

# Physical Health, Mental Health, and Life Changes Among Family Caregivers of Patients With Lung Cancer

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**T**he impact of cancer on the entire family has received greater research and clinical attention since 2002 (Braun, Mikulincer, Rydall, Walsh, & Rodin, 2007; Kim & Given, 2008). Given the reduction in healthcare resources and the growth of outpatient care, family caregivers increasingly have assumed responsibilities previously performed by healthcare professionals. Family caregivers include those who assist a relative or friend diagnosed with cancer. That assistance includes medical and personal care, as well as informational, emotional, or financial support (Nijboer et al., 1998; Stajduhar et al., 2010). The role of caregiving frequently is associated with multiple stressors, including disrupted household and work routines, family role changes, emotional distress, financial burden, and health problems of the caregiver (Gaugler et al., 2005; Molassiotis, Wilson, Blair, Howe, & Cavet, 2011a; Östlund, Wennman-Larsen, Persson, Gustavsson, & Wengström, 2010; van Ryn et al., 2011).

Family caregivers of patients with cancer have reported as much or greater emotional distress than the patients themselves (Carmack Taylor et al., 2008; Grunfeld et al., 2004; Hasson-Ohayon, Goldzweig, Braun, & Galinsky, 2010; Molassiotis et al., 2011b). An estimated 20%–30% of family caregivers of patients with cancer report clinically significant distress (Pitceathly & Maguire, 2003), and positive associations between patients' and caregivers' psychological adjustment have been found (Hodges, Humphris, & Macfarlane, 2005; Northouse, Mood, Templin, Mellon, & George, 2000). Although fewer studies have focused on the physical health of caregivers of patients with cancer, research does show impaired physiologic responses in naturalistic (King, Atienza, Castro, & Collins, 2002) and laboratory (Kiecolt-Glaser, Marucha, Malarkey, Mercado, & Glaser, 1995) settings and worsening physical health as the patient's illness progresses (Kurtz, Given, Kurtz, & Given, 1994). For example, caregivers

**Purpose/Objectives:** To describe physical health, mental health, and life changes among family caregivers of patients with lung cancer.

**Design:** Cross-sectional quantitative study.

**Setting:** A university outpatient oncology center, two Veterans Affairs outpatient clinics, and a private outpatient oncology practice in Indianapolis, IN.

**Sample:** 91 family caregivers of patients with lung cancer.

**Methods:** Data were collected using standardized instruments and analyzed using descriptive statistics and hierarchical multiple regression.

**Main Research Variables:** Demographic and medical factors, physical health, mental health, and life changes from caregiving.

**Findings:** Caregivers' physical health and mental health were below population norms, whereas social functioning did not differ from norms. More than 50% of caregivers reported negative emotional effects of caregiving, and more than 33% reported negative physical health effects of caregiving. About 40% of caregivers, however, reported positive changes in their relationships with the patients with lung cancer and other family members as a result of caregiving. Caregivers' mental health was more strongly associated with life changes than physical health.

**Conclusions:** Findings suggest that many family caregivers of patients with lung cancer experience negative physical and mental health effects of caregiving, whereas relations with family members improve for a substantial minority of caregivers. These positive and negative consequences of caregiving should be jointly considered when developing self-report measures and interventions for this population.

**Implications for Nursing:** Nurses can conduct brief screening assessments to identify caregivers with probable distress and can provide practical and psychosocial support, as well as referrals to support services.

**Knowledge Translation:** Findings suggest that interventions are needed to address the negative physical and emotional health consequences of caring for family members with lung cancer. Such interventions could build on the relational benefits of caregiving to improve the patient-caregiver relationship and expand caregivers' support system.

of patients with cancer have shown high rates of sleep disturbances following the cancer diagnosis (Carney et al., 2011; Carter, 2002; Dhruva et al., 2012). In a U.S. survey by Kim and Schulz (2008), caregivers of patients with cancer reported levels of physical and emotional strain equivalent to those of caregivers of patients with dementia and higher than those of caregivers of patients with diabetes and frail older adults.

