another individual in addition to the individual with cancer, versus caring exclusively for the individual with cancer. Self-reported height and weight for calculating body mass index (BMI) were also collected. Cancer care recipient information obtained via hospital records included age, patient type (pediatric or adult), cancer type, cancer treatment type, and hospital status (inpatient/outpatient).

Descriptive data about caregivers and care recipients are detailed in Tables 1–3. A total of 309 caregivers were screened for participation. Upon review, 55 were classified as not eligible and 115 were eligible but declined participation. An additional 10 caregivers were lost to follow-up, were no longer interested, or had changes to treatment plans. This left a total of 129 caregivers enrolled. Caregivers had a mean age of 48.6 years (SD = 11.8), were primarily female (n = 87, 67%), were married or partnered (n = 107, 84%), and were White non-Hispanic (n = 91, 71%). The majority of caregivers (61%) had completed either a bachelor's degree (n = 35, 27%) or graduate/postgraduate education (n = 44, 34%). They were caring for a variety of individuals with cancer (N = 111), who had a mean age of 41.6 years (SD = 18.6) and were mostly male (n = 61, 55%). The most frequent of the 26 different cancer types were melanoma (n = 22, 20%) and acute lymphocytic leukemia (n = 16, 14%).

Instruments

Health-Promoting Lifestyle Profile–II: The Health-Promoting Lifestyle Profile–II (HPLP-II) is a 52-item

instrument that collects information regarding frequencies of participation in health-promoting behaviors at the present time (Walker et al., 1987). This measure contains six subscales: health responsibility (attending to/taking responsibility for one's own health), physical activity, nutrition, spiritual growth, interpersonal relationships, and stress management. Responses are rated on a four-point Likert-type scale ranging from 1 (never) to 4 (routinely). The subscales are scored by calculating the mean of the items for each subscale, and the HPLP-II total score is the mean of all items in the scale. Total and subscale scores range from 1 to 4, with higher scores indicating more engagement in health-promoting behaviors. The HPLP-II and its subscales have been validated in English- and Spanish-speaking populations (Walker et al., 1988, 1990), and performed reliably well in other studies of informal caregivers (Ross et al., 2017). For the current study, this questionnaire had a Cronbach's alpha of 0.94.

Caregiver Reaction Assessment: The Caregiver Reaction Assessment (CRA) is a 24-item self-administered scale that measures the positive and negative effects of caregiving in five domains: caregiver esteem (7 items), lack of family support (5 items), impact on finances (3 items), impact on schedule (5 items), and impact on health (4 items) (Given et al., 1992). This measure is a valid and reliable tool for use in caregivers of individuals with cancer (Nijboer et al., 1999). Responses are rated using a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The five subscales (caregiver esteem, lack of family support, impact on finances, impact on schedule, and impact on health) are scored by calculating the mean of the subscale's items after appropriate reversals, with a range of 1 to 5. Higher subscale scores indicate more burden, except caregiver esteem, where a higher score indicates less burden and higher caregiver esteem (Given et al., 1992). A total score, representing overall caregiver burden, is obtained by calculating the mean of all 24 items (Grov et al., 2006). This instrument demonstrated a Cronbach's alpha of 0.86 in this study.

Family Care Inventory mutuality: The Family Care Inventory (FCI) is a valid composite measure of seven variables associated with caregiver strain (Archbold et al., 1990). The FCI Mutuality Scale within this larger inventory is a measure of the strength of the relationship between the caregiver and care recipient, self-reported by the caregiver in this study. Developed for use in older adult populations, it has been used in cancer populations as well (Schumacher et al., 2007, 2008). The 15-item scale addresses the relationship

dimensions of reciprocity, love, shared pleasurable activities, and shared values between the caregiver and the care recipient. Responses are rated on a five-point Likert-type scale ranging from 0 (not at all) to 4 (a great deal). Subscales are scored by calculating the mean of the items for each subscale, and the total mutuality score is the mean of all items in the scale. Scores range from 0 to 4, with higher scores reflective

TABLE 2. Patient Characteristics (N = 111)

Characteristic	\bar{X}	SD
Age (years)	41.6	18.6
Characteristic	n	%
Sex		
Male	61	55
Female	50	45
Patient type		
Adult	84	76
Pediatric	27	24
Cancer type^a		
Carcinoma	52	47
Leukemia	25	23
Sarcoma	23	21
Lymphoma	10	9
Myeloma	1	1
Cancer treatment type		
Biotherapy/immunotherapy	69	62
Allogeneic HSCT ^d	11	10
Chemotherapy	10	9
Surgery	10	9
Other ^b	11	10
Hospital status		
Inpatient	92	84

