Depressive symptoms in lung cancer Patients and their family caregivers and the influence of family environment

Laura A. Siminoff, PhD, **Maureen Wilson-Genderson, PhD**, and **Sherman Baker Jr., MD**

Abstract

Objective—This study investigated depressive symptomatology in lung cancer patients and their identified caregiver.

Methods—We conducted semi-structured interviews and administered measures of family environment, depressive symptomatology, and the extent to which the caregiver blamed the cancer on the patient not having taken better care of him/herself to 190 patient-caregiver dyads. Multivariate two-level models were used to estimate the unique effects for each dyad member and cross-partner effects while controlling for interdependencies in the data.

Results—More than half of patients (55%) were male but 74% of caregivers were female. The majority (57.4%) were spouses, followed by offspring and other family or friends The baseline model with covariates showed that younger caregivers, spouse caregivers, and caregivers who blamed the patient for the cancer had higher depressive symptom scores. When examining the unique effect for each dyad member, with the exception of patient report of familial conflict, patient and caregiver reports of lower familial cohesion and expressiveness and higher conflict were associated with higher depression scores for patient and caregiver respectively. When examining cross-partner effects, patient reports of lower cohesion, lower expressiveness and greater conflict were associated with higher caregiver depression scores. Offspring caregivers reported less depression than non-offspring caregivers.

Conclusion—The family environment and blaming the patient during times of illness can affect both patient and caregiver depression. Findings suggest that quality of the family dynamic is important for patients but may be particularly influential for caregivers. Future research should aid clinicians' assessment of family environment when making treatment plans.

Introduction

In cancer, progressive illness leads to an increased involvement of family members as caregivers and, ultimately, decision makers [1,2] Because more cancer patients receive their treatment in outpatient rather than in-patient settings, care of cancer patients falls increasingly on the shoulders of patients' families [3]. Families have different patterns of responses to a diagnosis of cancer and also have varying social, economic, and emotional resources that can be activated to respond to the cancer diagnosis and its aftermath. The literature suggests that several patient and caregiver characteristics factor into the response to a diagnosis and ability to positively adapt to the ensuing demands of treatment and living with cancer. Among these characteristics are patient and caregivers age, education, gender, access to resources, living arrangements and prior family function [4].

It is well known that depressive symptoms are more common in cancer patients than in the general population (25% vs. 6%) [5–8]. There are also significantly higher rates of depression among cancer patients than among individuals with other chronic illnesses [6]. Less work has been done with caregivers, but research suggests that they too suffer from higher rates of depression. While some studies suggest that caregivers experience

approximately equal symptoms of psychological distress such as depressed or anxious mood when compared to patients [8], others report that caregivers have even higher levels of depression than do the cancer patients that they care for [7,9]. A review by Fletcher et al. found that prevalence rates for caregiver depression ranged from 20%–73% and that higher levels of depression in caregivers are often associated with higher anxiety, sleep disturbance, fatigue, anger, guilt, and irritability, as well as with lower quality of life and satisfaction with life [10].

Caring for a patient with cancer can be overwhelming both mentally and physically, and caregivers of cancer patients spend a significant amount of their time caring for their ill loved one [11] which can further impact caregiver quality of life and lead to financial strain [9]. Rhee and colleagues found that two-thirds of caregivers of cancer patients reported having to make major life changes one-fourth reported difficulty in functioning normally due to increased stress levels since the diagnosis [9]. Caregivers of patients with cancer may experience poorer physical, psychological, and spiritual wellbeing, as well as poorer social functioning, than caregivers of patients with other chronic diseases [6].

Depressive symptomatology, as well as other mental health and quality of life-related variables, has been frequently conceptualized as an individual matter, but social contextual models argue that symptom levels are likely to co-vary in close relationships. According to family systems theory, any change in the functioning of one individual affects the functioning of the entire family system; therefore not only will any changes in the health status of one individual, such as psychosocial issues, acute or chronic illness, treatment failure, or symptom recurrence, affect the family system, but the way in which the family copes will in turn affect the patient's physical and psychosocial wellbeing [12,13]. Thus, while external variables such as disease severity and social support may affect patient and caregiver quality of life and psychosocial wellbeing directly, the interdependence of patients and caregivers contribute to a situation in which the well-being of each individual in the dyad also affects the wellbeing of the other [13].

