

## Supportive care needs in patients with lung cancer

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### Abstract

**Introduction:** The goal of this study was to characterize the prevalence and intensity of supportive care needs and interest in specific supportive care services among individuals with lung cancer.

**Method:** Participants ( $n = 109$ ) were recruited from two medical centers in Southern California to complete questionnaires on physical and psychological functioning following diagnosis of lung cancer.

**Results:** Participants reported the greatest need in the physical and daily living domain, followed by psychological needs, health system and informational needs, and patient care support needs. The most common unmet need was a lack of energy and tiredness (75%). Higher levels of supportive care needs were associated with worse physical functioning ( $\beta = -0.30$ ,  $p < 0.001$ ), greater symptom bother ( $\beta = 0.25$ ,  $p = 0.008$ ), lower satisfaction with health care ( $\beta = -0.24$ ,  $p = 0.002$ ), and higher levels of intrusive thoughts about cancer ( $\beta = 0.40$ ,  $p < 0.001$ ). The sample was most interested in receiving additional information about their disease and treatment (61.0%), exercise-related information and support (54.3%), and assistance dealing with fatigue (46.7%). Over 91% expressed interest in at least one specific supportive care service, and 51.4% were interested in one or more psychological services.

**Conclusion and implications for cancer survivors:** Our findings suggest that lung cancer survivors have many unmet needs. Patients who report higher physical distress and intrusive stress symptoms, or lower satisfaction with their health care, may experience the highest level of supportive care need and intervention.

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**Keywords:** lung cancer; support; adult; survivorship; lung neoplasms; psychological adaptation; psychosocial factors; quality of life; personal satisfaction; coping behaviors

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### Introduction

In the United States, lung cancer is responsible for more deaths each year than breast, prostate, and colorectal cancers combined [1]. Approximately 77% of individuals diagnosed with lung cancer have regional or distant spread of the disease at diagnosis, and the 5-year survival rate is under 16% for all stages combined [2]. Despite the large number of people affected and the poor outcomes associated with this disease, relatively little is known about the specific psychosocial needs of people with lung cancer [3]. Given the efficacy of psychosocial interventions for improving quality of life in cancer survivors [4–8], understanding the types and correlates of supportive care needs in people diagnosed with lung cancer is a necessary step toward the provision of effective psychosocial care. The primary goals of this research were to characterize the prevalence of distress, unmet

supportive care needs, and interest in specific supportive care services among individuals with lung cancer.

A small literature suggests that lung cancer patients have significantly more unmet supportive care needs than other cancer patient groups [9,10]. Patients living with lung cancer report having a number of distinct supportive care needs, including tasks of daily living [11], psychological needs such as dealing with sadness and worry [12,13], access to professional counseling and additional health information [14], and social support from friends, family, and medical staff [14,15]. Unfortunately, however, psychosocial concerns appear to be least likely to be addressed by the health-care team. In a study of 89 individuals with lung cancer, Hill *et al.* [9] reported that none of these patients' emotional, psychological, or social concerns were addressed by health-care providers, and only 43% of any patient concerns were mentioned or addressed during

health-care visits. Similarly, a recent chart review of newly diagnosed lung cancer patients identified an underutilization of referrals to supportive care services [16,17]. While it appears that psychosocial concerns are least likely to be addressed by the health-care team, those living with cancer are aware of the need for better coordination of supportive care services and show interest in services that go beyond surgery, chemotherapy, and radiation treatment, such as better communication of diagnosis and emotional support for caregivers [18]. However, little is known about which, if any, supportive care services are actually sought by those living with lung cancer. A first goal of this study was to document supportive care needs of lung cancer patients and to examine their associations with interest in a range of specific multidisciplinary services.

Another important unanswered question is when and for whom supportive care needs are most acute. Patients may report more psychological concerns at the time of diagnosis than at later stages of treatment [9]. As treatment progresses or as the disease process advances, needs related to physical concerns may become more salient to patients [9,19]. Individual difference variables such as gender and age also may be related to supportive care needs. Sarna *et al.* [20] found that women with lung cancer experience more anxiety and greater concerns after diagnosis than men, particularly with respect to managing household chores and caring for themselves. Cella *et al.* [21] also reported gender differences in distress in lung cancer patients, with women showing higher total mood disturbance than men, although no gender differences emerged in Maliski *et al.* [11]. Graves *et al.* [13] reported that younger age was associated with greater distress and greater desire for help with symptoms in lung cancer patients. We hypothesized that younger age, female gender, longer time since diagnosis, and more advanced stage of diagnosis would be associated with greater unmet supportive care needs.