According to the stress and coping paradigm (Lazarus & Folkman, 1984), caregivers' adaptational outcomes (e.g., physical and mental health, life changes) are influenced by their appraisal of demands and resources and their coping efforts. A demand appraised as exceeding the caregiver's resources is considered a stressor. Personal and social resources include sociodemographic factors (e.g., age, education, income), medical factors (e.g., cancer treatments), psychosocial factors (e.g., social support, personal traits), and physical factors (e.g., medical conditions). Demographic and medical factors associated with emotional distress among family caregivers of patients with cancer have included younger age (Dunn et al., 2012; Siminoff, Wilson-Genderson, & Baker, 2010), lower socioeconomic status (Nijboer, Triemstra, Tempelaar, Sanderman, & van den Bos, 1999), and being female (Dunn et al., 2012; Hagedoorn, Sanderman, Bolks, Tuinstra, & Coyne, 2008). Gender has been found to interact with family role (spouse or adult child) to predict cancer caregiving stress, with sons reporting the least stress and daughters reporting the most stress (Kim, Baker, & Spillers, 2007). In addition, greater caregiver distress has been correlated with worse patient functional status and being a member of a patient-caregiver dyad in which one or both members continue to smoke (Kozachik et al., 2001; Weaver, Rowland, Augustson, & Atienza, 2011). Other predictors of greater distress among cancer caregivers have included unmet psychosocial and practical needs, reduced work productivity, and social factors, such as reduced quantity or quality of support from family and friends (Francis, Worthington, Kypriotakis, & Rose, 2010; Fridriksdóttir et al., 2011; Hasson-Ohayon et al., 2010; Kim, Kashy, Spillers, & Evans, 2010; Mazanec, Daly, Douglas, & Lipson, 2011; Siminoff et al., 2010).

About one-third of spousal caregivers of patients with lung cancer experience clinically significant distress associated with caregiving (Carmack Taylor et al., 2008; Kim, Duberstein, Sörensen, & Larson, 2005). Mental health problems among caregivers of patients with lung cancer may be related to the patient's high physical symptom burden (Spiro, Douse, Read, & Janes, 2008) and stigma or attributions of blame, particularly when the patient persists in tobacco use (Lobchuk, Murdoch, McClement, & McPherson, 2008). Caregivers of patients with lung cancer have reported difficulty with tasks such as providing emotional support, managing problematic behav-

iors, monitoring symptoms, and performing household tasks (Bakas, Lewis, & Parsons, 2001). Patients with lung cancer and their spouses also have reported difficulty discussing the patient's prognosis, cancer-related symptoms, continued tobacco use, and the spouse's emotional well-being (Badr & Carmack Taylor, 2006).

Although stressors faced by caregivers of patients with lung cancer have been documented (Badr & Carmack Taylor, 2006; Bakas et al., 2001; Ellis, 2012; Wennman-Larsen, Persson, Östlund, Wengström, & Gustavsson, 2008), research is lacking that assesses physical and mental health outcomes in this population (Persson, Östlund, Wennman-Larsen, Wengström, & Gustavsson, 2008). In addition, little is known regarding caregivers' perceptions of positive and negative life changes associated with caring for their family member with lung cancer. Life changes from caregiving have been defined as altered daily activities, family roles, and perceptions of the future, as well as beneficial or deleterious effects of caregiving on physical and mental health and close relationships with others (Bakas, Champion, Perkins, Farran, & Williams, 2006). Although psychological distress among caregivers of family members with cancer has been well documented (Ellis, 2012), few studies have examined positive changes associated with cancer caregiving (Kim, Schulz, & Carver, 2007; Manne et al., 2004; Wagner, Tanmoy Das, Bigatti, & Storniolo, 2011). The limited literature suggests that a range of positive changes may occur, including increased appreciation of life, greater empathy for others, closer relationships with loved ones, and more positive self-perceptions (Green, Wells, & Laakso, 2011; Kim, Schulz, et al., 2007).

