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Predictors of Quality of Life for Long-Term Cancer Survivors With Pre-Existing Disabling Conditions

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According to national data from the Centers for Disease Control and Prevention, approximately 12 million cancer survivors had survived five years or more as of January 2007 (CDC, 2011). While all cancer survivors may experience long-term effects following the acute survivorship phase (National Cancer Institute [NCI], 2004), those with functional limitations resulting from pre-existing impairments may have special concerns related to their diagnosis and treatment. Previous research has shown that co-morbid health problems or disabling conditions can directly impact treatment, prognosis, and longer term outcomes for cancer survivors, including the ability to maintain health and carry out activities of daily living (Beck, Towsley, Caserta, Lindau, & Dudley, 2009; Gonzalez, Ferrante, Van Durme, Pal, & Roetzheim, 2001; Grov, Fossa, & Dahl, 2010; NCI, 2004; Piccirillo et al., 2003; Piccirillo, Tierney, Costas, Grove, & Spitznagel, 2004). Those with prior limitations in activities of daily living struggle to promote their health and prevent secondary disabling conditions under the best of circumstances (U.S. Department of Health and Human Services [USHHS], 2005). Cancer diagnosis and treatment may create additional challenges. For example, lymphedema could seriously impact wheelchair users, who engage in repetitive upper body motion. People who already experience fatigue (e.g., those with multiple sclerosis) may find increased fatigue following cancer treatment especially difficult to manage. If these individuals have limited access to routine health services (Iezzoni et al., 2010; Nosek, 2000; USHHS, 2005), they may have difficulty getting needed health care following active treatment, thereby delaying the diagnosis of recurrence or late effects of cancer treatment.

Health Promotion Among Cancer Survivors

Health-promoting behaviors have been associated with greater quality of life for cancer survivors (Blanchard et al., 2004; Conn, Hafdahl, Porock, McDaniel, & Nielsen, 2007; Courneya, 2009; Haas, in press), as well as those with other disabling conditions (Moore, Von Korff, Cherkin, Saunders, & Lorig, 2000; Rimmer, 1999; Tate, Roller, & Riley, 2001). For cancer survivors, physical activity and exercise have been associated with lower levels of depression and anxiety (Segar et al., 1998) greater self-esteem (Baldwin & Courneya, 1997), less fatigue (Brown et al., 2011), better control of treatment side-effects (Reigle, 2006), and higher quality of life (Galvao & Newton, 2005; Haas, in press). Self-efficacy is an important predictor of exercise behavior among cancer survivors (Haas, 2000; Lev, 1997), and exercise interventions that focus on building self-efficacy have been particularly effective (Bennett, Lyons, Winters-Stone, Nail, & Scherer, 2007). Unfortunately, physiological sequelae can impact strength and endurance, which in turn affects survivors' ability to be physically active (Aziz, 2002a, 2002b).

Given that many cancer survivors engage in health-promoting behaviors and those who do tend to report more positive outcomes, the following research question was addressed: After controlling for selected contextual factors, resources, barriers, and self-efficacy for health promotion, do health-promoting behaviors add significantly to the prediction of health-

related quality of life reported by long-term cancer survivors with pre-existing functional limitations?

A Model of Health Promotion and Quality of Life for People with Disabilities

This study was guided by Stuifbergen's model, which proposes that contextual and attitudinal factors influence health-promoting behaviors and quality of life for persons with disabilities (Stuifbergen, 1995; Stuifbergen & Becker, 1994; Stuifbergen, Seraphine, Harrison & Adachi, 2005; Stuifbergen, Seraphine, & Roberts, 2000). Model predictors have explained as much as 66% of the variance in quality of life (Stuifbergen et al., 2000), and findings have been used to design health promoting interventions, including one for low-income cancer survivors. This nursing research has shown that cognitive perceptual factors, such as self-efficacy and barriers, are more powerful predictors of health promotion and quality of life than is degree of impairment (Stuifbergen et al., 2005; Stuifbergen et al., 2000).