Past research has found that the mood and affect of a patient and his or her caregiver are significantly correlated [14–17]. Two studies by Kim and colleagues [18,19] showed interesting findings about psychological distress and physical and mental health in dyads. One study [18] examined breast and prostate cancer survivors and their spousal caregivers, and found that while each individual's psychological distress was the best predictors of their own mental and physical health outcomes, one's greater psychological distress also significantly predicted poorer physical health in the other. A second study [19] that examined adult caregiver daughters and their mothers with cancer found that while the daughters' distress levels did not affect the mothers' physical or mental health, the mothers' distress impacted the caregivers' mental and physical health. Other findings have been mixed. Segrin and colleagues [20] reported that while patient and caregiver anxiety was highly correlated, only caregiver anxiety was predictive of patient anxiety. In regards to depression, patient stress and negative affect predicted caregiver depression though none of the caregiver variables predicted patient depression in breast cancer patients [17]. Further, patient and caregiver difficulties with role adjustment after the cancer diagnosis significantly predict the role adjustment of the other [21,22]; patient emotional distress has also been found to predict caregiver emotional distress one year post-diagnosis and vice versa [21].

The present study investigated depressive symptomatology in patients with Stage III or IV lung cancer and their identified caregiver. The influence of age, gender, marital status, physical health status, relationship to patient (e.g., spouse, offspring) and blame, on depressive symptoms of both the patients and caregivers was explored using dyadic multilevel models.

1. Does own family environment (cohesion, expressiveness, conflict) affect one's own depressive symptoms?

2. Does one partner's family environment (cohesion, expressiveness, conflict) affect the other dyad members depressive symptoms?

3. Are the own and other effects for FES similar for the dimensions cohesion, expressiveness and conflict?

4. How do variables known to influence or be confounded with depressive symptoms and familial cohesion, including age, gender, marital status, physical health status, relationship to patient and blaming the patient affect the associations between FES and CES-D for patients and family members?

Methods

Data Source

The sample was drawn from a cross-sectional study designed to develop and validate the Cancer Communication Assessment Tool for Patients and Families (CCAT-PF). The measure was developed to assess congruence in patient-family caregiver communication. The results of this study have been published elsewhere [23,24]. The sample consists of 190 lung cancer patients and their primary caregivers. Patients were identified through electronic medical record review and, with permission of their physicians, contacted by letter. Patients received care at a comprehensive cancer center and its community affiliates in the Midwest. Most were taking treatment (65.5%) or had recently completed treatment (22.5%) consisting of surgery and/or radiation and at least one course of chemotherapy. The majority of the remaining patients were either in remission, had stable disease or were considering new treatment. Ninety-two percent (92%) of the patients were smokers. Caregivers (identified by patients) are defined as the individuals (non-healthcare providers) patients primarily rely on for help with care, treatment and decision making. Smoking status of the caregivers was not assessed. Inclusion criteria stipulated that patients all had advanced-stage (III and IV) non-small cell lung cancer; stage of disease was confirmed through chart review. Study eligibility required that a patient and at least one caregiver agree to participate. Subject response rate was 76%.

Procedures

All data were obtained from semi-structured individual interviews that were audiotaped and transcribed. Prior to participating, informed written consent was obtained from the patient and the caregiver as approved by the Institutional Review Board (IRB). Most patients and all caregivers were interviewed individually with measures presented in the same order to all respondents. Interviews lasted approximately 45–60 minutes and included structured questions about treatment preferences, mental health, family environment, and demographics. There was ample opportunity for the patient and caregiver to discuss information and feelings that were outside the limits of the structured questionnaires. All interviewers were trained research assistants and all were women.

Measures

Sociodemographic information was collected from patients and caregivers. The relationship of the caregiver to the patient was dummy coded for spouse (non-spouse caregiver = 0, spouse caregiver = 1) as well as offspring (non-offspring caregiver = 0, offspring caregiver = 1). Gender (male = 0 female = 1) and marital status (not married = 0 married = 1) were also dummy coded. Age was measured in years.