In previous studies, estimates of the prevalence of clinically significant mood disturbance in lung cancer patients have varied considerably, from low estimates of 4.7% [22] to 29% [23] and as high as 62% [13]. Accordingly, a secondary aim of the study was to characterize the prevalence of psychological distress in this population and to evaluate whether psychological status is related to supportive care needs. In a qualitative analysis of semi-structured interviews with lung cancer patients, Maliski *et al.* [11] found that individuals with clinically significant levels of depression reported more difficulties meeting health- and self-care needs. We hypothesized that having fewer psychological symptoms would be associated with fewer unmet supportive care needs.

Coping efforts may also play a role in the degree to which lung cancer patients experience supportive care needs. Coping efforts predict psychological adjustment to cancer [23–25], and most studies suggest active rather than avoidant forms of coping are associated with better adjustment [26–28]. We also hypothesized that engaging in high problem-focused coping and low avoidant coping would be associated with fewer unmet supportive care needs.

Finally, having unmet supportive care needs may impact satisfaction with health care. Patients' most salient memories of their interactions with health-care providers may center around issues of feeling connected to their providers and believing that their providers care about their level of comfort [14]. Unfortunately, at least one study suggests that the majority of lung cancer patients experience some level of dissatisfaction with the way their providers communicate with them about the goals of their treatment [15]. We hypothesized that having unmet supportive care needs would be associated with lower levels of satisfaction with health care.

The primary objectives of the current study were (1) to characterize the prevalence and intensity of supportive care needs, (2) to characterize interest in specific supportive care services (e.g. psychological counseling, symptom management, exercise/nutrition counseling), and (3) to identify the associations between mood disturbance, patient and disease characteristics and supportive care needs. Given the lack of consensus in the literature, a secondary objective of the study was to estimate the prevalence of mood disturbance in those with lung cancer. To accomplish these objectives, we recruited individuals with lung cancer from two separate cancer treatment facilities in Southern California. Self-report instruments were used to accomplish the study goals and test the following hypotheses: (1) Greater unmet supportive care needs are associated with female gender, younger age, greater time since diagnosis, more advanced cancer stage, higher mood disturbance, lower satisfaction with health-care providers, low problem-focused coping, and high avoidant coping, and (2) Unmet supportive care needs are associated with greater interest in accessing specific supportive care services, such as psychological counseling.

## Methods

### Participants

Participants were recruited from two medical centers in Southern California, Loma Linda University Medical Center (LLUMC), and City of Hope (CoH). Eligible patients were English-speaking adult men and women with a primary carcinoma of the lung, including nonsmall cell

lung cancer or small cell lung cancer. Participants who were diagnosed with mesothelioma, who were not physically well enough to be able to read and respond to the questionnaires, or who were not fluent in reading and writing English were not eligible for participation. Recruitment efforts at both sites attempted to maximize recruitment of those within 6 months of diagnosis. At Loma Linda, time since diagnosis was not a criterion for eligibility to participate, whereas those recruited at CoH had to be within 6 months of their initial diagnosis.

### Procedures

Recruitment procedures differed slightly across the two sites. Participants at LLUMC were recruited by mail from the hospital cancer registry. Participants from the tumor registry of LLUMC were sent a letter informing them of the study and requesting participation. A week later a follow-up telephone call was made. If the participant agreed, he or she was sent the questionnaire packet with a stamped return envelope. Participants who did not return the questionnaires after 3 weeks received a follow-up telephone call. For each returned questionnaire, a \$10 check was mailed to the participant. Identifying information from 370 lung cancer patients was obtained from the tumor registry at LLUMC. Of those 370 patient names, 152 (41.1%) could not be contacted, 70 (18.9%) were deceased, and 148 (40%) were successfully contacted. Among those that were successfully contacted, 93 (62.8%) provided verbal consent to participate in the study and 55 (37.2%) declined. Of those that agreed to participate, 67 (72.0%) returned the baseline questionnaire and 26 (28%) did not.