In this model, health-promoting behaviors include (but are not limited to) physical activity, nutrition, health responsibility (including management of chronic conditions), and stress management. Health promotion can limit secondary disabling conditions (Marge, 1988; Rimmer, 1999; Tate et al., 2001) but many find these behaviors difficult to implement. Despite impediments, recent research has shown that interventions designed to address their special needs can positively impact health promotion and quality of life for people with disabilities (Froehlich-Grobe & White, 2004; Mengshoel, Komnaes, & Forre, 1992; Moore et al., 2000; Rimmer, 1999; Stuifbergen, Becker, Blozis, Timmerman, & Kullberg, 2003; Stuifbergen, Morris, Jung, Pierini, & Morgan, 2010; USHHS, 2005). The current investigation incorporated contextual information about the cancer experience into this model and examined how much resources, barriers, and health promotion added to these contextual factors in predicting quality of life for cancer survivors.

Methods

Sample

The survey sample consisted of community-residing adult cancer survivors who reported functional limitations that existed prior to their cancer. Eligibility criteria were a self-reported cancer diagnosis and a prior functional limitation, completion of active treatment, at least 21 years of age, and ability to read and write English. Those in active cancer treatment were excluded because they may have different challenges to health promotion. However, survivors taking long-term hormonal treatment were included.

The following question on the recruitment flier was used to determine disability: "Are you limited in any way in any activities because of physical, mental, or emotional problems?" This question is used in the Behavioral Risk Factor Surveillance System and the National Health Interview Survey to determine disability status (CDC, 2005). While this question may exclude some individuals whose impairments do not result in these limitations, the Healthy People 2010 work panel addressing disability issues endorsed this item as adequate for surveillance (National Center on Birth Defects and Developmental Disabilities [NCBDDD], 2001). Respondents were also asked to confirm that this limitation existed prior to their cancer.

Instruments

Contextual factors—Survey participants were asked to report their age, education, gender, employment status, ethnicity/race, state of residence, insurance status, smoking status, cancer screening behaviors, type of cancer diagnosis, stage of cancer, type of

treatment (e.g., chemotherapy, radiation, surgery), time since diagnosis and completion of active treatment. Self-perceived health was assessed by asking respondents to rate their health on a 5-pt. scale, from "1", Excellent to "5" Poor. A modified version of the Charlson Comorbidity Index (Charlson, Pompei, Ales, & MacKenzie, 1987) was used to quantify comorbidities. This 16-item index produces a weighted score that reflects both the number and seriousness of co-morbid conditions. Self reports on the Charlson Index were significantly related ($r = .63$) to ratings from their medical records, and test-retest reliability of self-report scores was .91 (Katz, Chang, Sangha, Fossel, & Bates, 1996). Participants' ratings on the 8 items that assess functional limitations from the National Health Interview Survey (CDC, 2005) were compiled to create a total limitations score. The investigators' previous research yielded a Cronbach alpha of .73 for the total score on these 8 items.

Resources—The Economic Adequacy Scale (Lobo, 1982) assessed perceived adequacy of economic resources. Becker and Stuifbergen (2004) reported a Cronbach alpha reliability coefficient of .96 and a significant inverse relationship with barriers to health promotion among people with disabilities. Many individuals in this sample were beyond the childbearing years and left blank the item about childcare costs; this item was subsequently eliminated from the scale. Respondents also rated the adequacy of the assistance/supports available to help them for work, care for themselves and their families, and participate in social, community, and leisure activities. The 10-pt. rating scale ranged from "1" Not at all adequate to "10" Much more than adequate.

Social support—The Personal Resource Questionnaire (PRQ) measured perceptions of social support (Weinert & Brandt, 1987). Higher scores on the 25-item scale indicate greater perceived support. The reliability, content, construct, and criterion-related validity of this scale has been supported with various clinical groups, including women with breast cancer and people with disabilities (Northouse et al., 2002). Stuifbergen et al. (2000) reported a Cronbach alpha of .93 in a longitudinal study of individuals with multiple sclerosis. Scores on the PRQ were positively related to health-promoting activities ($r = .58$) and quality of life ($r = .64$).

Barriers—Factors that inhibit health-promoting behaviors were measured by the 18-item Barriers to Health-Promoting Activities for Disabled Persons Scale (Becker, Stuifbergen, & Sands, 1991). Internal consistency reliability has been reported above .80 in previous studies and test/retest reliability was .75 (Becker, Stuifbergen, Oh, & Hall, 1993; Becker et al., 1991). Significant negative correlations have been found between Barriers scale scores, measures of self-efficacy for health-promoting behaviors, and frequency of health-promoting behaviors among people with functional limitations (Stuifbergen et al., 2000).