Family Environment—Assessment of the family environment was done by having the patient and the caregiver respond to the Family Environment Scale (FES) [25]. The FES was developed to measure social and environmental characteristics of families. Subscales include measurements of Cohesion (degree of commitment, help and support family members provide for one another); Expressiveness (extent to which family members are encouraged to express their feelings directly), and Conflict (amount of openly expressed anger and conflict among family members). Each item is rated yes or no with higher scores reflecting less cohesion, less expressiveness and greater conflict.

Blame—The degree to which the family blames the patient was assessed with the single item: "The family blames the cancer on the patient not having taken better care of him/herself". This was coded 0 if the respondent denied this was ever the case and 1 if the respondent ever indicated that it was true.

Depressive Symptoms—Self-reported depressive symptomatology experienced by patients and caregivers was measured with the 20-item Center for Epidemiologic Studies Depression Scale (CES-D). The instrument was administered and scored (each item rated from 0 to 3) according to the procedures suggested by Radloff [26], with higher scores indicating more depressive symptoms. Reliability for patients was .86 and for the caregivers .91.

Patient Physical Health—Seven items representing physical well-being from FACT-L Version 4 were used to assess patient physical health including the following: `I have a lack of energy' ; `I have nausea'; `Because of my physical condition, I have trouble meeting the needs of my family'; `I have pain'; `I am bothered by side effects of treatment'; `I feel ill'; `I am forced to spend time in bed.' Items were scored on a scale of 1 to 4 with 0 being not at all and 4 being very much. Responses were summed and higher scores represent more health impairment Reliability was calculated as coefficient alpha=.85.

Caregiver Physical Health—Four items from the SF20 were used to assess caregiver physical health including a global item asking respondents to generally rate their health from excellent to poor. A series of 3 questions also asked respondents to rate their health on a scale of 1 to 5 where 1 is definitely true and 5 is definitely false. Responses were summed with higher scores representing more health impairment. Reliability was calculated as coefficient alpha=.90.

Data Analysis

Descriptive statistics (means and frequencies) for sample participant characteristics were computed. Before analysis, the distributions of the variables were inspected for skewness, kurtosis and outliers. The bivariate correlations amongst patient and caregiver CES-D and FES Cohesion, FES Expressiveness, and FES Conflict were computed.

The data were analyzed using the multivariate two-level model for matched pairs data [27–29]. This model enables the simultaneous estimation of the unique effects for each dyad member as well as cross-partner effects while controlling for interdependencies in the data. The inter-dyad effects, if not adequately modeled, may lead to misleading or incomplete understanding of depressive symptomology in these patients and family members [30]. The models were estimated using full information maximum likelihood (FIML) via HLM 6.04 [31] with all available data from all patients and caregivers.

We develop these models by first testing the association between the patient's FES cohesion scores and patient depressive symptoms along with the association between the caregiver's

FES cohesion score and caregiver depressive symptoms. These are referred to as `own' models as they examine whether the person's own score on the predictor variable influences the person's own outcome. Subsequently we add the cross-partner effect assessing the influence that patient cohesion has on caregiver depressive symptoms as well as the influence caregiver's cohesion has on patient's depressive symptoms. These are termed the `other' models as they reveal whether the participant's score on a predictor variable influences the other dyad member's outcome. A separate set of models is run for each FES subscale (cohesion, expressiveness, and conflict). The initial model includes the mean for patient and caregiver depressive symptoms and controls for demographics for patient and caregiver respectively. Then the three sets of models estimated testing own FES-cohesion and other FES-cohesion; testing own FES-expressiveness and other FES-expressiveness; and finally testing own FES-conflict and other FES-conflict. Examined also as potential explanatory variables are whether the family blames the cancer on the patient not having taken better care of him/herself and the nature of the caregiver relationship (spouse, offspring) to patient as a possible predictor of depressive symptoms.

We create parallel scales using the CES-D items for each member of the dyad to afford estimation of this multilevel model [27,32]. First, item pairs are formed by matching items on their standard deviations. Then, one item from each pair is randomly assigned to the first parallel scale and the other is assigned to the second parallel scale. This results in 2 parallel scales approximately equal in reliability and variance. Thus each respondent has 2 depressive symptom scores available resulting in four responses per dyad. The additional degree of freedom provided permits estimation of the measurement error variance.

Results

Descriptive statistics for the patient and caregivers by relational role are presented in Table 1. Notable is that 75% of the caregivers were women and 86% of the caregivers were married. Additional exploratory analyses revealed that 69% of the non-spouse caregivers were married.

