

Lung Cancer Patients and Their Spouses: Psychological and Relationship Functioning Within 1 Month of Treatment Initiation

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Abstract

Background Lung cancer morbidity and mortality may increase the risk for distress in couples facing this malignancy.

Purpose We examined the prevalence of psychological and relationship distress in lung cancer patients and their spouses, predictors of psychological distress for both, and whether relationship satisfaction moderated the relation between patient and spouse distress.

Methods Participants (169 patients and 167 spouses) completed questionnaires provided during clinic appointments at baseline (within one month of treatment initiation) and through the mail 3 and 6 months later. Analyses were from the baseline data.

Results In total, 34.6% of patients and 36.4% of spouses reported psychological distress. Patient and spouse distress were correlated, depending on the symptom examined. Only 10.9% of patients and 14.1% of spouses reported distressed spousal relationships. Distress predictors for

patients included less positive social interaction support, more behavioral disengagement and self-distraction coping, and the spouse reporting less use of humor for coping. Predictors for spouses included more behavioral disengagement and substance use coping, more blaming the patient for causing the cancer, and the patient using more behavioral disengagement coping. Relationship satisfaction moderated the association between each partner's distress.

Conclusions Psychosocial counseling for lung cancer patients should include spouses and target decreasing individual distress and enhancing relationship satisfaction.

Keywords Couples and lung cancer · Psychosocial distress · Relationship satisfaction

Introduction

The stress of a cancer diagnosis and its treatment can negatively affect the psychological functioning of both the patient and his/her spouse. Cancer survivors experience psychological symptoms such as depression and anxiety more often than the general population [1]. Individuals at highest risk for depression include those with a history of a mood disorder or alcoholism, advanced disease stage, uncontrolled pain, or a treatment that produces depressive symptoms [2]. Medical risk factors for depression include pre-treatment physical symptom burden, fatigue, and performance status. Lung cancer is obviously likely associated with many of these risk factors. In fact, the prevalence rate for distress may be even higher in individuals facing lung cancer than those facing other cancers. In a study of 4,496 cancer patients, 629 of whom were diagnosed with lung cancer, the

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rate of distress was highest among lung cancer patients at 43.4%; the average rate was 35.1% for the entire sample and lowest for gynecologic cancers at 29.6% [3]. Restricting the outcome to depression, a specific domain of distress, about one-third of lung cancer patients may have levels that warrant further evaluation [4].

Studies of couples coping with other cancers indicate that distress levels are similar for spouses and patients [5]. In one study of cancer patients and their spouses, both reported moderate levels of anxiety and depression, with rates of distress exceeding the normative cutoff scores for clinical anxiety and depression significantly higher than expected by chance [6]. In another cross-sectional study of cancer patients and caregivers, 80% of whom were spouses, no differences in depressive symptoms were found between patients and caregivers, but there was a significant correlation between caregiver and patient depression [7]. Other research has found that spouses of chronically ill patients experience more distress than patients [8, 9]. A more recent meta-analysis suggests that gender (female) is more important than social role (patient or spouse) in predicting individual distress [10].

Surprisingly, only two published studies have examined the psychological functioning of the spouses of lung cancer patients [11, 12], and neither examined lung cancer patient and spouse psychological functioning within the same study. Such studies miss key information about the adjustment process because the stress of cancer and the ways in which both partners cope occurs within the context of the intimate spousal relationship [13]. Specifically, couples researchers have highlighted the importance of a dyadic coping paradigm, taking into account coping at the individual level, how each partner's coping affects the other's distress and coping efforts, and the use of social support both inside and outside the relationship [14]. While there is extensive literature on the important role of coping and social support at the individual level in adjusting to chronic disease in both patients [15–17, 18–21] and spouses [22–24], researchers have only recently begun studying these constructs at the dyadic level.

Bodenmann suggests that each partner's coping responses are triggered by a stress communication process. This process is initiated by cognitive appraisal of the stressor, which includes what caused the stressor, who is responsible, and who has control over it. One partner communicates his/her appraisal to the other, causing the other to engage in some form of dyadic coping [25]. Since most lung cancers are smoking related, patients' appraisal may include attributing their cancer to their own behavior (self-blame), and spouses may feel a sense of blame for the cancer cause. Self-blame can be either characterological, blame reflecting stable personality traits or behavioral, understanding that one's behavior caused the stressor and

that one could potentially have control over changing the outcome [26, 27]. Self-blame has been studied in breast cancer patients, with both types of self-blame associated with worse adjustment [28, 29]. In a study of newly diagnosed breast cancer patients, behavioral self-blame was a correlate of current emotional distress. Characterological self-blame predicted increased distress even at 1 year after diagnosis [30]. To date, studies of spouse attributions of blame regarding lung cancer cause could not be located. Attributions of self-blame and blame may be particularly problematic if smoking has been a past source of conflict for the couple or becomes a contentious issue after diagnosis.

Smoking status itself may be a unique contributor to distress for couples facing tobacco-related cancers. Smoking has consistently been associated with psychological distress. In fact, nicotine dependence is associated with higher rates of major depression, anxiety disorders, and other substance dependence [31]. Strong associations have been found between a history of ever having smoked and both generalized anxiety disorder and alcohol abuse/dependence [32]. Since most lung cancer patients are current or former smokers, they may be more likely to have a history of mood or anxiety disorders and alcohol abuse/dependence, which increases the risk for distress when confronted with illness. Further, spouses who are current or former smokers may be at increased risk for future distress when faced with the patient's lung cancer diagnosis. A spouse's continued smoking after diagnosis could negatively impact his/her psychological functioning because of the potential distress it may cause the patient or the spouse's own recognition of the health risks for both partners.