^aCancer type is based on National Cancer Institute Surveillance, Epidemiology, and End Results (SEER) Program cancer classification categories. In this study, carcinoma includes prostate, melanoma, anal, breast, lung, colon, liver, cervical, ovarian, adrenal cortical, pancreatic, kidney, thyroid, and peritoneal cancers. Leukemia includes chronic myelogenous leukemia, acute lymphocytic leukemia, acute myelogenous leukemia, and chronic lymphocytic leukemia. Sarcoma includes brain, gastrointestinal stromal tumor, and desmoid tumors. Lymphoma includes thymoma, Hodgkin, and non-Hodgkin lymphoma. Myeloma includes multiple myeloma.

^bOther treatment types include radiation therapy (n = 3) and combination therapy (n = 8).

HSCT—hematopoietic stem cell transplantation

Note. Patient ages ranged from 4 to 76 years.

Note. Because of rounding, percentages may not total 100.

of a better caregiver–patient relationship. In this study, the scale demonstrated a Cronbach’s alpha of 0.95.

PROMIS® and NIH Toolbox measures: The PROMIS® (Patient-Reported Outcomes Measurement Information System) and NIH Toolbox are validated and reliable measures of self-reported health outcomes (Cella et al., 2010; Gershon et al., 2013). PROMIS measures captures the domains of physical, mental, and social well-being, whereas the NIH Toolbox measures address cognitive, emotional, sensory, and motor functions. PROMIS measures of global physical health and sleep disturbance, as well as NIH Toolbox measures of self-efficacy and

perceived stress, were used in this study. Individual items are rated using a five-point Likert-type scale ranging from 1 to 5, with higher scores indicative of higher levels of the concept being measured, which in the case of self-efficacy and physical health can be positive. Higher scores of sleep disturbance or perceived stress represent worsening of those symptoms. PROMIS global physical health was measured using an eight-item questionnaire. All other measures were delivered using computer adaptive testing, which uses validated algorithms to adapt a test based on the participant’s response. PROMIS measures generate a raw score from which t scores, which are standardized

TABLE 3. Caregiver Health Variables and Scores (N = 129)

Characteristic	\bar{X}	SD	Range
Body mass index	27.1	5.5	17.2–43.4
Physical health ^a	51.7	7.8	19.9–67.7
Perceived stress ^a	52	9.8	31.5–85.4
Self-efficacy ^a	51.7	9.4	17.3–68.4
Sleep disturbance ^a	54	7.9	26.4–83.8
Caregiver burden ^b	2.3	0.5	1.2–4.3
Mutuality ^c	3.3	0.7	0.3–4
Health-Promoting Lifestyle Profile–II^d	2.6	0.5	1.4–3.8
Spiritual growth	3	0.6	1.3–4
Interpersonal relationships	3	0.6	1.7–4
Nutrition	2.8	0.5	1.3–3.8
Health responsibility	2.4	0.5	1.2–4
Stress management	2.4	0.6	1.1–4
Physical activity	2.3	0.8	1–4
Characteristic	n	%	
Since becoming a caregiver, I exercise less.			
Agree/strongly agree	77	60	
Neither agree nor disagree	23	18	
Disagree/strongly disagree	27	21	
No response	2	1	
Since becoming a caregiver, my diet is worse.			
Agree/strongly agree	60	47	
Neither agree nor disagree	26	20	
Disagree/strongly disagree	41	32	
No response	2	1	
^a Measured using PROMIS® and/or NIH Toolbox t scores that are normed to the general population (\bar{X} = 50, SD = 10)			
^b Measured with the Caregiver Reaction Assessment. Scores range from 1 to 5, and higher scores indicate higher caregiver burden.			
^c Measured with the Family Care Inventory Mutuality scale. Scores range from 0 to 4, with higher scores reflective of a better caregiver–patient relationship.			
^d Measured with the Health-Promoting Lifestyle Profile–II. Scores range from 1 to 4, with higher scores indicative of more frequent participation in health-promoting behaviors.			
NIH—National Institutes of Health; PROMIS—Patient-Reported Outcomes Measurement Information System			

scores that are normed to the general population with a mean of 50 (SD = 10), are calculated.