Bivariate correlations revealed that caregiver depressive symptoms were significantly associated not only with caregivers own FES subscales (cohesion, expressiveness and conflict) but with patient depressive symptoms and FES subscales as well. In contrast patient depressive symptoms were significantly associated with patient cohesiveness and expressiveness but not with patient conflict, caregiver depressive symptoms, caregiver cohesion, expressiveness or conflict.

The bivariate correlation between spouse caregiver CESD and spouse caregiver age was −.18 (p > .08) and was −.32 (p < .05) for child caregiver. 42% of spouses blame the patient's cancer on the patient not having taken better care of him or herself whereas 34% of caregivers who are offspring do.

22% of spouse caregivers are at a score of 16 or higher on the CESD (commonly accepted cut off for probable depression) and 20% of the caregivers who were the patient offspring scored similarly. −0.090503 0.028

Baseline Model

The results of the baseline multilevel model predicting patient and caregiver mean depression scores including covariates age and gender for each dyad member were as follows: patient depressive symptoms M = 5.1, SE= 1.0, caregiver depressive symptoms M = 6.0, SE = 1.5. This suggests CES-D scores for the patient of approximately 10.0 and for the caregiver approximately 12.0 (recalling that these are in parallel scale units). No

covariates were significant (data not shown). The tau correlation between patient and caregiver depressive symptoms was .25.

Prior to testing the family cohesion elements in the model, additional level two covariates were added. These included the dummy variable representing whether the caregiver is a spouse, the variables indicating whether the family blames the patient from the patient and caregiver's perspectives respectively and physical health. The differences between the baseline model and this model were as follows: caregiver depressive symptoms M = 6.0, SE = 2.0, with caregiver age (b = −0.09, p < .05), caregiver blaming the patient (b = 1.4, p < .02), being the spouse of the patient (2.1, p < .05), and caregiver physical health (.48, p < .001) all associated with caregiver depressive symptom scores. Younger caregivers, those who blamed the patient, those who were the spouse of the patient and those with greater health impairment had higher depressive symptom scores. Additional differences for the patient were: patient depressive symptoms M = 3.1, SE = 2.6, with patient physical health (.46, p < .001) associated with patient depressive symptom scores. Patients with greater health impairment had higher depressive symptom scores.

Familial Cohesion Model

The multilevel model testing the associations between patient and caregiver depressive symptoms and the FES cohesion subscale are presented in Table 3. The first 2 columns present the `own' model of familial cohesion and depressive symptoms. Controlling for all other elements in the model depressive symptoms for the patient were M = .06, SE= 2.6, caregiver depressive symptoms were M = 1.0, SE = 1.8. Results show that lower patient age (−.02), blaming the patient (.99), more physical health impairment (.44) and lower reports of familial cohesion (.35) were associated with higher depressive symptom scores for the patient. Results show that lower caregiver age (−.10), blaming the patient (1.2), spouse as caregiver (2.4), more physical health impairment (.41) and lower reports of familial cohesion (.58) were associated with higher depressive symptom scores for the caregiver.

The second 2 columns present the `other' model of familial cohesion and depressive symptoms. Results were similar to the `own' model for the patient with the exception that age becomes non-significant. Likewise the results for the caregiver were similar to the `own' model with the additional significant association between patient ratings of familial cohesion and caregiver depressive symptom scores (.55) representing a cross-partner effect.

In both the `own' and `other' models there was a positive association between blaming the patient and depressive symptoms for the patient and the caregiver. This suggests dyads where there is a sense of blaming the cancer on the patient not having taken better care of him/her self have higher levels of depression. If the caregiver was the spouse of the patient there is an increase in depressive symptoms in both the `own' (2.4) and `other' (2.4) models for the caregiver.

Familial Expressiveness Model

The multilevel model testing the associations between patient and caregiver depressive symptoms and the FES expressiveness subscale are presented in Table 3. The first 2 columns present the `own' model of familial expressiveness and depressive symptoms. Controlling for all other elements in the model depressive symptoms for the patient were M = 2.2, SE= 2.5, caregiver depressive symptoms were M = 1.4, SE = 2.1. Results show that patient age (−.02), blaming the patient (1.1) and more physical health impairment (.46) were associated with higher depressive symptom scores for the patient. Results show that lower caregiver age (−.09), blaming the patient (.97), spouse as caregiver (2.4), more physical

health impairment (.40) and lower reports of familial expressiveness (.59) were associated with higher depressive symptom scores for the caregiver.