Another key barrier, depressive symptoms, was measured with the Center for Epidemiological Studies Depression Scale -10 (Andersen, Malmgren, Carter, & Patrick, 1994). Scores range from 0 to 30; higher scores indicate more depressive symptoms. The CESD-10 has demonstrated good reliability and validity (Radloff, 1997). The CESD has been used extensively with cancer survivors, particularly those with breast cancer (Badger, Segrin, Dorros, Meek, & Lopez, 2007; Bower et al., 2000; Given, Given, & Stommel, 1994; Hann, Winter, & Jacobsen, 1999). Roberts and Stuifbergen (1998) reported a Cronbach alpha coefficient of .86 and a .28 correlation coefficient between scores on the CESD-10 and incapacity status among people with multiple sclerosis.

Self-Efficacy for Health Promotion—Self-Efficacy for health promotion was measured with the Self-Rated Abilities for Health Practices Scale (Becker et al., 1993; Stuifbergen et al., 2000). Designed to measure perceived ability to perform health-promoting practices, the

28 items sum to create a total score encompassing: Nutrition, Well-being, Physical Activity/Exercise, and Responsible Health Practices. Stuifbergen et al. (2003) reported Cronbach alpha coefficients ranging from .92 to .95. Callaghan's study (2005) also supported the reliability and validity of this scale among older adults.

Health-Promoting Behavior—Health-Promoting Behavior was measured by the Health-Promoting Lifestyle Profile II (Walker, Sechrist, & Pender, 1995). Self-reported frequency of behavior on the 52-item HPLP-II yield scores on six subscales (Physical Activity, Health Responsibility, Spiritual Growth, Interpersonal Relations, Nutrition, and Stress Management). Reliability and validity of the HPLP-II have been supported in multiple studies, including those with people with cancer and other chronic health conditions (Berger & Walker, 2001; Ott, 1997; Walker & Nies, 1998). Stuifbergen et al. (2003) reported Cronbach alpha coefficients ranging from .93 to .95 in a study of people with Multiple Sclerosis.

Quality of life—Quality of Life was measured with the Functional Assessment of Chronic Illness Therapy – General Scale (FACT-G), originally developed for cancer patients (Webster, Cella & Yost, 2003). The developers report test/retest reliabilities ranging from .82 to .88, and its reliability and validity has been demonstrated with many patient groups (Cella et al., 1993; Ward et al., 1999; Wenzel et al., 1999). The scale contains 4 domains: Physical Well-Being (7 items), Social/Family Well-Being (7 items), Emotional Well-Being (6 items), and Functional Well-Being (7 items). Unlike more global quality of life measures, the FACT-G addresses acceptance of the cancer diagnosis, which Aziz (2002a) identified as key to survivors' quality of life.

Survey Procedures

Following Institutional Review Board approval, packets with postage-paid fliers describing the study and asking potential participants to self-disclose their cancer diagnosis, disability status and contact information were sent to other disability researchers, Independent Living Centers, and disability/cancer programs throughout the United States. In addition, the study was advertised through disability publications and on-line networks, many of which have national readership, as well as to individuals with disabilities who had participated in previous research. When fliers (or phone or email inquiries) were received, and eligibility was determined, the questionnaire packet was mailed with a stamped, self-addressed envelope. The cover letter indicated that the questionnaire should be completed by cancer survivors with pre-existing functional limitations, not proxies. Participants were told to call the project's toll-free number if they needed assistance completing the questionnaire. They were also instructed to take breaks as needed, if they become fatigued while completing the questionnaire.

After three weeks, reminders were sent to those who had not returned their surveys. Additional contacts were made when clarifications were needed or key information was left blank. Participants who returned the packets were sent a hand-written thank you note (with a link to a website regarding cancer survivorship) and a \$25 money order. Forty-three of those who expressed interest in participating were determined ineligible; 89% of those who initially expressed interest and were eligible subsequently returned completed questionnaire packets.

Results

Preliminary Data Analysis

After data were entered into SPSS Statistical Package for the Social Science (SPSS) Windows release 16.0, error checking was performed with a random sample, and it showed a .06 (%) error rate. Strategies including case deletion, variable deletion, and mean substitution were used with missing data as appropriate. Descriptive statistics and distributions for each variable were inspected, both to clean data and create a sample profile.

Prior to conducting regression analyses, assumptions concerning normality, skewness, and homoscedasticity were examined. The variance inflation factor and tolerance statistic were also reviewed to detect potential multicollinearity.