Perceptions of health-promoting behaviors: Caregivers were asked, “On a scale of 1 to 5, how much

do you agree or disagree with the following two statements?” “Since becoming a caregiver,” (a) “I exercise less” and (b) “my diet is worse.” Caregivers were asked to report their level of agreement based on a

TABLE 4. Predictors of Health-Promoting Behaviors

Health Outcome	B	SE	β	t	p
HPLP-II Total Score					
Self-efficacy	0.02	0.004	0.395	5.472	< 0.001
Physical health	0.013	0.005	0.224	2.919	0.004
Mutuality	0.155	0.045	0.239	3.424	0.001
BMI	-0.017	0.006	-0.206	-2.9	0.004
Age	0.006	0.003	0.162	2.444	0.016
HPLP-II Subscale					
Health responsibility					
Self-efficacy	0.025	0.005	0.424	5.262	< 0.001
Age	0.008	0.004	0.182	2.257	0.026
BMI	-0.017	0.008	-0.174	-2.192	0.03
Physical activity					
Physical health	0.032	0.009	0.323	3.72	< 0.001
BMI	-0.046	0.011	-0.327	-4.271	< 0.001
Self-efficacy	0.023	0.007	0.272	3.491	0.001
Mutuality	0.193	0.081	0.178	2.394	0.018
Sleep disturbance	0.016	0.008	0.153	1.982	0.05
Nutrition					
Physical health	0.027	0.006	0.39	4.716	< 0.001
Age	0.01	0.004	0.214	2.58	0.011
Spiritual growth					
Perceived stress	-0.022	0.005	-0.379	-4.229	< 0.001
Mutuality	0.244	0.054	0.306	4.492	< 0.001
Self-efficacy	0.014	0.005	0.235	2.71	0.008
Interpersonal relationships					
Race/ethnicity (group 2) ^a	0.344	0.127	0.27	2.712	0.008
Race/ethnicity (group 3) ^a	0.156	0.16	0.095	0.972	0.333
Self-efficacy	0.016	0.005	0.267	3.312	0.001
Mutuality	0.261	0.062	0.327	4.247	< 0.001
Physical health	0.015	0.006	0.206	2.596	0.011
Stress management					
Perceived stress	-0.03	0.004	-0.524	-7.008	< 0.001
Age	0.009	0.004	0.195	2.6	0.011
BMI	-0.017	0.007	-0.168	-2.324	0.022

^a Race/ethnicity was categorized into the following three categories: group 1 representing the Hispanic/Latinx reference group, group 2 representing White/Non-Hispanic, and group 3 representing non-White/non-Hispanic. BMI—body mass index; HPLP-II—Health-Promoting Lifestyle Profile-II; PROMIS—Patient-Reported Outcomes Measurement Information System

Note. Physical health was measured using PROMIS® Global Physical Health. PROMIS sleep disturbance and the National Institutes of Health Toolbox stress and self-efficacy were measured using computer adaptive testing.

five-point Likert-type scale ranging from 1 (strongly agree) to 5 (strongly disagree).

Statistical Analyses

To describe the health-promoting behaviors of caregivers, descriptive statistics (mean and standard deviation [SD] for normally distributed continuous data, median for ordinal and non-normally distributed continuous data, frequencies and percentages for nominal data) were used to describe the demographic characteristics, personal, interpersonal, and situational factors, and health-promoting activities by cancer caregivers.

To identify factors that contributed to participation in health-promoting behaviors, correlations matrices, parametric (t test and ANOVA) and non-parametric tests (Wilcoxon rank sum and Kruskal-Wallis) were used to identify which factors contributed to health-promoting behaviors by examining the relationships among the personal, interpersonal, and situational factors with the health-promoting behaviors, measured using both the HPLP-II total and subscale scores. The authors conducted a univariate analysis of each independent variable's impact on the HPLP-II total score to select variables for the multivariate linear regression. Factors with $p < 0.1$ in the univariate analyses were entered into linear regression models to assess the relationships between those factors and HPLP-II scale scores. To examine factors contributing to the participant's responses to the questions regarding changes in nutrition and exercise since becoming a caregiver, the participant's answers to these questions were dichotomized into "agreed" or "did not agree," then logistic regression models were run to evaluate which personal, interpersonal, and situational factors predicted perceived changes in exercise and diet status. Variables in the final models were selected using backward elimination with removal criteria of $p \leq 0.1$. Variables in the final models were selected using backward elimination with removal criteria of $p \leq 0.1$. All data analyses were conducted using IBM SPSS Statistics software, version 23.0. A $p < 0.05$ was considered significant.

Results

Description of Health-Promoting Behaviors in Cancer Caregivers

Total scores for the HPLP-II ranged from 1.4 to 3.8 ($\bar{X} = 2.6$, $SD = 0.5$). Health-promoting behaviors that they participated in most frequently included spiritual growth ($\bar{X} = 3$, $SD = 0.6$) and interpersonal relationships ($\bar{X} = 3$, $SD = 0.6$). The least-practiced

health behaviors included health responsibility ($\bar{X} = 2.4$, $SD = 0.5$), stress management ($\bar{X} = 2.4$, $SD = 0.6$), and physical activity ($\bar{X} = 2.3$, $SD = 0.8$).