The second 2 columns present the `other' model of familial expressiveness and depressive symptoms. Results were similar to the `own' model for the patient. Likewise the results for the caregiver were similar to the `own' with the additional significant association between patient ratings of familial expressiveness and caregiver depressive symptom scores (.25) representing a cross-partner effect.

In both the `own' and `other' models there was a positive association between blaming the patient and depressive symptoms for the patient and the caregiver. This suggests dyads where there is a sense of blaming the cancer on the patient not having taken better care of him/her self have higher levels of depression. If the caregiver was the spouse of the patient there was an increase in depressive symptoms in both the own (2.4) and other (2.4) models for the caregiver. Finally in both models (own −.09; other −.09) there was a significant negative association between caregiver age and caregiver depressive symptoms suggesting that younger caregivers reported more depression.

Familial Conflict Model

The multilevel model testing the associations between patient and caregiver depressive symptoms and the FES conflict subscale are presented in Table 3. The first 2 columns present the `own' model of familial conflict and depressive symptoms. Controlling for all other elements in the model depressive symptoms for the patient were M = 1.4, SE= 2.9, caregiver depressive symptoms were M = 1.0, SE = 2.1. Results show that patient age (−.02), blaming the patient (1.1) and more physical health impairment (.46) were associated with higher depressive symptom scores for the patient. Results show that lower caregiver age (−.09), blaming the patient (1.0), spouse as caregiver (2.3), more physical health impairment (.42) and lower reports of familial expressiveness (.59) were associated with higher depressive symptom scores for the caregiver.

The second 2 columns present the `other' model of familial conflict and depressive symptoms. Results were similar to the `own' model for the patient. Likewise the results for the caregiver were similar to the `own' with the additional significant association between patient ratings of familial conflict and caregiver depressive symptom scores (.21) representing a cross-partner effect.

In both the `own' and `other' models there was a positive association between blaming the patient and depressive symptoms for the patient and the caregiver. This suggests dyads where there is a sense of blaming the cancer on the patient not having taken better care of him/her self have higher levels of depression. If the caregiver was the spouse of the patient there was an increase in depressive symptoms in both the `own' (2.3) and `other' (2.3) models for the caregiver. Finally in both models there was a significant negative association between caregiver age and caregiver depressive symptoms suggesting that younger caregivers reported more depression.

Models Controlling for Relational Role of Child

All the `other' models were re-run to examine the relational role of the caregiver being the offspring of the patient. For the FES cohesion model all the estimated parameters remained the same in terms of interpretation but caregiver being the offspring was marginally associated with caregiver depressive symptoms (b = −1.5, p < .01). The results were similar for the FES expressiveness (b = −2.0, p < .05) and FES conflict (b = −2.0, p < .05) models with caregiver being the offspring was significantly associated with caregiver depressive

symptoms. These findings suggest that, overall offspring caregivers experience less depression than non-offspring caregivers.

Discussion

Depression is common and persistent in patients with lung cancer and is widely reported to affect caregivers of individuals with many disease states including cancer. Adding to our understanding, these results demonstrate that multiple aspects of the family environment are influential to the emotional well-being of both lung cancer patients and their caregivers. For patients, their own ratings of low familial cohesion are associated with higher levels of depressive symptoms. For caregivers, not only were their own ratings of low cohesion and expressiveness and high conflict related to higher levels of depressive symptoms, but the patients' ratings of low cohesion, low expressiveness and higher conflict were also associated with higher depressive symptoms in the caregiver. This is the first study of which we are aware to use dyadic multilevel models to assess these associations between cancer patients' and caregivers' emotional well-being and family environment characteristics. These findings suggest that the quality of the family dynamic is important for patients but may be particularly influential for caregivers.