Both the dyadic coping paradigm and research on couples facing chronic disease suggest that patient and spouse distress may be related; yet, research is lacking on factors that could moderate their association. Relationship satisfaction may be one key factor, as it has been shown to be a moderator in the association between patients' use of protective buffering (a relationship-focused coping strategy used to protect once partner from emotional upset) and psychological distress among couples facing breast cancer [33]. However, for couples facing lung cancer, the research is limited, thus, the importance of relationship satisfaction can only be inferred from a few studies showing potential communication problems for these couples. For example, a cross-sectional study of the rehabilitation needs of disease-free lung, colon, and prostate cancer survivors found that lung cancer patients had more problems with communication and interactions with a partner than the other cancer patients [34]. Our own qualitative work has also indicated that both patients and spouses have trouble communicating openly, particularly about continued tobacco use, cancer symptoms, prognosis, and the emotional effects of lung cancer on the spouse [35]. Whether the communication skills deficit predated the cancer

or was exacerbated by the diagnosis, it could increase the risk of distress in both partners. Healthy spousal communication is important for couples facing cancer, as it has been associated with less distress and more relationship satisfaction in both patients and their partners [36].

The aims of the current study were to: (1) measure the prevalence of distress in lung cancer patients and spouses and assess relationship satisfaction within 1 month of treatment initiation; (2) examine the association between patient and spouse psychological distress, relationship satisfaction, social support, coping, substance use, and attitude regarding the cancer cause; (3) evaluate correlates of patient and spouse psychological distress; and (4) explore the role of relationship satisfaction in moderating the association between patient and spouse psychological distress. Although longitudinal data on QOL and relationship satisfaction was collected at three time points, within 1 month of treatment initiation (baseline) and at 3 and 6 months follow-up, this paper focuses only on the baseline data.

We based our design on a conceptual dyadic model depicting the associations among patient psychological distress, spouse psychological distress, and relationship satisfaction (Fig. 1). The model demonstrates that medical factors such as performance status, disease stage, and time since diagnosis also are related to these constructs. We propose that the patient’s psychological distress is directly affected by his/her own coping style, social support, attitude (self-blame regarding cancer cause), and substance use (tobacco use; alcohol use), as well as the spouse’s distress and his/her coping style, social support, attitude, and substance use. We propose the same predictors for the spouse’s distress. We also propose that patient coping style,

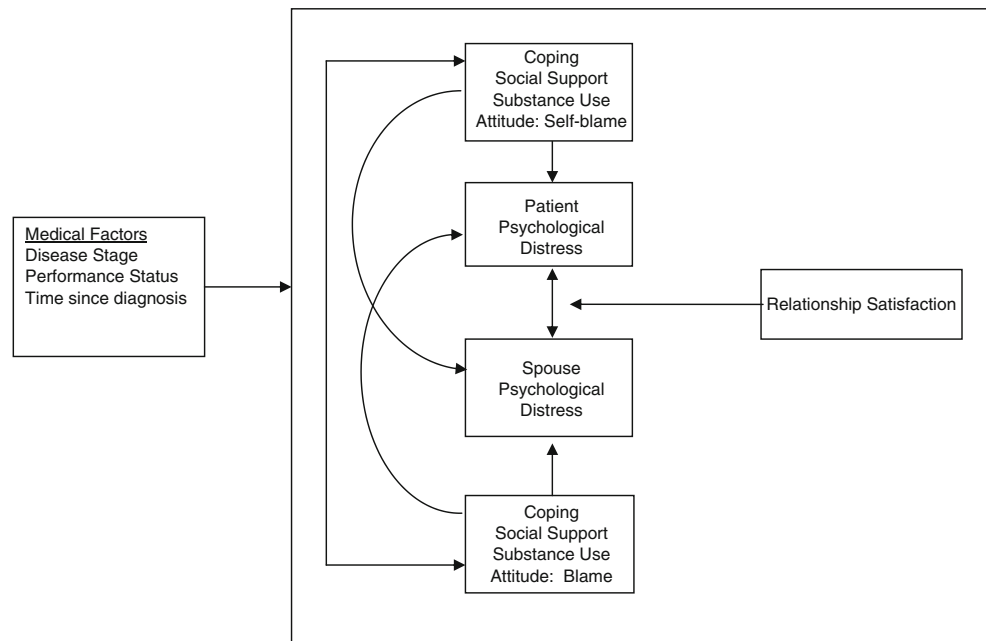
social support, substance use, and attribution of cancer cause are related to spouse coping style, social support, substance use, and attribution of cancer cause. Finally, we hypothesize that relationship satisfaction moderates the association between patient and spouse psychological distress, i.e., in couples with high relationship satisfaction, the association between patient and spouse psychological distress will be weak, meaning one person may experience high distress levels without impacting the psychological distress of the other. Conversely, in couples with low relationship satisfaction, patient and spouse distress levels will be strongly related. This hypothesis is consistent with the dyadic coping literature in that couples with high relationship satisfaction will be better able to engage in positive supportive dyadic coping [25], such that one partner recognizes the other’s distress, the need to assist him/her in coping, and the need to actively manage his/her own distress to effectively do so.

Methods

Participant Eligibility

Eligible patients had a lung cancer diagnosis with an Eastern Cooperative Oncology Group (ECOG) Performance Status Score [37] of 2 or less; were within 1 month of treatment initiation; could read and speak English; were able to provide informed consent; had a spouse or significant other with whom they have resided for at least 1 year; and were aged 18 or older. Eligible spouses were the spouse or significant other of a patient diagnosed with lung cancer;

Fig. 1 Conceptual model



had the patient's consent to be contacted; could read and speak English; and were able to provide informed consent.