Internal consistency reliability was determined for all scales. The Cronbach alpha coefficients were all above .75 for the psychosocial measures. However, the Cronbach alpha coefficients for the 8-item functional limitations scale and the Charlson Co-Morbidity Index were only .65 and .51 respectively.

Sample Description

The sample of 145 survivors was 80% female; 95% were non-Hispanic Whites and 73% had at least a college degree (see Table 1). On average, they were 63 years old. Twenty-six percent were working, but another 39% reported being unemployed due to their disability. Although 19 types of cancers were reported, 54% were breast cancer survivors. Among their 22 pre-existing disabling conditions, 86% had neuromuscular conditions. The average number of years since cancer diagnosis was 9 years, although 47% had been diagnosed five years or less. Forty-eight percent of the sample had additional diagnoses, most commonly diabetes, asthma, rheumatoid arthritis, renal function, and peptic ulcers.

Comparison of FACT-G Scores

As shown in Table 2, average FACT-G scores for this sample were generally within half a standard deviation of the scores for other groups in all areas except Physical Well Being. Their average scores were roughly half a standard deviation lower on Physical Well Being.

Bivariate Correlations

Table 3 shows the bivariate correlations among contextual factors, resources, barriers and quality of life (FACT-G subscales). With the exception of the general health and functional limitations self-ratings, the resource and barriers items, particularly depressive symptoms (CESD-10), social support (PRQ), and barriers to health promotion, as well as frequency of health promotion (HPLP-II), correlated more highly with FACT-G subscales than other contextual factors such as age or cancer-related variables.

Regression Analyses

The following steps were undertaken to determine the predictors to include in the regression analyses. First, those variables with the most missing data (such as time since treatment ended or cancer stage) or highly skewed distributions were excluded. Next, the bivariate correlations were examined to identify the strength of relationship among variables. In addition, the actual content of the various psychosocial measures were examined so that conceptual overlap among specific scale items could be identified. A number of items on the social support measure (PRQ) were found to be conceptually similar to items on both the Health Promoting Lifestyle Profile (HPLP-II) and the FACT-G outcome measure. Consequently, the PRQ was not used in the subsequent regression analyses. Because there

were items asking about sleep quality on both the HPLP-II predictor and the FACT-G, the sleep item was removed from the FACT-G.

In summary, thirteen predictors were utilized in the subsequent regression analyses, and the functional subscale of the FACT-G was modified to eliminate the sleep item. Four 3-step hierarchical regressions were performed to predict each of the four subscales of the FACT-G quality of life measure: Physical, Emotional, Social, and Functional. Contextual factors, including general health, employment status (i.e., employed/unemployed due to disability), time since cancer diagnosis, treatment (i.e., radiation, chemotherapy), total number of functional limitations, and co-morbidities were the available predictors on the first block. They entered the equation if they met the stepwise inclusion criteria (probability of F to enter < .05, probability of F to remove > .10). The following predictors were available for entry on the second block: Perceived Economic Adequacy, Perceived Adequacy of Supports, Depressive Symptoms (CESD-10), Self Rated Abilities for Health Practices, and the Barriers Scores. The Health Promoting Lifestyle Profile Total (HPLP-II) was made available for entry on the final step.

Physical quality of life—General health, unemployed due to disability, and total number of functional limitations were the contextual factors that entered on the first step of the equation. The CESD and Economic Adequacy Scale scores added significantly to the prediction of the Physical Quality of Life subscale score. The HPLP-II did not meet the statistical criteria for entry. The adjusted R^2 on the last step was .60. (see Table 4)

Emotional quality of life—Because of the conceptual overlap between the CESD measure of depressive symptoms and the outcome measure, the CESD was not a predictor in this equation. As shown in Table 4, the HPLP-II score contributed significantly to the prediction of the Emotional subscale score, after the general health, Barriers score, and Self-Rated Abilities for Health Practices measures entered the equation. Together, they accounted for 50% of the variance.

Social quality of life—The HPLP-II contributed significantly to the prediction of the FACT-G Social score, after general health, total functional limitations, Charlson Co-Morbidities Index, adequacy of supports, CESD scores, and Economic Adequacy scores entered the equation. The adjusted R^2 for this equation was .51 (see Table 4).