Despite controlling for a number of factors in these models, a caregiver blaming the patient for the cancer was significantly associated with higher depressive symptoms for the patient and the caregiver in each model tested. A review of 13 studies [33] found that when family members perceived the cause of an illness to be controllable by the patient, they were more critical of the patient than family members who perceived the cause as being outside of the patient's control. Blame is a salient aspect to consider in the context of lung cancer as more than 90% of lung cancers in men and at least 70% in women are directly attributable to cigarette use [34]. Empirical literature suggests that blame or anger toward lung cancer patients may alter helping behaviors and reduce communication between primary caregivers and patients [35–37]. Thus, blaming the patient may lead to poorer caregiving responses and increased conflict surrounding patient care decision-making. Families coping with lung cancer and patients may be especially vulnerable to poorer mental health outcomes as a result of the debilitating nature of the illness in conjunction with the additional stigma that many patients carry as tobacco users.

Finally, spousal caregivers consistently exhibit higher depressive symptoms than non-spouse caregivers. In contrast, offspring-caregivers exhibited lower levels of depressive symptoms overall. Interestingly, in both the models controlling for spouse and offspring relational role, age was significantly and negatively associated with depressive symptoms. Post-hoc exploratory analyses revealed that the 5 youngest offspring caregivers were all caring for a parent who was not currently married, suggesting potentially a high degree of burden and the likelihood of losing the last living parent to cancer. Thus age and relationship play an intertwined role.

There are some limitations which should be noted. We do not have information on the smoking status of the caregiver nor do we have information on the complete household composition of the study participants. These pieces of information would be important in attempting to determine the degree to which blame results from exposure to second hand smoke on the part of a non-smoking caregiver for example. Furthermore, examining these dynamics might yield different results in a patient population not so likely to be seen as culpable for their illness.

Conclusions

The study again demonstrates that a serious illness affects the entire family and not just the individual with the disease. An important component of a cancer patient's treatment and care is a clear understanding of the family as a unit and what support and assistance the patient can realistically expect and maintain over the course of months or years of treatment. Maintenance of the health of these familial bonds is critical for individuals with cancer. Indeed, our data indicate that caregivers' own emotional well-being is quite sensitive to patients' experiences and status. Attending to the needs of caregivers, therefore, is a logical piece of helping to care for patients. However, how much can be done to strengthen, repair, or create more robust responses in less cohesive families remains a question. It seems unlikely from our data that these families draw together as a result of the illness. Rather, serious illness causes further stressors on such families. Future research should focus on how to assist cancer patients' clinicians in assessing family cohesion and using this information as they consider treatment and care plans for patients.

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Table 1

Descriptives

	Total (N=190)	Spouse (N= 104)	Offspring (N=50)	Other (N=36)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Patient age	65.3 (9.7)	64.5 (9.7)	70.0 (9.1)	63.4 (9.0)
Caregiver age	55.0 (13.4)	61.0 (11.0)	41.7 (8.7)	55.9 (13.4)
Patient CESD	13.8 (9.0)	13.1 (9.0)	14.4 (9.0)	15.1 (9.0)
Caregiver CESD	11.3 (9.4)	11.8 (9.3)	10.3 (9.8)	11.1 (9.5)
Patient FES Cohesion	9.2 (1.6)	9.0 (1.4)	9.2 (1.6)	9.8 (2.4)
Caregiver FES Cohesion	8.9 (1.5)	8.7 (1.2)	8.7 (1.6)	9.7 (2.5)
Patient FES Expressiveness	11.7 (2.4)	11.5 (2.3)	11.8 (2.2)	12.2 (2.9)
Caregiver FES Expressiveness	11.3 (2.2)	11.3 (2.1)	11.2 (2.1)	11.8 (2.6)
Patient FES Conflict	10.5 (1.8)	10.3 (1.6)	10.6 (1.9)	11.0 (2.3)
Caregiver FES Conflict	10.5 (1.6)	10.4 (1.5)	10.7 (1.8)	10.8 (1.9)
Patient Physical Health (FACT-L physical)	9.1 (5.5)	9.7 (5.7)	8.9 (4.8)	8.8 (5.7)
Caregiver Physical Health (SF20 physical)	8.7 (3.8)	8.7 (3.7)	7.8 (3.0)	10.8 (4.6)
	(%)	(%)	(%)	(%)
Patient sex (% female)	45	27	74	65
Caregiver sex (% female)	75	73	70	89
Patient % Married	68	100	27	12
Caregiver % Married	86	100	76	56
Patient Blame %	30	33	24	31
Caregiver Blame %	40	42	34	46