At CoH, consecutively seen patients who met the eligibility criteria were identified by the Project Coordinator (PC) in conjunction with clinic staff and the attending physician prior to the patient's scheduled surgical or medical oncology clinic visit. The PC met with potential participants during their clinic visit to explain the study and consent interested patients. Consenting patients were provided the Time 1 questionnaire, a stamped return envelope addressed to the central data collection point (CoH Department of Psychology) and a copy of the IRB-approved consent form. Participants were asked to complete the questionnaire independently within 2 weeks and to return it by mail. Participants who did not return their questionnaire within 3 weeks received a reminder telephone call to answer any questions and to prompt them to return the questionnaire. If questionnaire packets were not received within 2 weeks after the reminder call, a duplicate questionnaire and return envelope were mailed to the participant. Participants received a thank you letter and were compensated \$20.00 following receipt of the study questionnaire.

A total of 101 consecutive patients from CoH were identified as eligible for the study. However, 38 (37.6%) of these patients were never able to be contacted and invited into the study because they did not have an outpatient clinic visit (i.e. when consent would occur) within 6 months of diagnosis. Of the 63 (62.4%) remaining patients who were contacted for study participation, 62 (98.4%) consented to participate, and baseline study questionnaires were returned by 42 (67.7%) patients.

### Measures

#### Supportive Care Needs Survey, Short Form (SCNS)

The SCNS [29] consists of 31 items answered on a divided 5-point Likert scale. For each item, participants indicate that they either have 'no need' for the item (1 = 'not applicable', 2 = 'satisfied') or some need for the item (3 = 'low need', 4 = 'moderate need', 5 = 'high need'). As described in McElduff *et al.* [30], any item rated 3, 4, or 5 was considered to be an unmet supportive care need. The instrument contains the following four domains: psychological needs (e.g. fears about cancer returning), health system and information needs (e.g. opportunity to talk to someone who understands and has been through a similar experience), physical and daily living needs (e.g. feeling unwell), and patient care and support needs (e.g. hospital staff attending promptly to physical needs). Scores for the four subscales were generated by averaging the completed items for each subscale. Construct validity and internal reliability for the SCNS have been established [30]. Internal consistency estimates for the current sample were excellent, with a Cronbach's  $\alpha$  of  $>0.87$  for all four scales.

#### Interest in supportive care services

An author-constructed list of 13 supportive care services was provided to each participant, and participants were asked which of the services would be helpful to them if available at no cost. Items were: additional information about disease or treatment, assistance quitting smoking, support group for lung cancer, internet support group for lung cancer, nutritional information and support, help with depression or anxiety, information about hospice services, spiritual counseling, counseling with a social worker or psychologist, financial counseling, treatment for pain, assistance dealing with fatigue, and exercise-related information and support. Participants were asked to indicate each service that they believed would be helpful for them.

#### Impact of Events Scale—revised

The Impact of Events Scale—Revised [31] was used to assess the intrusiveness of cancer-related thoughts. The instrument has good internal

consistency and is sensitive to effects of psychological intervention [31,32]. The 7-item intrusiveness scale was used (Cronbach's  $\alpha = 0.89$ ).

#### **The Center for Epidemiologic Studies Depression Scale (CES-D)**

CES-D is a 20-item measure of depressive symptoms that employs 4-point Likert scales for each item [33]. It has been well validated for use in cancer [34,35]. Cronbach's  $\alpha$  in the current study was 0.79.

#### **COPE**

The COPE [36] is a 60-item measure used to assess different ways in which people respond to stress. In the present study, only scales for problem-focused coping and avoidant coping were used. Problem-focused coping was a composite scale derived from two COPE subscales: coping through planning and active coping efforts (4 items,  $\alpha = 0.84$ ). Avoidant coping was a composite scale derived from the mental disengagement, behavioral disengagement, and denial subscales (12 items;  $\alpha = 0.71$ ). Each item was measured using Likert scales ranging from 1 ('I don't do this at all') to 4 ('I do this a lot').