Functional quality of life—The HPLP-II score did not contribute statistically to the prediction of FACT-G Functional scores after other variables entered the equation. However, the CESD, Self-Rated Abilities for Health Practices, and the adequacy of supports did add significant unique variance, after general health, employment status, and total number of functional limitations had been accounted for. These six predictors accounted for 68% of the variance in predicting the FACT-G subscale scores (see Table 4).

Discussion

While researchers and clinicians alike are coming to understand the key role of co-morbidities in cancer diagnosis, treatment, and long-term survivorship, this is one of the first studies to investigate the post-treatment survivorship experience of those who had disabling conditions prior to their cancer diagnosis. Their quality of life profile (FACT-G) was similar to other groups of cancer survivors except in the area of Physical Well Being, where they were roughly half a standard deviation below the mean of the other groups. This is perhaps to be expected, since 43% of them reported their health was poor or fair, many have mobility impairments, and half have other co-morbidities. By contrast, in 2009 the CDC reported that only 14% of Americans reported their health was fair or poor (CDC, 2009).

This finding underscores the importance of providing this special group of cancer survivors with the means to promote their health to the greatest extent possible, given the multiple threats to their health status.

While anyone with limitations in activities of daily living could participate in the study, most survey respondents had neuromuscular conditions, such as polio and multiple sclerosis. This sample selection bias was undoubtedly due in part to the researchers' previous experience conducting research in these communities. While this credibility assisted in participant recruitment, it does limit interpretation of the findings. Future studies should investigate the survivorship experiences of those with other types of disabling conditions, as well as a broader ethnic and racial cross-section than were accessed in this exploratory study.

The one-item rating of perceived health status proved to be a stronger predictor of quality of life than the Charlson Co-Morbidity Index. Other researchers have pointed out the limitations of co-morbidity indicators as predictors of health status or quality of life (Extermann, 2000; Reeve, 2010) because even when using a scoring system that weights for seriousness of the diagnosis, these indicators may not capture the complexity of living with co-morbid conditions. Future research should continue to develop and refine more robust co-morbidity measures.

The dichotomous variable representing employment due to disability had a moderately strong relationship with three of the four quality of life subscales. This variable may have served as an indicator of the degree of functional limitations and merits further exploration in future studies. Self-reported economic adequacy was also related to FACT-G scores, underscoring the key role of financial resources in maintaining health related quality of life.

None of the cancer-related variables (i.e., time since diagnosis, type of treatment) were significant predictors of FACT-G scores. Almost one third of these respondents were at least 10 years past diagnosis, so they may have associated other health factors with their current quality of life. The fact that 48% had an additional co-morbid condition suggests multiple health factors impact their lives, and they may find it difficult to disentangle these effects. Many participants commented through the survey or personal communication that it was not the cancer but the pre-existing conditions that made it difficult for them to take care of their health. In addition, these simple indicators for the cancer-related variables may not adequately capture the degree of challenges imposed by diagnoses or treatments. Future studies should examine the clinical experience of selected groups of cancer survivors in more detail, so more meaningful clinical indicators can be integrated into such research.

Conceptual overlap was observed among the items on the psychosocial predictors and the quality of life outcome measures. This overlap necessitated the removal of some predictor measures, so that identical constructs on both the predictor and outcome sides of the equations would not be assessed. The rapid growth of research on cancer survivorship has led to a proliferation of measures used to assess psychological as well as physical functioning. As discovered here, many of these measures may overlap conceptually. Researchers are advised to clarify both conceptual and operational definitions moving forward. Recent efforts by the National Cancer Institute's Outcomes Research Branch to utilize strong psychometric approaches to refining outcomes measurement, as well as projects such as PROMIS (www.nihpromis.org) should facilitate this effort.

The bivariate relationships between scores on the Health Promoting Lifestyle Profile and the FACT-G subscales ranged from .28 for the Physical Subscale to .56 for the Social subscale. HPLP-II scores added significantly to the prediction of scores on the FACT-G Emotional and FACT-G Social scales, after other variables had entered, but not to the prediction of

Fact-G Physical or Fact-G Functional Scales scores. For these two scales, the CESD was the strongest predictor, and it was also strongly correlated with the health promotion measure, making it difficult for the HPLP-II to enter once the CESD entered.