To address gaps in knowledge regarding the lung cancer caregiving experience, the current study sought to (a) describe the physical and mental health of caregivers of patients with lung cancer, (b) determine which aspects of caregivers' lives changed as a result of providing care to a family member with lung cancer, (c) examine the extent to which patient and caregiver demographic variables (e.g., age, gender) and patient medical factors (e.g., time since diagnosis, treatments received) were associated with caregivers' physical and mental health and life changes from caregiving, and (d) determine the extent to which caregivers' physical functioning and mental health were associated with life changes from caregiving. Regarding the third goal, the authors hypothesized that caregiver demographic characteristics, including younger age, female gender, and less income and education, and worse patient functional status would be associated with worse physical and mental health and more negative life changes among caregivers based on prior theory (Lazarus & Folkman, 1984) and research (Dunn et al., 2012; Hagedoorn et al., 2008; Kozachik et al., 2001; Nijboer et al., 1999; Siminoff et al., 2010).

## Methods

### Participants and Procedure

Following approval of study methods by the Indiana University institutional review board, a convenience sample of family caregivers of patients with lung cancer was recruited from a university outpatient oncology center, two Department of Veterans Affairs hospital outpatient clinics, a private outpatient oncology practice, and a tumor registry in Indianapolis, IN. The current research represents a secondary analysis of data from this cross-sectional, quantitative study (Bakas et al., 2001). During a clinic visit, patients with lung cancer identified and gave researchers permission to contact family caregivers. Inclusion requirements included (a) being a family caregiver of a noninstitutionalized patient with lung cancer, (b) being aged 18 years or older, and (c) performing at least two types of caregiving tasks from the Oberst Caregiving Burden Scale (Carey, Oberst, McCubbin, & Hughes, 1991) time subscale for at least one month. This 15-item subscale assesses the degree of time spent performing caregiving tasks (e.g., emotional support, personal care) on a scale from 1 (none) to 5 (a great amount). A research assistant approached caregivers from each of the study sites during the patient's clinic visit to screen them for study eligibility and request participation. Caregivers of patients affiliated with the tumor registry were recruited by telephone. Following eligibility screening and an informed consent process that included discussion of the research status of the survey, participants' rights, and the risks and benefits of participation, caregivers completed either a face-to-face or telephone interview. Caregivers who lived more than one hour from the study site completed a telephone interview. Caregivers received \$10 for their participation in this study.

### Measures

**Physical and mental health:** Participants completed the **Medical Outcomes Study SF-36®** (Ware, Snow, Kosinski, & Gandek, 1993), a valid and reliable 36-item measure of health-related quality of life that has been used with caregivers of patients with cancer, including those with lung cancer (Northouse et al., 2002; Sarna et al., 2006; Weitzner, Jacobsen, Wagner, Friedland, & Cox, 1999). The SF-36 includes eight physical and mental health subscales: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health. Standardized subscale scores range from 0–100, with higher scores indicating better health. The physical functioning and mental health subscales were used to represent physical and mental health in the regression equation.

**Life changes:** The 15-item **Bakas Caregiving Outcomes Scale (BCOS)** (Bakas et al., 2006) was used to assess caregivers' perceptions of positive and negative

changes in their lives as a result of providing care for a patient with lung cancer. The measure has shown adequate reliability and validity with family caregivers of patients who had a stroke (Bakas et al., 2006) and patients with lung cancer (Bakas, Barr, Croner, Schmidt, & Hardin, 2000). In a previous study with caregivers of patients with lung cancer, the BCOS showed good internal consistency reliability ( $\alpha = 0.88$ ) and evidence of unidimensionality, with item loadings from a factor analysis ranging from 0.3–0.78 (Bakas et al., 2000). The measure also showed adequate construct validity based on significant, moderate associations with measures of caregiving burden (–0.33 to –0.28), self-esteem (0.41), and mental and physical health (0.33–0.47) (Bakas et al., 2000). Criterion-related validity was supported by a significant association with a criterion variable asking how the caregiver's life had changed overall (0.61). Caregivers were asked to rate each item using a seven-point response scale. A score of 1–3 indicated a change for the worse, 4 indicated no change, and scores of 5–7 indicated an improvement. Total BCOS scores range from 15–105, with scores below 60 indicating consistently negative changes from providing care.