Sample Characteristics

For patients, average age was 62.9 (SD=10.1), with a range of 30.3–86.6 years. The majority was male (62.7%); not Hispanic or Latino (95.3%); white (88.2%); educated with some college credits, a 2-year degree or higher (61.5%); retired (50.6%); and married (97.6%). Disease stage at study entry was 16.3% stage 1, 14.5% stage 2; 32.5% stage 3, and 36.7% stage 4. Average time since diagnosis was 2.3 months (SD=1.7). As expected from our stratified sampling procedure, 45 patients were undergoing curative surgery, 57 had inoperable tumors and were receiving combined modality therapy, 55 had metastatic disease, and one was not assigned to any category because he/she did not receive treatment. A total of 22% had at least two positive CAGE questionnaire responses indicating potential problems with alcohol use. At study entry, 9.8% were current smokers, 26.8% were recent quitters (quit within the past 6 months), 48.8% were former smokers (quit more than 6 months ago), and 14.6% were never smokers.

For spouses, average age was 60.4 (SD=11.1; range=30.6–86.4 years). Most were female (67.1%); not Hispanic or Latino (96.4%); white (91.5%); educated with some college credits, a 2-year degree or higher (58.1%); and employed full time (41.8%). Almost 14% had a least two positive CAGE questionnaire responses indicating potential problems with alcohol use. A total of 19.1% were current smokers, 2.5% were recent quitters, 32.1% were former smokers, and 46.3% were never smokers.

Comparisons were made between study participants and non-participants (those who refused or who consented but did not return surveys) based on age, race/ethnicity, type of cancer (SCLC versus NSCLC), therapy/disease stage category, and ECOG performance status. Significant differences were found for ECOG score $\chi^2(2, N=314)=11.85, p=.003$, and ethnicity $\chi^2(1, N=342)=3.77, p=.05$. Specifically, non-participants were less likely to have physical symptoms (ECOG of 0 or 1; decliners=94%; participants=87%), and more likely to be from an ethnic/racial minority group (decliners=20%; participants=14%). No other significant between-group differences were found.

Procedures for Baseline Assessment

The University of Texas M. D. Anderson Cancer Center's Institutional Review Board approved this study. Lung cancer patients attending appointments at the Thoracic/Head and Neck Clinic were approached for recruitment. We excluded patients having an ECOG score of 3 or 4 because they would be less likely to have a 6-month survival time

for participation and may have limited abilities to complete the questionnaires [38, 39]. To recruit a representative sample, we used a stratified sampling procedure targeting patients in three therapy/disease stage categories: undergoing curative surgery; inoperable and receiving combined modality therapy; and having metastatic disease.

Eligible patients who provided consent were asked to complete the questionnaires, with baseline measures taken within 1 month of treatment initiation. After obtaining the patient's permission, the spouse/significant other was contacted and asked to complete a similar questionnaire battery. Most patients and spouses took the questionnaires home for completion and returned them in postage-paid envelopes. A few completed the baseline questionnaires while waiting for their clinic appointments. Patients and spouses were asked to complete the questionnaires separately. Reminder phone calls were made if packets were not returned. Upon return of each completed baseline packet, participants received a small gift worth \$10 (or \$20 per couple).

Measures

Instruments in our assessment battery had established reliability and validity and were chosen based on our conceptual model.

Demographic/Medical Factors

Patients and spouses provided demographic information including age, gender, race, marital status, occupational status, and educational history. Current and past alcohol use (CAGE questions), smoking status (current, former, recent quitter, or never smoker), and previous psychiatric history also were assessed. Additionally, patients were asked questions about their disease including time since diagnosis, disease stage, and treatment.

Psychological Distress

Patients and spouses completed the *Brief Symptom Inventory (BSI)*, a 53-item, self-report measure of the past-weeks psychological functioning in nine symptom dimensions: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. It also yields a Global Severity Index (GSI) and has a definition for "caseness," a score identifying individuals experiencing distress [40]. Distressed is defined as having a *T* score ≥ 63 on the GSI or a *T* score ≥ 63 on any two dimensions. Psychometric analyses show it is reliable and valid [41]. It has been used with a range of psychiatric [42] and medical [43] populations, including cancer [3, 28].

Relationship Satisfaction

Patients and spouses completed the *Dyadic Adjustment Scale (DAS)*, a 32-item self-report measure assessing four components of marital functioning: satisfaction, cohesion, consensus, and expression of affection. A cutoff point of 97 has been used to identify distressed relationships. Internal consistency reliability for the DAS is high (.96). The scale has been tested extensively with both married and unmarried, cohabitating couples [44].

Factors Affecting Psychological Distress

Patients and spouses completed measures of substance use, coping style, social support, and attitude about the cancer cause. Substance use was assessed as part of the medical/demographic form as discussed above.

Coping style was assessed with the *COPE*. The *COPE* measures a set of conceptually distinct coping subscales. Internal reliability of most items is adequate, ranging from .65 to .90 [45]. A shortened, 24-item version of the *COPE* was used, which has 12 subscales including self-distraction, active coping, denial, coping with substance use, using emotional support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, and use of religion. Patients and spouses rated the coping strategies they have used to cope with lung cancer since the diagnosis.

Social support was assessed using the *Medical Outcomes Study-Social Support Scale (MOS Social Support)*. This 20 item, self-administered, scale measures perceived availability of four dimensions of functional support (emotional/informational, tangible, affectionate, and positive social interaction); it yields four subscale scores and a Social Support Index. Alphas are all greater than .91 [46].