The hierarchical regressions performed in this study accounted for at least 50% of the variance in the four FACT-G subscale scores. As expected, different variables were predictive of different subscales on the multidimensional FACT-G. However, the CESD measure of depressive symptoms entered all the equations where it was used as a predictor and was the strongest predictor in two equations. Previous studies have shown a link between depression and quality of life for individuals with a variety of chronic conditions including cancer (Aziz, 2002a; Stuifbergen et al., 2000). These findings underscore the importance of screening cancer survivors for depression, particularly those with other disabling conditions, and making access to mental health supports readily available. At the same time, because this was a correlational study, causal relationships among variables cannot be determined. Longitudinal studies are needed to track the impact of psychosocial factors throughout the survivorship process from initial diagnosis into long-term survivorship for cancer survivors with pre-existing conditions.

Conclusions

This study was undertaken to expand our understanding of health promotion and quality of life for survivors with pre-existing disabling conditions. While self-rated health and/or the number of functional limitations entered all equations, psychosocial factors such as depressive symptoms or self-efficacy for health promotion, added significantly to the prediction of all quality of life subscale scores. The importance of these results is that they begin to identify key factors that are amenable to intervention and are consistent with previous research showing that psychosocial variables can mediate the relationship between incapacity and quality of life for people with chronic disabling conditions (Stuifbergen et al., 2000). As such, these findings add to the growing body of scientific evidence supporting the key role of health promotion, holistically defined to encompass both mind and body, in enhancing quality of life for cancer survivors.

Implications for Nursing

These findings suggest that nursing interventions that reduce depression and build perceived ability to engage in health promoting behaviors may help ameliorate the negative influence of poorer health status and functional limitations on quality of life experienced by survivors with pre-existing disabling conditions. Also, the findings provide valuable guidance for clinicians, especially for primary health care providers who may have limited experience treating cancer survivors who have multiple health issues. Not only physical needs, such as medication management and physical accessibility, but also mental health supports should be addressed when nurses are taking care of this special group of survivors.

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Table 1

Sample demographic characteristics (n=145)

Variable	Frequency	%
Gender		
Female	116	80
Male	29	20
Race/Ethnicity		
Non-Hispanic White	138	95
Other	7	5
Employment Status		
Full-time or part-time	38	26
Unemployed due to disability	56	39
Retired	33	23
Other	18	12
Education		
High School or less	28	19
Some College	36	25
Bachelor's Degree	42	29
Post-Bachelors'	39	27
Types of Prior Disabilities		
Polio	53	37
Multiple Sclerosis	55	38
Other Neuromuscular	16	11
Other ^a	21	14
Types of Cancer ^b		
Breast	81	54
Prostate	15	10
Melanoma	15	10
Gynecologic	10	7
Colorectal	8	6
Other	20	14
Years Since Cancer Diagnosis ^c		
5 years or less	67	47
6–10 years	35	24
More than 10 years	42	29
Cancer Treatments		
Surgery	126	87
Chemotherapy	51	35
Radiation	61	42

^aOther disabilities includes sensory impairment, benign tumor, mental health, chronic disease with functional limitation, developmental disability, and HIV.

^b Some people had more than one type of cancer, so total does not equal 145. Other type of cancer includes head & neck, bladder, lymphoma, nonmelanoma skin, and lung cancer.

^c Because of missing data, total participants do not equal 145

Table 2**FACT-G Scores for Different Groups**

	Survivors + Disabilities (N=145)	Cancer (N=2,236)	General pop (1,078)	Breast cancer (N=202)	Elderly + cancer (N=85)
FACT-G Physical well-being	18.2 (5.9)	21.2 (6.2)	22.7 (5.4)	23.8 (4.7)	21.0 (5.1)
FACT-G Social/family well-being	20.1 (5.4)	22.3 (4.8)	19.1 (6.8)	21.1 (5.4)	22.0 (5.3)
FACT-G Emotional well-being	17.4 (4.4)	18.1 (4.5)	19.9 (4.8)	17.6 (4.0)	15.3 (3.6)
FACT-G Functional well-being	17.9 (5.8)	18.8 (6.4)	18.5 (6.8)	21.2 (6.1)	17.3 (6.8)
Total FACT-G	73.6 (17.7)	80.4 (15.9)	80.1 (18.1)	----	----

Note. Average age of elderly cancer patients was 75 years old (range 65 – 90 years). Comparison data reported in Overcash, Extermann, Parr, and Balducci (2001); Brucker, Yost, Cashy, Webster, and Cella (2005); Avis, Crawford, and Manuel (2005).