**Medical factors:** Caregivers reported the patient's medical information, including time since diagnosis and history of surgery, radiation, or chemotherapy. The patient's physical functioning was assessed via a caregiver-reported **Karnofsky Performance Status (KPS) scale** (Karnofsky & Burchenal, 1949), which uses a 10-point response scale ranging from 0 (deceased) to 100 (normal, no complaints, no evidence of disease) in 10-point increments. The KPS was found to have adequate reliability and validity for use with patients with cancer (Yates, Chalmer, & McKegney, 1980).

**Sociodemographic factors:** Caregivers reported standard sociodemographic characteristics such as age, gender, race, employment status, education, income, and type of relationship to the patient.

### Statistical Analyses

Data were analyzed with SPSS®, version 19.0, statistical software. Descriptive statistics were used to characterize the caregivers' physical health, mental health, and life changes. The authors examined bivariate associations between demographic and medical factors and caregivers' physical health, mental health, and life changes. Discrete variables were analyzed using t-tests or analysis of variance; continuous variables were analyzed using Pearson correlations. Assumptions of multiple regression were evaluated using procedures outlined by Tabachnick and Fidell (2001). Skew and kurtosis indices suggested that the data were normally distributed. Any demographic and medical factors that were significantly associated with life changes ( $p < 0.05$ ) were controlled in the main analysis using hierarchical multiple regression in which



**Table 1. Sample Characteristics (N = 91)**

Characteristic	$\bar{X}$	SD	Range
Caregiver age (years)	58	13	26–83
Patient age (years)	64	10	40–83
Caregiver education (years)	13	2	7–20
Years since patient's diagnosis	1	2	0–12
Patient Karnofsky Performance Status	78	13	50–100

  

Characteristic	n	%
<b>Female caregiver</b>	71	78
<b>Male patient</b>	61	67
<b>Type of relationship</b>		
Spouse	64	70
Adult child <sup>a</sup>	16	18
Missing	11	12
<b>Race or ethnicity</b>		
Non-Hispanic White	80	88
African American or Black	10	11
Other	1	1
<b>Caregiver employment status</b>		
Working full- or part-time	40	44
Unemployed or retired	51	56
<b>Type of treatment<sup>b</sup></b>		
Chemotherapy	56	62
Radiation	53	58
Surgery	36	40

<sup>a</sup> Includes one adult child-in-law

<sup>b</sup> More than one option may have applied.

life changes were regressed on physical functioning and mental health. According to Tabachnick and Fidell (2001), the number of cases needed for testing the multiple correlation in multiple regression can be determined by the rule  $N \geq 50 + 8$  (number of independent variables), which assumes that  $\alpha = 0.05$  and  $\beta = 0.2$ . Eighty-nine caregivers provided complete data for the regression analysis, and, thus, up to four independent variables could be included. A post-hoc power analysis also was conducted to determine the adequacy of the sample size for the hierarchical multiple regression analysis with four predictors. The study had more than 99% power to detect overall effect size ( $R^2 = 0.35$ ,  $F[4, 84] = 2.48$ ,  $p < 0.05$ ) (Faul, Erdfelder, Lang, & Buchner, 2007).

## Results

### Sample Characteristics

A total of 110 family caregivers of patients with lung cancer were approached in person (93%) or via telephone (7%) to request study participation. Of those, 91 (83%) consented to participate and completed the questionnaires, and the other 19 caregivers were ineligible, unable to be contacted, or unwilling to participate, most commonly because they felt they could not make the time commitment. Most of the 91 participants (80%) completed a face-to-face assessment, and 20%

completed the assessment over the phone because of traveling distance. When comparing caregivers who completed a face-to-face assessment to those who completed a phone assessment on demographic and medical factors and study variables, only two differences were found. Caregivers who completed a phone assessment experienced less bodily pain ( $t[89] = -2.17$ ,  $p < 0.05$ ) and were more likely to be caring for a patient who had undergone surgery ( $\chi^2 [1, N = 91] = 6.9$ ,  $p < 0.05$ ) than caregivers who completed an in-person assessment.