Attitude about the disease cause was assessed using the constructs of *Self-Blame and Blame*. For the patient, two items assessing behavioral and characterological self-blame were used based on previous work in breast cancer patients [30]. These items were validated with the Self-Criticism subscale of the Coping Strategies Inventory. Both questions were reworded for administration to the spouse.

Recruitment

A total of 460 lung cancer patients and their partners were approached during their clinic appointments. In total, 116 were ineligible; reasons included beyond treatment requirement (47.4%); widowed, divorced, single, or separated (30.2%); no confirmed diagnosis, recurrent lung cancer, or not lung primary (12.1%); did not speak English (7.8%); and spouse unable to provide informed consent (2.6%). Of the remaining 344 patients, 74 declined to participate. Reasons for refusal included: patient or spouse not interested

(45.9%); patient or spouse too distressed (41.9%); “too old” to complete questionnaires (6.8%); already too much paperwork (2.7%); approached by too many studies (1.4%); and too busy (1.4%). In sum, 270 couples were eligible and consented. Of these, 92 couples did not return baseline surveys; in two of these couples, the patient died before the surveys could be completed. A total of 158 couples returned their surveys; there were an additional 11 couples in which only the patient returned a survey and nine couples in which only the spouse returned a survey. Thus, from the 270 consented couples, we received 169 surveys from patients and 167 surveys from spouses, representing response rates of 62.6% and 61.9%, respectively.

Results

Descriptive Statistics

Table 1 provides descriptive statistics of psychosocial functioning for patients and spouses. We conducted paired samples *t* tests to examine whether there were differences in distress between patients and spouses. Patients had significantly higher scores on Somatization. This difference was clinically meaningful, but not surprising given all of the physical side effects of lung cancer and its treatment.

Spouses had significantly higher scores on Paranoid Ideation (which at these score levels really measure suspiciousness and mistrust); spouse scores on Interpersonal Sensitivity also were higher, but results were not significant. Paired samples *t* tests also showed that patients had significantly higher scores on relationship satisfaction than spouses, though mean scores for both indicated high satisfaction.

Table 1 also provides descriptive statistics of baseline scores on factors affecting psychological distress for both patient and spouse participants. We conducted paired sample *t* tests to examine whether there were differences in social support, coping, and alcohol use between patients and spouses. Patients reported higher levels of social support than spouses on all MOS Social Support Subscales and on the Social Support Index. Given this finding, it was not surprising that patients reported higher use of emotional support as a means of coping. Spouses used more maladaptive coping strategies in a few categories including self-distraction, denial, and venting. Patients were more likely than spouses to use humor as a means of coping. They also endorsed more positive CAGE items than spouses. On self-blame/blame scales, patients reported a moderate degree of behavioral self-blame and a low degree of characterological self-blame regarding their disease cause; spouses reported a fairly low degree of blame towards the patient regarding the disease cause.

Table 1 Baseline psychosocial functioning

Measure	Patients	Spouses	<i>P</i>
Psychological distress			
GSI (<i>T</i> score)	53.9 (10.0)	53.1 (10.8)	.50
Somatization	57.4 (10.5)	51.6 (9.3)	<.0001
Obsessive-Compulsive	53.8 (9.9)	55.3 (10.9)	.19
Interpersonal Sensitivity	48.9 (7.9)	50.6 (9.5)	.08
Depression	53.1 (9.5)	53.7 (10.0)	.61
Anxiety	54.0 (10.7)	54.0 (10.8)	.97
Hostility	50.6 (9.1)	52.1 (9.9)	.15
Phobic Anxiety	50.9 (8.0)	49.8 (7.4)	.23
Paranoid Ideation	48.4 (8.2)	50.2 (8.7)	.05
Psychoticism	53.5 (9.1)	54.8 (9.7)	.20
Social support			
Social Support Index	89.7 (13.2)	78.0 (22.0)	<.0001
Tangible	89.4 (15.7)	73.3 (29.1)	<.0001
Affectionate	94.4 (13.6)	85.3 (22.8)	<.0001
Positive social interaction	91.0 (14.6)	78.8 (26.3)	<.0001
Emotional/informational	88.0 (14.7)	77.9 (22.9)	<.0001
Coping			
Self-distraction	2.1 (0.8)	2.2 (0.8)	.05
Active coping	3.0 (0.9)	3.0 (0.9)	.44
Denial	1.4 (0.6)	1.5 (0.7)	.04
Substance use	1.2 (0.4)	1.1 (0.4)	.36
Using emotional support	3.5 (0.8)	3.2 (0.9)	.001
Behavioral disengagement	1.1 (0.3)	1.1 (0.5)	.45
Venting	1.5 (0.6)	1.7 (0.8)	.06
Positive reframing	2.6 (1.0)	2.6 (1.0)	.95
Planning	2.9 (1.0)	3.0 (0.8)	.41
Humor	1.5 (0.8)	1.2 (0.4)	<.0001
Acceptance	3.3 (0.8)	3.2 (0.8)	.38
Religion	3.1 (1.0)	3.2 (1.0)	.55
Alcohol use			
Positive CAGE items	.79 (1.2)	.48 (1.1)	.02
Blame			
Patient behavioral self-blame	2.5 (1.2)	–	
Patient characterological self-blame	1.7 (1.1)	–	
Spouse blame patient	–	1.8 (0.9)	
Relationship satisfaction			
DAS total	120.4 (18.1)	118.4 (18.1)	.18
Consensus	52.7 (9.9)	51.4 (9.5)	.15
Satisfaction	41.4 (4.7)	40.5 (5.4)	.02
Affectional expression	9.7 (2.7)	9.5 (2.9)	.49
Cohesion	16.8 (4.2)	17.1 (4.6)	.46

Prevalence of Psychological Distress and Assessment of Relationship Satisfaction

Using the BSI definition of “caseness,” 34.6% of patients and 36.4% of spouses met the definition. For patients, 37.5% of males and 29.3% of females met the definition. For spouses, 38.8% of males and 33% of females met the definition.