Table 2

Bivariate Correlations between Caregiver and Patient Depressive Symptoms and Family Environment Characteristics

	1	2	3	4	5	6	7	8
1 Caregiver CESD	1.0							
2 Patient CESD	0.26***	1.0						
3 Caregiver FES Cohesion	0.26***	0.06	1.0					
4 Patient FES Cohesion	0.33***	0.32***	0.50***	1.0				
5 Caregiver FES Expressiveness	0.32***	0.04	0.39***	0.24***	1.0			
6 Patient FES Expressiveness	0.27***	0.20**	0.29***	0.48***	0.32***	1.0		
7 Caregiver FES Conflict	0.29***	0.02	0.28***	0.24**	0.33***	0.17*	1.0	
8 Patient FES Conflict	0.24**	0.13	0.23**	0.39***	0.17*	0.32***	0.37***	1.0

Note: CES-D = Center for Epidemiologic Studies Depression Scale; FES = Family Environment Scale

Table 3

Multilevel Model Testing Associations between Patient and Caregiver Depressive Symptoms and the FES Subscales

	Own Model		Other Model	
	Patient	Caregiver	Patient	Caregiver
	Parameter estimate SE	Parameter estimate SE	Parameter estimate SE	Parameter estimate SE
FES Cohesion Model				
Intercept	0.06 (2.6)	1.0 (1.8)	1.7 (2.8)	1.4 (2.3)
Sex	0.60 (.53)	−0.24 (.53)	0.50 (.53)	−0.02 (.53)
Age	−0.02 (.03)*	−0.10 (.02)***	−0.02 (.02)	−0.09 (.02)***
Family blames patient	0.99 (.51)*	1.2 (.48)*	1.1 (.52)*	1.1 (.47)*
Spouse Caregiver	−0.81 (.54)	2.4 (.55)**	−0.91 (.54)	2.4 (.54)***
Physical Health	0.44 (.04)***	0.41 (.06)***	0.44 (.04)***	0.39 (.06)***
FES Cohesion Patient	0.35 (.15)*		0.51 (.18)**	0.55 (.17)**
FES Cohesion Caregiver		0.58 (.16)***	−0.32 (.18)	0.31 (.18)**
FES Expressiveness Model				
Intercept	2.2 (2.5)	1.4 (2.1)	2.3 (2.7)	2.9 (2.3)
Sex	0.72 (.52)	0.16 (.53)	0.72 (.52)	0.12 (.53)
Age	−0.02 (.03)*	−0.09 (.02)***	−0.02 (.03)	−0.09 (.01)***
Family blames patient	1.1 (.51)*	0.97 (.48)*	1.1 (.51)*	0.79 (.48)*
Spouse Caregiver	−0.88 (.53)	2.4 (.54)***	−0.88 (.53)	2.4 (.54)***
Physical Health	0.46 (.04)***	0.40 (.06)***	0.46 (.04)***	0.39 (.06)***
FES Expressiveness Patient	0.08 (.09)		0.09 (.10)	0.25 (.10)**
FES Expressiveness Caregiver		0.59 (.11)***	−0.01 (.11)	0.51 (.11)***
FES Conflict Model				
Intercept	1.4 (2.9)	1.0 (2.1)	3.3 (3.1)	.97 (1.9)
Sex	0.68 (.53)	−0.11 (.53)	0.74 (.53)	−0.01 (.53)
Age	−0.02 (.03)*	−0.09 (.02)**	−0.02 (.02)	−0.08 (.02)***
Family blames patient	1.1 (.53)*	1.0 (.48)*	1.2 (.54)*	1.0 (.48)*
Spouse Caregiver	−0.84 (.54)	2.3 (.54)***	−0.87 (.54)	2.3 (.55)***
Physical Health	0.46 (.04)***	0.42 (.06)*	0.46 (.04)***	0.40 (.06)***
FES Conflict Patient	0.13 (.14)		0.19 (.15)	0.21 (.15)*
FES Conflict Caregiver		0.59 (.15)***	−0.23 (.16)	0.53 (.16)***

FIML, HLM 6.04.Note: The CES-D scores are parallel measures such that the means presented as intercept are roughly half what the score would be in original units. Spouse Caregiver is coded 1 if the caregiver is the spouse of the patient and 0 if the caregiver is not.

*
p < .05

**
p < .01

***
p < .001