More than half (61%) of the caregivers reported that they believed that they exercised less since becoming a caregiver, and nearly half (47%) reported that their diet was worse. Double-duty caregivers (odds ratio [OR] = 3.02, 95% CI [1.26, 7.22]), and those with higher levels of caregiver burden (OR = 2.29, 95% CI [1.003, 5.24]) were more likely to report exercising less since becoming a caregiver. Caregivers who were younger (OR = 0.96, 95% CI [0.93, 0.998]), had higher BMIs (OR = 1.1, 95% CI [1.02, 1.19]), and who had higher levels of burden (OR = 3.96, 95% CI [1.6, 9.81]) were more likely to report that their diet had worsened since becoming a caregiver.

Factors That Influence Health-Promoting Behaviors in Cancer Caregivers

In examining univariate analyses, caregiver age ($r = 0.223$, $p = 0.013$), self-efficacy ($r = 0.565$, $p < 0.001$), physical health ($r = 0.504$, $p < 0.001$), and mutuality ($r = 0.354$, $p < 0.001$) were positively correlated with total HPLP-II scores. Caregiver BMI ($r = -0.284$, $p = 0.002$), perceived stress ($r = -0.547$, $p < 0.001$), sleep disturbance ($r = -0.247$, $p = 0.006$), and CRA ($r = -0.406$, $p < 0.001$) were negatively correlated with total HPLP-II scores. Final models showing factors that influenced total scores and subscales of the HPLP-II are shown in Table 4. Controlling for age ($B = 0.006$, $p = 0.016$) and BMI ($B = -0.017$, $p = 0.004$), caregivers with higher scores in self-efficacy ($B = 0.02$, $p < 0.001$), physical health ($B = 0.013$, $p = 0.004$), and mutuality ($B = 0.155$, $p = 0.001$) participated in more health-promoting self-care activities, as measured by higher total scores on the HPLP-II. Among all the factors tested in the model, self-efficacy had the strongest effect on total HPLP-II scores (standardized coefficient = 0.395). Self-efficacy also was the most important predictor of the health responsibility subscale (standardized coefficient = 0.424), and it was a significant predictor of all of the other HPLP-II subscales except nutrition and stress management. In addition to influencing total HPLP-II scores, mutuality and physical health were also important influential factors for many of the HPLP-II subscales. Caregivers with higher levels of mutuality scored significantly higher on the HPLP-II subscales of physical activity ($B = 0.193$, $p = 0.018$), spiritual growth ($B = 0.244$, $p < 0.001$), and interpersonal relationships ($B = 0.261$, $p < 0.001$). Individuals with higher scores for physical health (i.e., better physical health) reported higher

scores for the subscales of physical activity ($B = 0.032$, $p < 0.001$), nutrition ($B = 0.027$, $p < 0.001$), and interpersonal relationships ($B = 0.015$, $p = 0.011$).

Implications for Nursing

This study confirmed findings from past research, including the finding that caregivers are more likely to participate in spiritual growth and interpersonal relationships than in physical activity, health responsibility, and stress reduction (Dionne-Odom et al., 2017). Based on these findings, oncology nurses might focus on those three target areas and provide online resources for brief stress-reduction techniques, and/or encourage caregivers to take regular exercise breaks and schedule time for their own needed health evaluations. As in multiple studies, self-efficacy predicted participation in health-promoting behaviors (Sheeran et al., 2016), and this study also confirmed the findings of Cuthbert et al. (2017); that the physical health of caregivers is an important determinant of caregiver participation in health-promoting behaviors. If caregivers start the caregiving journey obese or in poor health, it is not likely that during this high stress time they will make improvements in healthy living, particularly if this has eluded them in the past. However, if nurses were to serve as health coaches, assisting caregivers to meet small, attainable health goals without leaving the care recipient, this might serve as a catalyst to increase caregiver self-efficacy and thereby increase the chances of sustaining healthy behaviors during the prolonged caregiving experience.