Using the DAS cutoff of ≤ 97 for relationship distress, 10.9% of patients and 14.1% of spouses met this cutoff. For patients, 7.7% of males and 16.4% of females reported distressed relationships. For spouses, 9.6% of males and 16.2% of females reported distressed relationships.

Association between Patient and Spouse Psychological Distress, Relationship Satisfaction, Social Support, Coping, Substance Use, and Attitude Regarding the Cancer Cause

We calculated paired samples correlations to examine the association between patient and spouse psychological distress using the GSI and the nine subscales of the BSI. The correlation between patient GSI and spouse GSI was .151 ($p=.074$). There were significant positive associations between patient and spouse distress on the Interpersonal Sensitivity, Hostility, and Paranoid Ideation subscales. In terms of relationship satisfaction, paired samples correlations between patients and spouses on the DAS total score and four subscale scores were all positive and all reached statistical significance. For social support, three of the four MOS subscales had positive correlations that were significant. For coping, only three of 12 COPE subscales had positive correlations that were significant and included coping with substance use, positive reframing, and religion. Consistent with the finding for coping with substance use, endorsement of CAGE items was significantly correlated. Finally, patient’s self-blame and spouse blaming the patient were significantly correlated (see Table 2).

Correlates of Psychological Distress

Based on our conceptual model, we proposed that the patient’s psychological distress would be directly affected by his/her coping style, social support, substance use (tobacco use; alcohol use), and attitude (self-blame regarding cause of cancer), as well as the spouse’s psychological distress and his/her coping style, social support, substance use, and attitude. We propose the same predictors for the spouse’s distress.

Given that the BSI yields a Global Severity Index Score (GSI) and nine symptom dimension scores, 20 regressions (ten for the patient and ten for the spouse) would need to be run in order to thoroughly examine predictors of the outcome of psychological distress. Such an analysis would be far too extensive with the sample size. Because the GSI yields the best single indicator of current psychological distress, it was chosen as the outcome measure of psychosocial adjustment for the regression analyses; thus, we only had to run two regressions (one for the patient and one for the spouse). To determine which combination of variables best predict our dependent variable (psychological distress), we conducted separate stepwise regressions for

Table 2 Paired sample correlations between patient and spouse psychological functioning, relationship functioning, social support, coping, substance use, and attitude

Measure	Correlation	<i>P</i>
Global Severity Index	.151	.074
Somatization	.153	.069
Obsessive-Compulsive	.135	.109
Interpersonal Sensitivity	.176	.037
Depression	.048	.568
Anxiety	.128	.129
Hostility	.203	.015
Phobic Anxiety	.012	.883
Paranoid Ideation	.225	.007
Psychoticism	.072	.397
DAS total score	.500	<.0001
Dyadic consensus	.362	<.0001
Dyadic satisfaction	.540	<.0001
Affectional expression	.336	<.0001
Dyadic cohesion	.561	<.0001
MOS—tangible support	.225	.023
MOS—affectionate support	.185	.063
MOS—positive social interaction support	.256	.009
MOS—emotional/information support	.232	.019
COPE—self-distraction	.152	.126
COPE—active coping	.014	.886
COPE—denial	−.057	.572
COPE—substance use	.291	.003
COPE—using emotional support	−.064	.524
COPE—behavioral disengagement	−.010	.917
COPE—venting	.016	.876
COPE—positive reframing	.236	.017
COPE—planning	−.074	.461
COPE—humor	.104	.298
COPE—acceptance	.148	.139
COPE—religion	.429	<.0001
CAGE positive items	.229	.018
Patient self-blame and spouse blame	.380	<.0001

patients and spouses. For both, step one included demographic and medical factors as control variables, and step two included all of the proposed predictor variables. To reduce the number of variables entered in the stepwise regressions, we examined the associations between psychological distress and all of the potential predictor variables. Only the variables significantly related at $p \leq .05$ were included in the regressions. For patients, the variables significantly related to psychological distress (BSI GSI) included the patient’s education, three subscales from the MOS Social Support scale (affectionate support, positive social interaction support, emotional/information support), four subscales from the COPE (self-distraction, denial, drug use, behavioral disengagement), and smoking status, as well as two subscales from the spouse’s COPE (drug use, humor). For spouses, the variables significantly related to

psychological distress included the spouse’s three subscales from the MOS Social Support scale (affectionate support, positive social interaction support, emotional/information support), five subscales from the COPE (self-distraction, denial, drug use, behavioral disengagement, venting), alcohol use (number of positive CAGE items), and attitude (blame regarding cancer cause), as well as one subscale from the patient’s COPE (behavioral disengagement).

For patients, we first entered education as a control variable. Next, we entered the predictor variables that had significant associations with psychological distress. The final model was significant, adjusted $R^2 = .279$, $F(4,134) = 14.38$, $p < .0001$, with four significant predictors of distress including the patient reporting less positive social interaction support, more use of behavioral disengagement as a coping strategy, and more use of self-distraction as a coping strategy, as well as the spouse reporting less use of humor as a coping strategy (see Table 3).