Demographic and medical characteristics of the sample are shown in Table 1. Most caregivers were non-Hispanic White and the spouse (70%) or adult child (18%) of the patient. The majority of caregivers were women. Caregivers' ages ranged from 26–83 years, with an average age of 58 years. Participants had a mean educational level of 13 years, and the median household income was \$30,000–\$40,000. The average time since the patient's diagnosis was one year, and the majority of patients had undergone chemotherapy and radiation. KPS scores suggested that, on average, patients experienced some difficulty in carrying out daily activities (Karnofsky & Burchenal, 1949).

### Descriptive Statistics

Table 2 shows descriptive statistics and Cronbach alphas for study variables. Cronbach alphas for most measures ranged from 0.8–0.92, indicating good internal consistency reliability. Cronbach alphas for bodily pain (0.68) and social functioning (0.68) were marginal. Caregivers had lower mean scores than U.S. population norms (Ware, Kosinski, & Keller, 1994) across all SF-36 subscales, with the exception of social functioning (see Table 3). The largest negative differences were observed for bodily pain and role limitations because of emotional problems.

Most caregivers reported that several aspects of their lives had changed for the worse as a result of providing care for their family member (see Tables 4 and 5). More

**Table 2. Descriptive Statistics for Study Variables (N = 91)**

Variable	$\bar{X}$	SD	Range	$\alpha$
<b>Life changes (BCOS)</b>	55.23	10.9	31–99	0.88
<b>Physical and mental health<sup>a</sup></b>				
Physical functioning	77.86	24.71	5–100	0.92
Role, physical	73.35	34.72	0–100	0.8
Bodily pain	61.1	31.82	0–100	0.68
General health	66.67	21.47	25–100	0.81
Vitality	52.53	23.98	10–95	0.86
Social functioning	81.87	26.17	0–100	0.68
Role, emotional	68.13	39.73	0–100	0.83
Mental health	69.23	20.61	0–100	0.82

<sup>a</sup> SF-36®

BCOS—Bakas Caregiving Outcomes Scale

**Table 3. Differences in SF-36® Mean Scores Between Caregivers and U.S. Population Norms (N = 91)**

Characteristic	$\bar{X}$	95% CI
Physical functioning	-6.3	[-11.4, -1.3]
Role, physical	-7.5	[-14.7, -0.4]
Bodily pain	-14.1	[-20.6, -7.6]
General health	-5.2	[-9.7, -0.8]
Vitality	-8.4	[-13.3, -3.4]
Social functioning	-1.4	[-6.8, 4]
Role, emotional	-13.2	[-21.3, -5]
Mental health	-5.5	[-9.7, -1.2]

CI—confidence interval

Note. Scores were on a scale ranging from -30 (caregivers worse) to 10 (caregivers better).

than 50% reported reductions in time for social activities, as well as a decreased level of energy, emotional well-being, and ability to cope with stress. More than one-third of the caregivers reported negative changes in physical health and functioning as a result of caregiving. Aspects of caregivers' well-being that were least negatively affected by caregiving included self-esteem, relationship with the patient, and relationships with family members. In fact, about 40% of caregivers reported that their relationship with the patient and other family members had improved since providing care, and about 20% of caregivers reported improvement in their self-esteem.

### Correlates of Physical Health, Mental Health, and Life Changes

Bivariate associations between demographic and medical factors and the eight subscales of the SF-36 were examined. Several caregiver demographic characteristics were associated with physical health outcomes. Specifically, male caregivers reported better physical functioning than female caregivers ( $t[89] = 2.23, p < 0.05$ ). Adult child caregivers reported better physical functioning ( $t[78] = -2.43, p < 0.05$ ) and general health ( $t[77] = -2.47, p < 0.05$ ) than spousal caregivers. Employed caregivers also showed better physical functioning ( $t[89] = 3.29, p < 0.01$ ) and general health ( $t[88] = 2.77, p < 0.01$ ) than retired or unemployed caregivers, and years of education were positively correlated with these outcomes (physical functioning [ $r = 0.23, p < 0.05$ ]; general health [ $r = 0.39, p < 0.001$ ]). Income was positively associated with physical functioning ( $r = 0.34, p < 0.01$ ), general health ( $r = 0.39, p < 0.001$ ), and vitality ( $r = 0.26, p < 0.05$ ). No other significant associations were found between caregiver demographics and their physical and mental health outcomes.