The most novel finding of this study may be that mutuality, the strength of the relationship between the care recipient and caregiver, was an important influential factor in caregivers' participation in health-promoting behaviors. Because a diagnosis of cancer leads to physical, psychological, and financial changes that strain even the healthiest of relationships (Girgis et al., 2013), oncology nurses should be alert for tension or conflict in caregiver-patient relationships. Nursing interventions to improve communication and coping can improve caregiver-recipient mutuality (Northouse et al., 2007), and nurses should make appropriate referrals for social work, spiritual care, or counseling for relationships that appear to be struggling. Relationships that are most at risk include those with preexisting relationship problems and open conflict, as well as those that engage in protective buffering, such as hiding concerns and feelings or avoiding discussions (Traa et al., 2015). There are several reasons that mutuality

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- Many cancer caregivers exercise less and eat a less healthy diet after becoming caregivers; therefore, oncology nurses should encourage caregiver participation in health-promoting self-care.
 - When individuals with cancer and their caregivers have stronger, healthier relationships, cancer caregivers may be more likely to participate in health-promoting self-care.
 - Oncology nurses might improve health-promoting self-care in caregivers by making appropriate referrals for social work, spiritual care, and/or counseling for caregivers at risk, including those experiencing high levels of burden, low self-esteem, and/or relationship difficulties.
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might influence participation in health-promoting behaviors. It is possible that in caregiver-recipient dyads with high levels of mutuality, the caregiver feels more freedom to ask for permission to take a walk, exercise, fulfill spirituality needs, or attend stress-reduction classes. In healthy relationships, the individual with cancer may be more worried about the health of the caregiver than individuals in less healthy relationships, and, therefore, care recipients in healthy dyads may be more likely to encourage self-care in the caregiver. Likewise, a caregiver in a healthy relationship may engage in positive health behaviors in an attempt to lead by example, thereby encouraging the care recipient to eat better or to participate in other health-promoting behaviors. The exact mechanism whereby higher levels of mutuality facilitate more participation in health-promoting behaviors in this population is unclear and warrants future examination.

One of the interesting findings of this study was that many of the caregivers reported that becoming a caregiver had changed their participation in exercise and nutrition for the worse. Caregivers who reported higher caregiver burden and individuals who were double-duty caregivers were most likely to report those changes. Oncology nurses witness the frontline struggle that caregivers face when trying to balance the demands of caregiving with home responsibilities and maintaining their own self-care. There are no easy answers; educating caregivers on the importance of self-care or encouraging caregivers to leave the bedside to take a walk or a nap potentially could result in more guilt and stress for the caregiver. Most interventions targeting cancer caregivers have focused on caregiver preparedness through the provision of information/education and skill development,

with much less focus on caregiver health and self-care (Ugalde et al., 2019). Nursing research is clearly needed to examine novel interventions for cancer caregivers to reduce stress and improve participation in health-promoting self-care activities that do not add excessive time demands. The influence of outside factors (e.g., employment, double-duty caregiving) on cancer caregivers' participation in health-promoting activities has received little research attention to date and also might be an important area of future study.

Oncology nurses who work with individuals with cancer and their caregivers can advocate for programs that help guide the caregiver in ways to be present for the individual with cancer but also be able to meet their numerous other obligations, including financial, work, and family/community commitments. Simple, validated screening tools such as the Distress Thermometer are available to quickly identify those caregivers who are experiencing significant distress (Bevans et al., 2011). Northouse et al. (2012) have recommended that clinicians become champions for caregivers, and they have provided practical guidelines for providing care to cancer caregivers in the practice setting. At the very least, oncology nurses might educate the caregivers on the importance of taking time to participate in health-promoting self-care, and explain that research supports that a healthier caregiver not only provides better care, but also may improve health outcomes for the individual with cancer as well (Dionne-Odom et al., 2017; Litzelman & Yabroff, 2015).

Limitations

This study had many strengths, most notably that the survey was available to caregivers in both English and Spanish. However, as with any cross-sectional survey, there is a threat of recall and response bias. Because the data are from one time point after caregiving began, it is not possible to ascertain whether the caregivers' health behaviors actually changed as a result of caregiving. This study included only caregivers from the NIH Clinical Center, a unique research hospital that might not be typical of cancer care in the general population, thereby limiting the generalizability of the findings. The majority of the participants in this study were relatively young and well educated. Younger and better educated caregivers might be more likely to seek novel cancer treatments at facilities such as the NIH and/or might be more likely to participate in Internet surveys. Therefore, additional research is needed to confirm the findings in other cancer caregiving populations.

Conclusion

This study provided important insights into factors that influence participation in health-promoting self-care in cancer caregivers. Novel findings of this study include the importance of mutuality (i.e., the strength of the relationship between the caregiver and the care recipient) as an important predictor of health-promoting behaviors in cancer caregivers. Future research is needed to examine novel interventions to increase health-promoting activities in cancer caregivers. These interventions might be strengthened by including components that focus on increasing self-efficacy and/or improving the strength of the relationship between the caregiver and care recipient.

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