Table 3

Bivariate Correlations among Contextual Factors, Barriers, Resources, Health Promoting Behaviors, and Quality of Life among Cancer Survivors with Prior Conditions (n=145)

Variable	Physical	Functional	Social	Emotional
General health	-.55 **	-.58 **	-.30 **	-.55 **
Number of activity limitation days	-.60 **	-.47 **	-.23 **	-.45 **
Time since cancer diagnosis	.06	.04	-.03	.05
Radiation	-.05	-.06	-.14	-.13
Chemotherapy	.02	.02	-.07	-.02
Surgery	.14	.07	-.08	.08
Other therapies	.00	.02	.14	.11
Age	.19 *	.05	.04	.13
Education	.06	.15	.19 *	.22 **
Unemployed due to disability	.40 **	.38 **	.06	.27 **
Charlson Co-Morbidity Index	-.24 **	-.19 **	-.20 *	-.20 **
Total functional limitations	-.32 **	-.33 **	-.23 **	-.28 **
Adequacy of assistance/support	.32 **	.52 **	.57 **	.36 **
Economic Adequacy Scale	.46 **	.42 **	.51 **	.35 **
CESD - 10	-.66 **	-.71 **	-.51 **	-.70 **
PRQ	.39 **	.62 **	.80 **	.49 **
Barriers to Health Promotion Scale	-.51 **	-.48 **	-.42 **	-.56 **
Self-Rated Abilities for Health Practices	.32 **	.53 **	.38 **	.44 **
HPLP-II	.28 **	.54 **	.56 **	.52 **

Note. CESD -10: Center for Epidemiological Studies Depression Scale, PRQ: The Personal Resource Questionnaire, HPLP-II: Health-Promoting Lifestyle Profile II. Employed coded "1" and unemployed due to disability coded "0".

* $p < .05$.

** $p < .01$.

Table 4**Hierarchical Regressions to Predict Quality of Life in Survivors with Prior Disabling Conditions****Hierarchical Regression to Predict FACT-G Physical Scale (n=136)**

Predictors	Beta	Adj. R ²	F Δ
Self-Perceived Health	-.21 *		
Unemployed due to Disability	.21 *		
Total Functional Limitations	-.10	.42	
CESD -10	-.42 *	.58	53.22 *
Economic Adequacy Scale	.18 *	.60	8.72 *

Hierarchical Regression to Predict FACT-G Emotional Scale (n=135)

Predictors	Beta	Adj. R ²	F Δ
Self-Perceived Health	-.35 *	.30	
Barriers Total	-.33 *	.44	35.55 *
Self-Rated Abilities for Health Practices	-.04	.46	5.67 *
Health Promotion (HPLP-II) Total	.31 *	.50	11.26 *

Hierarchical Regression to Predict FACT-G Social Scale (n=136)

Predictors	Beta	Adj. R ²	F Δ
Self-Perceived Health	.06		
Total Functional Limitations	-.02		
Charlson Comorbidities Index	-.03	.13	
Adequacy of Assistance/Supports	.24 *	.34	43.57 *
CESD -10	-.19 *	.41	17.15 *
Economic Adequacy Scale	.25 *	.45	9.69 *
Health Promotion (HPLP-II) Total	.30 *	.51	16.03 *

Hierarchical Regression to Predict FACT-G Functional Scale (n=136)

Predictors	Beta	Adj. R ²	F Δ
Self-Perceived Health	-.14 *		
Unemployed due to Disability	.21 *		
Total Functional Limitations	-.07	.42	
CESD -10	-.44 *	.63	74.89 *
Self-Rated Abilities for Health Practices	.19 *	.67	15.46 *
Adequacy of Assistance/Supports	.17 *	.68	8.82 *

Order of variables represents order of entry into model. Beta Weights shown for last step in model.

* Significant at $p < .05$; F for final model=42.2, $df=5/130$, $p < .001$

Order of variables represents order of entry into 3-step model. Beta Weights shown for last step in model.

* Significant at $p < .05$; F for final model=34.74, $df=4/130$, $p < .001$

Order of variables represents order of entry into 3-step model. Beta Weights shown for last step in model.

* Significant at $p < .05$; F for final model=20.92, $df=7/128$, $p < .001$

Order of variables represents order of entry into 3-step model. Beta Weights shown for last step in model.

* Significant at $p < .05$; F for final model=49.67, $df=6/129$, $p < .01$