Limited associations were found between patient characteristics and caregivers' physical and mental health outcomes. The patient's receipt of chemotherapy was correlated with worse role-emotional functioning among caregivers ( $t[89] = -2.31, p < 0.05$ ). Conversely, greater time since the patient's diagnosis and better patient functional status were correlated with better role-emotional functioning among caregivers ( $r = 0.22$  and  $0.25, p < 0.05$ , respectively). Better patient functional status also was associated with better physical health outcomes (i.e., physical functioning, role-physical functioning, general health, and vitality) among caregivers (range =  $0.24-0.35, p < 0.05$ ). None of the other patient demographic (e.g., age, gender) or medical factors (e.g., surgery, radiation) showed significant associations with caregivers' physical and mental health outcomes.

Caregiver demographic factors significantly associated with more positive life changes included gender (men reported more than women) ( $t[89] = 2.34, p < 0.05$ ) and years of education (those with more years of education had more positive life changes) ( $r = 0.31, p < 0.01$ ). None of the other demographic and medical factors were significantly associated with life changes. All eight subscales of the SF-36 showed significant, positive correlations with life changes (range =  $0.33-0.47, p < 0.05$ ), with the exception of bodily pain ( $r = 0.18, p = 0.09$ ).

### Physical Functioning and Mental Health as Predictors of Life Changes

In the regression model, control variables (i.e., caregiver gender and years of education) were entered in Step 1, and physical functioning and mental health were

**Table 4. Proportion of Caregivers Reporting Life Changes Associated With Caregiving (N = 91)**

Variable	Change for Worse		No Change		Change for Better	
	n	%	n	%	n	%
Self-esteem	8	9	67	74	16	18
Physical health	32	35	52	57	7	8
Time for family activities	43	47	44	48	4	4
Ability to cope with stress	54	59	26	29	11	1
Relationship with friends	24	26	52	57	15	16
Future outlook	44	48	28	31	19	21
Level of energy	49	54	35	39	7	8
Emotional well-being	56	62	27	30	8	9
Roles in life	32	35	45	50	14	15
Time for social activities with friends	52	57	34	37	5	5
Relationship with family	8	9	47	52	36	40
Financial well-being	33	36	52	57	6	7
Relationship with the patient with lung cancer	7	8	46	51	37	41
Physical functioning	34	37	50	55	7	8
General health	29	32	55	60	7	8
Life in general	35	38	31	34	25	27

**Table 5. Medians and Interquartile Ranges for Bakas Caregiving Outcome Scores Measuring Life Changes (N = 91)**

Characteristic	Median	Interquartile Range
Self-esteem	4	4–4
Physical health	4	3–4
Time for family activities	4	3–4
Ability to cope with stress	3	2–4
Relationship with friends	4	3–4
Future outlook	4	3–4
Level of energy	3	3–4
Emotional well-being	3	2–4
Roles in life	4	3–4
Time for social activities with friends	3	2–4
Relationship with family	4	4–5
Financial well-being	4	3–4
Relationship with the patient with lung cancer	4	4–6
Physical functioning	4	3–4
General health	4	3–4
Life in general	4	3–5

Note. Scores were on a scale ranging from 1 (change for worse) to 7 (change for better).

entered in Step 2. These four variables accounted for 35% of the variance in life changes (see Table 6). Examination of the unique effects indicated that male gender, higher levels of education, and better mental health were associated with more positive life changes.