For spouses, we proceeded in a similar manner, first entering education as a control variable, followed by the predictor variables that had significant associations with psychological distress. The final model was significant, adjusted $R^2 = .250$, $F(4,100) = 9.69$, $p < .0001$, with four significant predictors of distress including the spouse reporting more use of behavioral disengagement as a coping strategy, more use of substances as a coping strategy, and more blame of the patient for causing the cancer, as well as the patient reporting more use of behavioral disengagement as a coping strategy (see Table 3).

Relationship Satisfaction as a Moderator

The Actor–Partner Interdependence Model (APIM) for analyzing dyadic data was used to examine whether

Table 3 Stepwise regression analysis predicting psychological distress

Predictor	β	<i>t</i>	<i>P</i>
Patient psychological distress			
Patient COPE (behavioral disengagement)	.35	4.77	<.0001
Patient COPE (self-distraction)	.25	3.43	.001
Patient MOS social support (positive social interaction)	−.21	−2.89	.004
Spouse COPE (humor)	−.19	−2.56	.012
Adjusted $R^2 = .279$, $F(4,138) = 14.38$, $p < .0001$			
Spouse psychological distress			
Spouse COPE (behavioral disengagement)	.33	3.89	<.0001
Patient COPE (behavioral disengagement)	.26	2.98	.004
Spouse blame patient for cancer	.21	2.28	.025
Spouse COPE (substance use)	.21	2.34	.021
Adjusted $R^2 = .250$, $F(4,100) = 9.69$, $p < .0001$			

relationship satisfaction moderated (buffered) the association between each person's level of psychological distress, controlling for age, gender, and participant role (patient or spouse). Data from couples are related, thus analyses must adjust for non-independence so that statistical significance tests are not biased, and model the interdependence or mutual influence process itself. The APIM accomplishes both using a multilevel modeling approach, in which data from two dyad members are treated as nested scores within the same group (i.e., couples) [47–50]. With this approach, we can examine how a person's independent variable score affects both his/her own dependent variable score (actor effect) and the other's dependent variable score (partner effect). To accomplish this, the data was arranged so that each person's outcome score was associated with his/her own predictor scores and the other's predictor scores [47]. As such, each couple had two lines of data (on the first line, the patient was the actor and the spouse was the partner; on the second line, the spouse was the actor and the patient was the partner). Analyses were conducted using SAS Proc Mixed and examined the effects of the interaction between actors' dyadic adjustment and partner's distress on actors' distress.

The main predictor variables (actors' scores on dyadic adjustment and partners' scores on each of the nine BSI symptom dimensions) were centered to make interpretation of the intercept more direct. The variables of actor's relationship satisfaction (DAS Total Score), partner's distress (BSI symptom dimension or GSI), and the interaction term of actor's relationship satisfaction by partner's distress were entered into the model after controlling for age, gender, and participant role (patient or spouse) of the actor. The outcome variable was actor's distress (BSI symptom dimension or GSI). Results indicated that relationship satisfaction buffered the association between each partner's level of psychological distress on three BSI symptom dimensions: Somatization (items reflect distress from perceptions of bodily dysfunction); Paranoid Ideation (items represent suspiciousness and mistrust); and Psychoticism (items reflect a withdrawn, isolated lifestyle and thought control). The interactions approached significance for the GSI ($p=.07$) and Depression ($p=.08$). The interactions for Obsessive-Compulsive, Anxiety, Hostility, Phobic Anxiety, and Interpersonal Sensitivity were not significant (see Table 4).

Two representative plots depicting the interactions are provided for illustration. One standard deviation above and below the mean represents high and low relationship satisfaction, respectively. Figure 2 illustrates how relationship satisfaction buffers the effect of one person's symptoms of paranoid ideation on the other person's symptoms of paranoid ideation. In other words, when relationship satisfaction is low, associations between one person's

paranoid ideation and the other's paranoid ideation appear stronger ($\beta=.31$, $p=.001$) than in couples with high levels of relationship satisfaction ($\beta=.08$, $p=.14$). However, it is worth noting that for those with high relationship satisfaction, the slope of the regression line was not significantly different from zero. The graph for the GSI is comparable to this one.

Interestingly, the graphs for somatization, psychoticism, and depression were similar to each other (see Fig. 3 for the somatization plot). Although Fig. 3 is similar to Fig. 2 in that the slope of the line representing low relationship satisfaction is positive ($\beta=.38$, $p=.001$), the slope of the line representing high relationship satisfaction is negative ($\beta=-.13$, $p=.05$). Here, both slopes are statistically different from zero.

Discussion

This research adds to the literature on the dyadic coping paradigm for couples facing chronic disease, as it is the first known examination of psychological and relationship satisfaction of lung cancer patients and their spouses within the same study and the first to examine relationship satisfaction as a moderator of the association between patient and spouse psychological distress. Results confirmed a number of predictions in our a priori conceptual dyadic model.

Both patients and spouses reported high rates of psychological distress, although only about a third of patients met the criterion for clinically significant distress in contrast to the rate of 43.4% of patients in Zabora et al.'s survey [3]. A strength of our study design was the standard baseline assessment timing within 1 month of treatment initiation. There was no standard assessment timing in Zabora's sample; thus, participants may have been further into or post-treatment and experiencing more physical side effects, or may have had more advanced disease. Our longitudinal data will determine if distress increases over time as a result of treatment and the debilitating nature of the disease.