#### **Distress thermometer (DT)**

Roth *et al.* [37] created a single-item measure asking respondents to rate the level of distress they experienced over the previous week on a 0–10 scale. The DT exhibits good sensitivity and specificity for identifying clinically significant distress in cancer survivors [38].

#### **Memorial Symptom Assessment Scale—Short Form (MSAS-SF)**

Twelve symptoms from the MSAS-SF [39,40] were used to assess for the presence and degree of bother associated with symptoms commonly experienced by those with lung cancer: pain, lack of energy, cough, dry mouth, nausea, shortness of breath, lack of appetite, difficulty swallowing, weight loss, dysgeusia, constipation, and insomnia. Participants indicated whether or not they had experienced the symptom in the past week. For each experienced symptom, participants rated the degree to which the symptom distressed or bothered them using a 5-point Likert scale. The MSAS-SF has demonstrated good convergent validity when used with cancer populations [39]. For the present study, bother scores were summed across items to generate a total Symptom Bother score (Cronbach's  $\alpha = 0.85$ ).

#### **Satisfaction with health care**

Participants were asked to report their feelings about their experiences with the doctors and nurses that they see most frequently for care of their lung

cancer by rating each of 10 author-constructed satisfaction items on a 6-point Likert scale. Examples of these items are 'I have complete trust in my doctors and nurses', 'I feel that my doctors and nurses listen to what I have to say', and 'I feel that I am able to participate fully in decisions about my care'. Internal reliability for the measure was good (Cronbach's  $\alpha = 0.78$ ).

#### **Physical functioning**

The physical functioning subscale from the 36-item Medical Outcomes Study Short Form (SF-36; [41]) was used. This subscale consists of 10 items that assess the impact of health on one's ability to perform moderate and vigorous physical activity and engage in instrumental activities of daily living [41]. Each item requires participants to indicate whether their health currently limits their ability to engage in specific activities (e.g. 'walking one block'). Participants are asked to indicate whether their health does not limit the activity, limits the activity a little, or limits the activity a lot. Internal consistency for the current sample was excellent ( $\alpha = 0.91$ ).

#### **Data analysis**

Descriptive statistics were computed, and differences between the two recruitment sites were evaluated for demographic and other key study variables using independent samples *t*-tests and  $\chi^2$  tests of association. Scores for the four subscales of the Supportive Care Needs Survey were standardized in order to evaluate which subscales were associated with the highest levels of unmet need. Pairwise comparisons between the four subscales were conducted using paired-samples *t*-tests, and the Bonferroni correction was used to limit  $\alpha$  for each of these comparisons to 0.008. Pearson product-moment correlations were used to test the hypotheses that age, time since diagnosis, psychological symptoms, coping, and health-care satisfaction would be associated with supportive care needs. Analysis of variance was employed to evaluate the hypotheses that gender and stage of disease would be associated with supportive care needs. A multivariate hierarchical regression was used to identify the most salient predictors of supportive care needs. Order of entry was chosen by assuming that physical concerns would be most strongly associated with supportive care needs. Demographic and medical characteristics were entered in steps 1 and 2 of the hierarchical model, followed by psychological symptoms (step 3) and coping efforts (step 4). Finally, the relationships between supportive care needs and interest in specific supportive care services were evaluated using point-biserial correlations.

## Results

### Participant characteristics

Demographic and personal characteristics of the 109 participants are shown in Table 1. Compared with similar age groups in the counties from which participants were recruited, the current sample reported a higher median household income and was less ethnically diverse [42]; however, both groups of participants were demographically representative of the patients treated for cancer at the respective sites. Participants sampled from the two recruitment sites did not differ with respect to total supportive care needs, age, education, gender, ethnicity, marital status, distance from clinic, or stage of disease. However, participants recruited from CoH reported significantly greater annual household income,  $t(79) = 3.00$ ,  $p = 0.004$ , and significantly less time since diagnosis,  $t(102) = 5.92$ ,  $p < 0.001$ .