## Discussion

The current study furthered knowledge of physical health, mental health, and life changes experienced by family caregivers of patients with lung cancer. As hypothesized, physical health and mental health in this sample were lower than population norms (Ware et al., 1994) and similar to those found in studies of caregivers of patients who had a stroke (Parag et al., 2008) and caregivers of patients with mixed cancer types (Weitzner, McMillan, & Jacobsen, 1999). Social functioning in this sample, however, was comparable to that of the general population (Ware et al., 1994). These results parallel changes that participants attributed to caregiving; more than 50% reported negative emotional health consequences, and more than 33% reported negative physical health consequences of caregiving. With regard to social functioning, more than 50% of caregivers reported no changes in relation-

ships with family and friends, and about 40% reported positive changes in relationships with the care recipient and other family members. In a population-based study of caregivers of family members who had a stroke, a similar prevalence of physical and mental health consequences of caregiving was found, although fewer caregivers (17%) reported positive changes in family relationships (Parag et al., 2008). The present findings also are consistent with research on family caregivers of chronically ill individuals that found both positive personal changes (e.g., closer family relationships, increased appreciation of life) and negative health effects of caregiving (Baanders & Heijmans, 2007; Carney et al., 2011; Fridriksdóttir et al., 2011; Green et al., 2011; Kim & Schulz, 2008; Kim, Schulz, et al., 2007; Manne et al., 2004). Taken together, these results support a multidimensional model of adjustment to caregiving in which positive and negative adaptational outcomes may occur either simultaneously or sequentially for the same caregiver (Parkes, 1971). Specifically, many caregivers in the current study reported concurrent perceptions of improved relationships and more personal health problems from caregiving.

The extent to which demographic and medical factors predicted life changes and physical and mental health outcomes was examined. Consistent with prior research (Gaugler et al., 2005) and the current hypothesis, women were more likely to report negative life changes than men. Several possible explanations for this gender difference have been suggested. Women may be more likely to attend to and report their emotional and relational concerns (Barr, Kahn, & Schneider, 2008). In addition, women are more likely to have multiple roles that compete for limited psychological resources and are more likely to assume time-consuming and burdensome tasks, such as household responsibilities and personal care of

**Table 6. Hierarchical Multiple Regression Predicting Life Changes (N = 89)**

Independent Variable	B	$\beta$	t	Bivariate r	Partial r
<b>Step 1<sup>a</sup></b>					
Caregiver gender	-6.44	-0.24	-2.43	-0.25*	-0.25*
Caregiver education	1.55	0.3	3.05	0.31**	0.31**
<b>Step 2<sup>b</sup></b>					
Caregiver gender	-5.93	-0.22	-2.46	-0.25*	-0.26*
Caregiver education	1.32	0.26	2.85	0.31**	0.3**
Caregiver physical functioning	0.04	0.08	0.77	0.33**	0.08
Caregiver mental health	0.22	0.42	4.43	0.46***	0.44***

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

<sup>a</sup> $R = 0.39$ ;  $R^2 = 0.15$ ; adjusted  $R^2 = 0.13$ ; F change = 7.75\*\*;  $R^2$  change = 0.15;  $F[2, 86] = 7.75$ \*\*

<sup>b</sup> $R = 0.59$ ;  $R^2 = 0.35$ ; adjusted  $R^2 = 0.32$ ; F change = 12.89\*\*\*;  $R^2$  change = 0.2;  $F[4, 84] = 11.39$ \*\*\*

B—unstandardized regression coefficient

Note. N = 89 because two cases were missing.

Note. Gender coded (male = 1 and female = 2)



the patient (Barnett & Hyde, 2001; Gaugler et al., 2008). Also consistent with hypotheses, lower educational attainment was associated with more negative life changes. Level of education has shown mixed associations with appraisals of caregiving burden, and ethnicity appears to moderate these associations (Lawton, Rajagopal, Brody, & Kleban, 1992). In contrast to the general caregiving literature in which younger age (Dunn et al., 2012; Siminoff et al., 2010) and lower income (Nijboer et al., 1999; Zhang, Zyzanski, & Siminoff, 2010) are risk factors for distress and reduced quality of life, these variables were not correlated with life changes or mental health outcomes in the current study. Physical health outcomes, however, showed inconsistent associations with several indicators of socioeconomic status. Specifically, lower levels of income and education and being unemployed or retired were correlated with worse physical functioning and general health, but were unrelated to pain or role-physical functioning. The limited demographic variability may partially account for the null findings. Contrary to prior research (Kozachik et al., 2001) and the study's hypothesis, patient functional status was not associated with life changes. However, consistent with hypotheses, reduced patient functional status was associated with worse physical health outcomes and role-emotional functioning among caregivers. Therefore, the health effects of caregiving may increase as the patient requires more assistance with activities of daily living. Taken together, the results partially support the theoretical perspective that caregivers' adaptational outcomes (e.g., health, life changes) are influenced by resources, including socioeconomic and medical factors (Lazarus & Folkman, 1984).