Another strength of our design was the simultaneous measurement of psychological distress in both patients and spouses. Similar to previous research [10], we found an association between patient and spouse distress. Had we only used a global distress measure, however, we would have had an incomplete picture of the association between patient and spouse distress. In fact, the correlation between patient and spouse global distress was quite low. In a recent meta-analysis, Hagedoorn and colleagues [10] found that the correlation between patient and partner distress was only moderate, which is similar to our results on three of the BSI symptom dimensions. Thus, we found

Table 4 SAS Proc mixed interactions examining relationship satisfaction as a buffer of the association between each partner’s psychological distress^a

Outcome	Interaction	β	<i>df</i>	<i>t</i>	<i>P</i>
A_SOMATIZATION	A_DAS*P_SOMATIZATION	-.01	259	-4.77	<.0001
A_PARANOID IDEATION	A_DAS*P_PARANOID IDEATION	-.01	246	-2.69	<.01
A_PSYCHOTICISM	A_DAS*P_PSYCHOTICISM	-.01	257	-3.07	<.01
A_GSI	A_DAS*P_GSI	-.0002	264	-1.83	=.07
A_DEPRESSION	A_DEPRESSION*P_DEPRESSION	-.005	248	-1.74	=.08

Interactions for Obsessive-Compulsive, Anxiety, Hostility, Phobic Anxiety, and Interpersonal Sensitivity were not significant

^aNote: *A* actor; *P* partner; *GSI* Global Severity Index

that the strength of the association between patient and spouse distress depended on the psychological symptom examined.

Importantly, correlates of distress for both patients and spouses were factors that are amenable to intervention. In terms of coping, behavioral disengagement seems to play a key role in both patient and spouse distress; the greater the use of behavioral disengagement, the higher the distress levels reported. Such findings are not surprising given that behavioral disengagement, assessed with the items “giving up trying to deal with it” and “giving up the attempt to cope,” is associated with helplessness and the expectation of poor coping outcomes [45]. Quite notably, however, is the fact that the patient’s use of behavioral disengagement is associated with spouse distress. It is possible that when patients use such a coping strategy, they have lost hope in their battle with cancer and may even question continuing treatment, which may be extremely distressing for spouses, though this requires further exploration. Fortunately, our

results indicate that one partners’ use of behavioral disengagement is not related to the other’s use of it for coping; thus, at least one member of the dyad may continue to cope adaptively.

In terms of social support, for patients, more positive interaction support was associated with less distress. Numerous studies have shown the important role of social support for how patients cope with and adjust to cancer [18, 19]. Talking with others facilitates processing of traumatic events if the social context of discussions is supportive and positive; however, talking does not facilitate cognitive processing when others’ responses are unsupportive or critical [51]. Patients may avoid discussing cancer to avoid negative interactions [18]. This may be why a spouse’s coping with humor is associated with less distress for patients because use of humor generally occurs during positive interactions.

A unique finding was that an attribution of blame towards the patient for the cancer cause was a significant

Fig. 2 Plot depicting how relationship satisfaction buffers the effect of one partner’s symptoms of paranoid ideation on the other partner’s symptoms of paranoid ideation

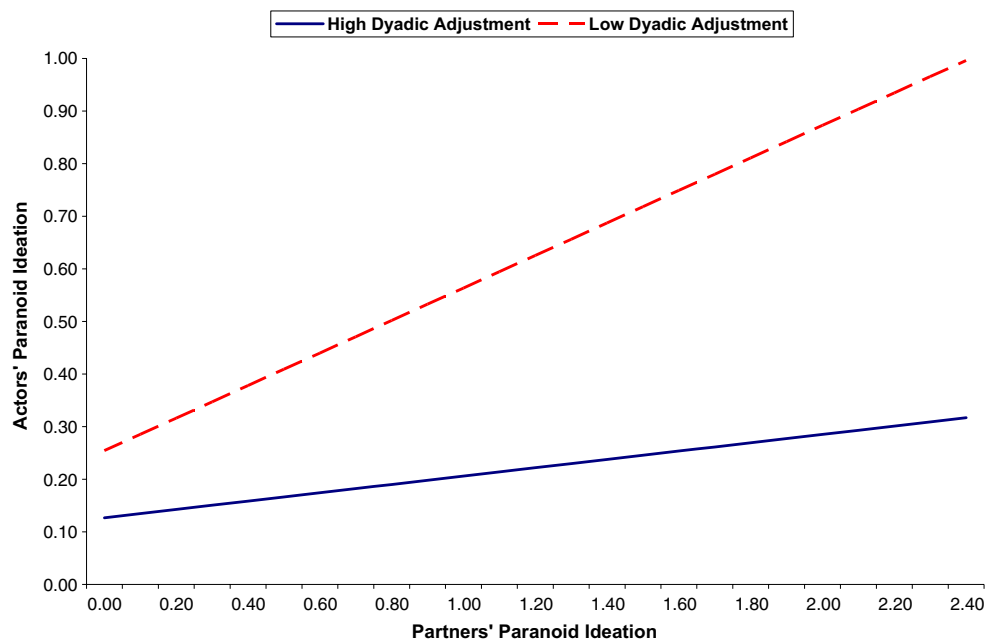
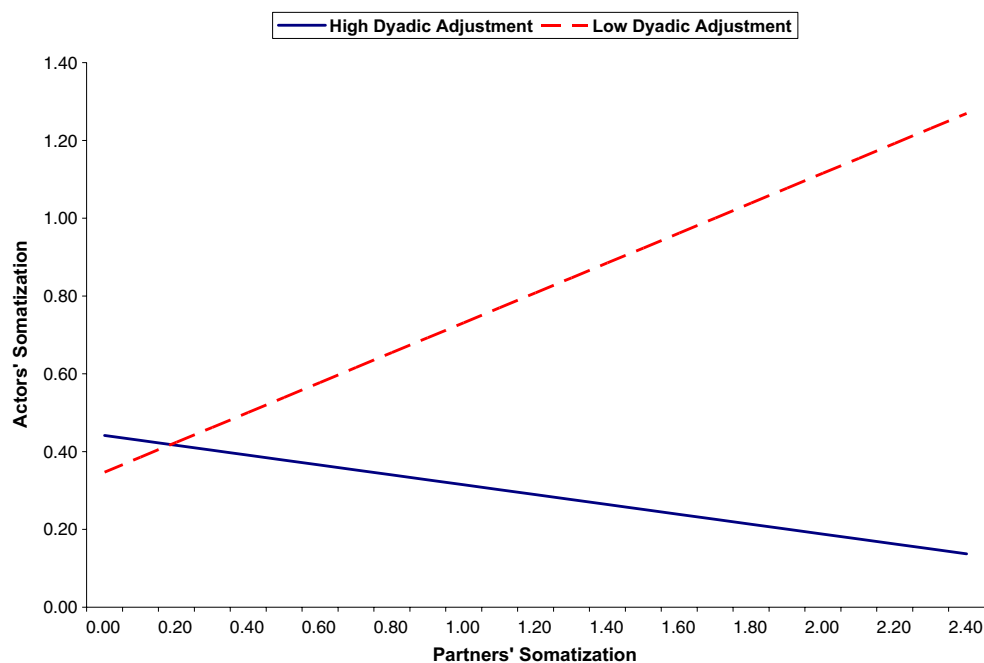