### Prevalence of distress

Depression and distress prevalence estimates were derived using recommended cut-off scores on the CES-D ( $\geq 16$ ) [43] and DT ( $\geq 4$ ) [38], and results across the two instruments were similar. On the CES-D, 37.4% of participants had scores suggestive of clinically significant depression. On the DT, 37.5% of participants met the threshold for clinically significant distress. However, agreement between the two instruments was not perfect, with concurrence on 76.6% of cases (49.5% classified as nondistressed on both, 27.1% classified as distressed on both). Of the remaining 23.4% of cases for whom the instruments disagreed, 13.1% were

classified as distressed by DT but not CES-D and 10.3% were classified as distressed by CES-D but not DT.

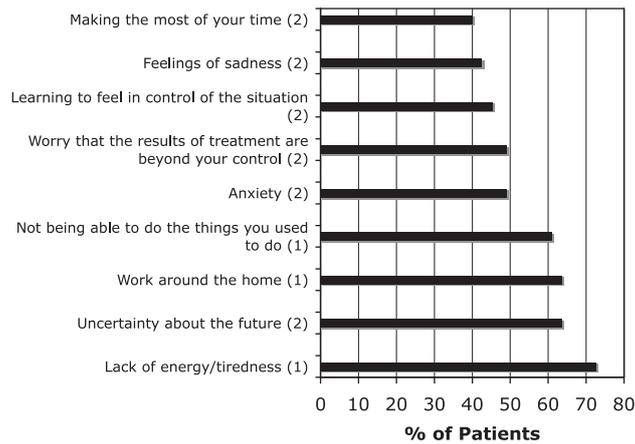
### Supportive care needs

Across the four domains in the Supportive Care Needs Survey, participants reported the greatest level of need for help with physical and daily living needs ( $\bar{x} = 3.2$ ,  $SD = 1.2$ ), followed by psychological needs ( $\bar{x} = 2.7$ ,  $SD = 1.0$ ), health system and informational needs ( $\bar{x} = 2.3$ ,  $SD = 0.9$ ), and patient care support needs ( $\bar{x} = 2.1$ ,  $SD = 0.7$ ). All matched pairwise comparisons between the four domains were statistically significant ( $p < 0.008$ ). In the physical and daily living domain, 80% of participants reported at least one unmet need. The most common unmet need was a lack of energy and tiredness (75%). For items in the psychological domain, at least one unmet need was reported by 78% of participants, with the most common unmet need being uncertainty about the future (64%). Sixty-six percent of participants reported at least one unmet need for the health system and informational domain. Being informed about things one could do to help get well was the most common unmet need in that domain (34%). Finally, 57% of participants reported at least one unmet need in the patient care support domain, with having one member of the medical staff available to talk about all aspects of one's condition, treatment, and followup being the most common unmet need in this domain (33%). The most prevalent unmet supportive care needs across all domains of the SCNS are shown in Figure 1.

**Table 1.** Demographic and medical characteristics of participants

	Total sample (n = 109)		Participants from City of Hope (n = 42)		Participants from Loma Linda (n = 67)	
	$\bar{x}$ (SD)	%	$\bar{x}$ (SD)	%	$\bar{x}$ (SD)	%
Age (years)	68.5 (10.1)		68.3 (10.2)		68.7 (10.1)	
Gender (% Female)		53.2		50.0		55.2
Annual household income (\$)	49 551 (39 299)		66 282 (45 203)		40 221** (32 448)	
Education (number of years)	13.5 (2.6)		14.1 (2.7)		13.1 (2.4)	
Ethnicity						
White		77.4		81.0		75.0
Latino		3.8		4.8		3.1
African-American		7.5		4.8		9.4
Asian-American		6.6		7.1		6.3
Other		4.7		2.4		6.3
Marital status (% married)		67.0		69.0		65.7
Distance to clinic (miles)	33.1 (39.8)		30.5 (27.9)		34.7 (45.6)	
Time since diagnosis (weeks)	54.1 (63.6)		13.6 (8.6)		79.4 (69.9)***	
Stage of disease						
I/II		24.7		17.5		29.3
III/IV		44.8		55.0		38.4
Unknown		30.5		27.5		32.3

Differences between COH and LLU participants are indicated by: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .



**Figure 1.** Most prevalent unmet supportive care needs. (1) = Physical and daily living needs, (2) = Psychological needs

**Table 2.** Correlations between supportive care needs and psychological symptoms, coping behaviors, and post-traumatic growth

	Total supportive care needs	Physical & daily living needs	Health system and information needs	Patient care support needs	Psychological needs	$\bar{x}$ (SD)	Range
Physical functioning	-0.51***	-0.59***	-0.22*	-0.29**	-0.43***	42.9 (27.8)	0–100
Intrusion symptoms	0.61***	0.37***	0.44***	0.48***	0.64***	9.4 (8.9)	0–35
Distress	0.51***	0.35***	0.29**	0.38***	0.60***	3.2 (3.0)	0–10
Depressive symptoms	0.62***	0.46***	0.36***	0.43***	0.69***	14.4 (11.2)	0–53
Satisfaction with health care	-0.46***	-0.15	-0.49***	-0.45***	-0.41***	52.8 (8.7)	18–60
Symptom bother	0.57***	0.55***	0.32***	0.35***	0.51***	1.4 (0.8)	0–3.25
Avoidance coping	0.32***	0.18	0.32***	0.23*	0.30**	1.7 (0.4)	1–3.08
Problem-focused coping	0.26**	0.17	0.26**	0.18	0.22*	2.7 (0.8)	1–4

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

### Simple and covariate-adjusted predictors of supportive care needs

Age, gender, marital status, and cancer stage were not significantly associated with total supportive care needs or any of the four subscales of the SCNS. Other physical and psychosocial correlates of supportive care needs are shown in Table 2. Total supportive care needs were significantly and positively correlated with cancer-related intrusive thoughts ( $r = 0.61$ ,  $p < 0.001$ ), distress ( $r = 0.51$ ,  $p < 0.001$ ), depressive symptoms ( $r = 0.62$ ,  $p < 0.001$ ), symptom bother ( $r = 0.57$ ,  $p < 0.001$ ), avoidance coping ( $r = 0.32$ ,  $p = 0.001$ ), and problem-focused coping ( $r = 0.26$ ,  $p < 0.05$ ). Having more unmet supportive care needs was also negatively associated with satisfaction with health care,  $r = -0.46$ ,  $p < 0.001$ , and with physical functioning,  $r = -0.51$ ,  $p < 0.001$ . Effect sizes for the relationships between supportive care needs and psychological/physical symptoms were moderate to large in size [44]. In order to identify which factors were uniquely associated with total supportive care needs in covariate-adjusted models, a hierarchical regression analysis was conducted with five blocks of variables: (1) time since diagnosis, (2) physical well-being (physical functioning and symptom bother), (3) coping efforts (avoidant and problem-focused coping), (4) psychological

disturbance (depressive symptoms, distress, and intrusive thoughts), and (5) satisfaction with health care. Order of entry was chosen on the basis of which constructs were deemed to be most proximal to the experience of supportive care needs. Results are shown in Table 3. With the exception of time since diagnosis (block 1), each block significantly added to the prediction of supportive care needs, and the full model explained 69.1% of the variance in supportive care needs,  $F(9, 75) = 18.6$ ,  $p < 0.001$ . In the final model, higher levels of total supportive care needs were significantly associated with worse physical functioning ( $\beta = -0.30$ ,  $p < 0.001$ ), greater symptom bother ( $\beta = 0.25$ ,  $p = 0.008$ ), and lower satisfaction with health care ( $\beta = -0.24$ ,  $p = 0.002$ ). Given significant differences in income between the two recruitment sites, income was considered as a covariate in block 1 but was not included due to excessive missing data on this variable ( $n = 28$  with missing income data). However, when income was included in the model, the pattern of results related to both blocks and individual predictors was unchanged.

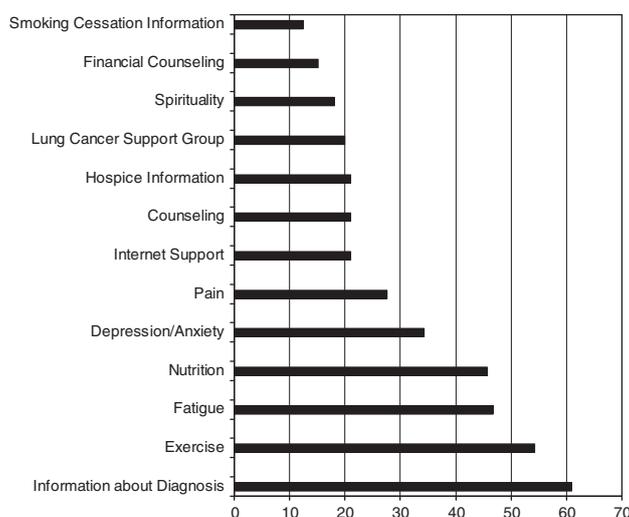
### Interest in available supportive care services