The regression analysis indicated that mental health was more strongly associated with life changes than physical functioning. Those findings are similar to those found in research with caregivers of patients with cardiovascular disease; caregivers' mental health was moderately correlated with life changes, whereas their physical health was not (Halm & Bakas, 2007). It should be noted that older caregivers have reported more physical strain associated with caregiving than younger caregivers (Kim & Schulz, 2008), and older adults were underrepresented in the current sample. Additional research is needed to clarify the relationships among age, health status, and life changes in family caregivers of patients with lung cancer.

### Limitations

Limitations of this study and directions for future research should be noted. The cross-sectional design and retrospective reporting of life changes preclude causal inferences about associations between caregivers' characteristics and these changes. In addition, consistent with most caregiver studies, the sample primarily consisted of Caucasian, middle-class women who were either spousal or adult child caregivers. The results might not

generalize to other types of populations. Replication in a larger and more diverse sample of caregivers is needed. In addition, information regarding patient medical factors and caregiver demographics was not collected from nonparticipants, and, therefore, the authors were unable to assess response biases based on these factors. Findings regarding the patient's medical factors and functional status should be interpreted with caution because these data were reported by caregivers. Future research should compare medical record data and biologic variables to caregiver report to see which types of data are most strongly associated with caregiver life changes. Finally, other caregiver-reported outcomes could be examined in future research. For example, the extent to which cancer-related stigma, illness-related attributions (e.g., blame), health behaviors (e.g., smoking, alcohol use), and coping strategies predict life changes warrants additional study.

## Implications for Nursing Research and Practice

The current findings present implications for future research. The results suggest that many family caregivers of patients with lung cancer experience negative physical and mental health consequences of caregiving but also positive changes in their family relationships as a result of caregiving. Those positive and negative effects should be jointly considered when developing future research studies and self-report measures for this population. Few research-based interventions have been developed for caregivers of patients with cancer (Kim & Given, 2008). Research is required to develop and evaluate psychosocial interventions that are tailored to the needs and preferences of caregivers of patients with lung cancer. Many caregivers in the current study reported improved relationships with the patient and other family members, suggesting that interventions could build on the relational benefits of caregiving to better strengthen the patient-caregiver relationship and expand caregivers' support system.

Findings suggest that oncology nursing efforts are especially needed to identify and provide greater support for caregivers with poor mental health. Brief screening measures with clinically meaningful cutoff points, such as the Patient Health Questionnaire—depression scale (Spitzer, Kroenke, & Williams, 1999), may be used to identify caregivers with a probable need for support services. Those caregivers may be referred to mental health services. Although a range of services, including psychotherapy, pharmacotherapy, and educational interventions, is available to patients with cancer and their family members at many comprehensive cancer centers, individuals treated at other centers, including those of lower socioeconomic status, ethnic minorities, and those with low health literacy, may not experience the same level of care (Institute of Medicine, 2008).

Nurses can play an important role in addressing caregivers' practical challenges (e.g., transportation, finances), health maintenance, and psychosocial support needs. First, nurses may prepare patients' family members for the emotional aspects of caregiving by providing informational and practical resources to assist them in supporting the patient. This preparation also may involve referring caregivers to resources to improve their self-care. In addition, acknowledging and validating caregivers' emotions may help caregivers process the implications of the diagnosis. Given the complex psychosocial issues associated with the etiology of lung cancer and the potentially severe side effects of the disease and its treatment, determining how best to meet caregivers' needs is an important goal for future research and clinical care.

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