Fig. 3 Plot depicting how relationship satisfaction buffers the effect of one partner's symptoms of somatization on the other partner's symptoms of somatization



correlate of spouse psychological distress, and patient self-blame and spouse blame were significantly correlated. Such attributions may require considerable attention in psychosocial interventions with couples facing tobacco-related cancers, as smoking cessation may have been a long-standing source of spousal conflict even prior to the diagnosis. Also of interest is the potential problem of alcohol use for some patients and spouses. Such use may facilitate psychological distress. Again, coping with substance use was associated with higher distress in spouses, and interestingly, patient and spouse use of coping with substance use was positively correlated, as was patient and spouse endorsement of CAGE items. This area warrants further study as our assessment of alcohol use was limited to the CAGE questionnaire and the question regarding coping with substance use did not probe for specific substances.

Results of the stepwise regression analyses indicated that patient global distress was *not* a significant correlate of spouse global distress, as measured by the GSI of the BSI, and vice versa. We also found that the correlation between patient and spouse to be moderate, at best, yet there are fairly high rates of distress for both patients and spouses. These findings are consistent with our working hypotheses that relationship satisfaction would moderate the association between patient and spouse psychological distress; relationship satisfaction buffered the association between each partner's level of psychological distress on three BSI symptoms dimensions controlling for age, gender, and participant role (patient versus spouse). Specifically, we found that when

relationship satisfaction is low, associations between one person's psychological distress and the other's psychological distress are stronger for certain psychological symptoms. The associations are weaker for couples with good relationship satisfaction. Couples with good relationship functioning are likely better able to engage in positive supportive dyadic coping, such that one partner recognizes the other's distress and the need to assist him/her in coping [25]. To effectively assist with the other's coping efforts, the partner may actively manage his/her own distress knowing that it is in the best interest of both partners' well-being and in the well-being of their relationship. Indeed, further analysis of our data revealed that in only 17.6% of the couples, both members were classified as distressed (as defined by the BSI). Thus, for approximately half of the distressed patients, the spouse was not classified as distressed, and for about half of the distressed spouses, the patient was not classified as distressed. This is not to say that having a distressed partner is not distressing for couples with good relationship satisfaction; rather, they may be better than those with poor relationship satisfaction at managing their distress so it does not reach a clinical level.

Even though our findings indicate that both patients and spouses report good relationship satisfaction overall, with a small subset of both patients and spouses reporting distressed spousal relationships, results support the view that the target of psychosocial interventions for patients and spouses facing lung cancer should be the couple. The most adaptive coping may be when both members of the couple share a common appraisal of the

stressor, which may promote conjoint coping and mutual support. A communal coping approach may be more effective in improving adjustment of both members of the couple than an individual coping approach. A recent study supports couples-coping training, as it may facilitate both partners' processing of the cancer experience and subsequent adjustment [52]. Interventions that target both decreasing individual distress and enhancing relationship satisfaction may improve patient and spouse QOL, maximize caregiver assistance during the disease course, minimize caregiver burden, and assist the spouse toward a healthier bereavement following the patient's death.

This study has some limitations that warrant discussion. The analyses focused only on baseline data; thus, we did not test our conceptual model in its entirety, and we only examined our data cross-sectionally. Additionally, the stepwise regression analysis used is an exploratory technique. Given the dearth of studies on psychological and relationship functioning in lung cancer, we felt this approach was justified, as it will guide our future analyses. Our subsequent longitudinal analyses will overcome these two issues, providing a more definitive picture of factors predicting distress in both patients and spouses and how these factors change over time. Further, our participation rate may affect generalizability; however, this rate is comparable to other couples studies in the oncology setting [36, 53]. Given that our sample comprised individuals initiating treatment for a cancer with a relatively poor prognosis, it was not surprising that almost half of the refusers reported one or both partners were too distressed to complete the questionnaires. We did not collect marital satisfaction or psychological distress data at recruitment; thus, we cannot determine whether those who did not complete the questionnaires were more or less maritally or psychologically distressed than those who did complete them. Future studies may benefit from asking non-participants to complete a brief, anonymous measure of psychological and marital distress to allow for comparisons between participants and non-participants. Finally, future studies should also include the patient's perception of his/her physical symptoms which may have a significant impact on both patients' and spouses' psychological state as well as their relationship satisfaction.

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