Regarding the specific supportive care services that might be available, approximately half of all participants indicated that exercise-related

**Table 3.** Stepwise hierarchical regression of total supportive care needs on time since diagnosis, physical well-being, coping behaviors, psychological symptoms, and satisfaction with health care

Step	Variable	$\beta_{\text{step}}$	$\beta_{\text{full}}$	95% CI for $\beta_{\text{full}}$	p-value	$\Delta R^2$	F-change
1	Weeks since diagnosis	-0.08	-0.00	(-0.17, 0.17)	0.99	0.01	0.5 n.s.
2	Physical functioning	-0.27**	-0.30***	(-0.45, -0.15)	<0.001	0.34	21.4***
	Symptom bother	0.42***	0.25**	(0.07, 0.43)	0.008		
3	Avoidant coping	0.16	0.05	(-0.11, 0.20)	0.55	0.10	7.5***
	Problem-focused coping	0.26**	0.13	(-0.01, 0.27)	0.07		
4	Intrusion symptoms	0.50***	0.40***	(0.21, 0.59)	<0.001	0.19	130.8***
	Depressive symptoms	0.06	0.06	(-0.15, 0.26)	0.61		
	Distress	-0.11	-0.10	(-0.27, 0.08)	0.30		
5	Satisfaction with health care	-0.24**	-0.24**	(-0.38, -0.09)	0.002	0.05	10.8**

$R^2$  for the full model = 0.691; \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

**Figure 2.** Percentage of participants interested in each of 13 supportive care services

information and support (54.3%), additional information about their disease or treatment (61.0%), and assistance dealing with fatigue (46.7%) would be helpful (see Figure 2). Relatively few participants expressed an interest in financial counseling (15.2%) or assistance with quitting smoking (12.4%). However, 44% of current smokers ( $n = 10$ ) expressed interest in smoking cessation. Although 27.6% were interested in treatment for pain, 40.6% of those who reported pain in the past week expressed interest in pain treatment. The substantial majority (91.4%) of participants reported interest in at least one of the supportive care services, and the mean number of desired services was 4.0 ( $SD = 2.9$ ). Approximately half (51.4%) of participants endorsed interest in receiving at least one psychological service (i.e. help with depression/anxiety, counseling, support group, or internet support group).

#### Associations between reported supportive care needs and interest in available services

Point-biserial correlations between total and subscale scores of the Supportive Care Needs Survey and interest in each of the 13 multidisciplinary

services are displayed in Table 4. Higher total supportive care needs were significantly correlated with interest in obtaining information about disease or treatment, internet support groups, help with depression or anxiety, information about hospice services, counseling or psychotherapy with a therapist, traditional support group, treatment for pain, and assistance with fatigue. Physical daily living needs, health system/information needs, and psychological needs predicted interest in multi-disciplinary services in similar ways, with higher levels of these needs associated with greater interest in counseling or psychotherapy with a therapist, and assistance dealing with fatigue (see Table 4). Patient care needs exhibited only one significant correlation with the interest variables (i.e. help with anxiety or depression).

#### Discussion

This study highlights the high level of distress and unmet supportive care needs among those with lung cancer. Nearly 40% reported levels of distress and depressive symptomatology that meet clinical cut-offs, and many of these patients are interested

**Table 4.** Point-Biserial correlations between total and subscale scores from the supportive care needs survey and interest in each of 13 multidisciplinary services

	Total supportive care needs	Physical daily living needs	Psychological needs	Health system and information needs	Patient care support needs
Information about disease or treatment	0.27**	0.19	0.31**	0.23*	0.16
Exercise information and support	0.14	0.09	0.15	0.18	0.06
Assistance dealing with fatigue	0.35***	0.34**	0.31**	0.24*	0.17
Nutrition information and support	0.11	0.13	0.09	0.16	0.001
Help with depression or anxiety	0.32**	0.20*	0.51***	0.11	0.23*
Treatment for pain	0.24*	0.26**	0.27**	0.09	0.18
Internet support group for lung cancer	0.29**	0.22*	0.33**	0.23*	0.16
Counseling or psychotherapy with a social worker or psychologist	0.32***	0.24*	0.34***	0.28**	0.12
Information about hospice services	0.22*	0.23*	0.18	0.15	0.16
Support group for lung cancer	0.23*	0.16	0.29**	0.25*	0.06
Spiritual counseling	0.09	0.20*	0.15	0.06	-0.04
Financial planning or counseling	0.19	0.12	0.19	0.19	0.13
Assistance quitting smoking	0.10	0.12	0.11	0.10	0.09

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

in treatments that could improve distress, psychological symptoms, and other problems that impact quality of life. Over half of all patients in this study expressed an interest in services related to exercise, treatment of fatigue, information about their disease or treatment, and psychological counseling or support.

Overall, findings provided partial support for our hypotheses. As hypothesized, greater supportive care needs were associated with having higher levels of psychological disturbance, lower health-care satisfaction, and greater use of avoidant coping strategies. Contrary to our initial hypothesis, however, greater supportive care needs were also associated with greater, rather than lower, use of problem-focused coping strategies. It may be that having unmet supportive care needs results in increased use of a variety of coping strategies. In other words, lung cancer survivors may be seeking to ameliorate unmet needs by any means necessary, and using multiple types of coping strategies may increase the likelihood that at least one strategy will prove to be effective. Demographic and medical characteristics that were hypothesized to be associated with supportive care needs (i.e. gender, age, time since diagnosis, and cancer stage) were not.

These findings suggest that unmet supportive care needs are common across individuals with lung cancer and might have a clinically significant impact on well-being. Because supportive care needs are not predicted by information that would be readily available in a chart review (e.g. cancer type, stage, time since diagnosis, age, gender), identification of individuals most likely to experience supportive care needs may require more careful assessment on the part of health-care providers. Such assessment could include psychological screening [45,46], waiting-room administration of an instrument such as the Supportive Care Needs Survey, or clinical interviews with a social

worker, psychologist, nurse, physician, or other health-care provider. Early identification of these needs could represent an opportunity for health-care providers to improve patients' level of satisfaction with their care and to develop treatment plans or referrals to address unmet needs.

The experience of having unmet supportive care needs was most strongly associated with intrusive cancer-related thoughts, limitations in physical functioning, bother associated with physical symptoms, and health-care satisfaction. Regardless of whether supportive care needs are caused by or result in these particular problems, which cannot be determined from a cross-sectional study, it is encouraging that there are empirically supported treatments that could reduce their impact on patients' quality of life. Cancer-related stress or more general anxiety symptoms secondary to painful and sometimes invasive medical treatments are likely amenable to psychological [47,48] and medical treatments [49]. Additionally, although commonly experienced symptoms such as fatigue and pain are difficult to treat, comprehensive symptom management strategies may provide substantial palliation [50]. With respect to impairments in physical function, it is encouraging that information about exercise was the most commonly identified service desired by those with lung cancer. The role of exercise in the recovery process from surgery and other medical treatments for lung cancer is only beginning to be explored, but there is evidence that pulmonary rehabilitation programs can significantly improve patient outcomes [51]. Finally, simply taking the time to initiate dialogue with patients about supportive care needs may significantly improve health-care satisfaction [52].

With regard to study limitations, findings are limited to data provided at study entry in a planned longitudinal design. Additionally, the generalizability of findings is limited to patients who are sufficiently healthy to respond to written surveys.

Identifying and successfully recruiting individuals with lung cancer are tasks greatly complicated by the high morbidity and mortality associated with the disease. Patients who experienced a rapid decline after diagnosis would have been unlikely to participate in the present study.

The distress and symptom burden borne by those with lung cancer is high. Our results demonstrate that a large majority of patients experience unmet supportive care needs across multiple domains, and having unmet supportive care needs is associated with dissatisfaction with health-care providers and mood disturbance. Efforts to improve the clinical assessment of supportive care needs could improve patient satisfaction with care and quality of life outcomes in individuals with lung cancer.

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