Relationships Between Smoking Status and Psychological Distress, Optimism, and Health Environment Perceptions at Time of Diagnosis of Actual or Suspected Lung Cancer

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Abstract

Background—While much research and practice resources have addressed smoking cessation among cancer patients, less emphasis has been placed on personal psychological and environment factors associated with smoking at the time of diagnosis.

Objective—To examine differences in psychological distress, optimism, and perceptions of the health environment/illness experience based on smoking status in patients with current, former, and no smoking history with newly diagnosed suspected or actual lung cancer.

Methods—Data were derived from a descriptive study of 52 patients (34 men; 18 women, age 37–83 years) undergoing diagnostic evaluation for actual or suspected lung cancer. Descriptive statistics were used to characterize data. ANOVA, chi-square, and Spearman correlation tests were used to determine relationships among main study variables (smoking status, anxiety, worry, perceived cognitive functioning, optimistic outlook, health environment/illness experience perceptions).

Results—Current smoking status was associated with higher psychological distress (anxiety and worry) among patients facing a new suspected or actual cancer diagnosis.

Conclusions—The study was able to provide important information relative to smoking status and psychological distress at the time of diagnosis of suspected or actual lung cancer. Findings demonstrate needs for assessment and targeted interventions to reduce psychological distress and to promote long-term adaptation in patients smoking at time of diagnosis.

Implications for Practice—Nurses are positioned to provide support and resources for cancer patients. It is critical that smoking cessation interventions also address nicotine craving, emotion regulation and adaptive coping skills.

Keywords

Lung neoplasms; Smoking; Perception; Optimism; Anxiety

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Introduction

Lung cancer is the leading cause of cancer death and the second most common cancer in incidence for both men and women in the United States.[1] Smoking exposure is the primary environmental factor responsible for the incidence of lung cancer.[1] A diagnosis of actual or suspected lung cancer is a serious life-threatening stressor that may be compounded by its association with smoking status. Patients who are active smokers have the added stressor of smoking cessation at the time of a potentially life-threatening diagnosis of lung cancer.[2] While many newly diagnosed patients with suspected or actual lung cancer are current smokers,[3,4] little research has examined relationships between smoking status at diagnosis in relation to psychological distress and personalized perceptions relative the health care environment and illness experience. Evaluating patients' perceptions about the illness context and level of psychological distress in relation to smoking status is important as it may impact adaptation over time. Therefore, the purpose of this study is to examine psychological distress and perceptions of health care environment and illness experience in relation to smoking status (current, former, and never smokers) and smoking intensity at the time of a suspected or new lung cancer diagnosis. The inquiry examines presence of an optimistic outlook related to these factors, and discusses implications of these findings relative to the role of the nurse as a patient advocate.

Background

Patients who receive a new diagnosis of suspected or actual lung cancer face multiple cognitive and emotional challenges.[5] Given the disease is associated with smoking, patients may feel responsible if they perceive the diagnosis is related to smoking behaviors.[6] Further, patients may perceive stigma from health providers, friends, and family that contribute to lowered perceptions of support.[6] Problems relative to smoking behaviors and emotional vulnerability have been recognized in other cancer and medical conditions. For example, smoking continuation and relapse were associated with heightened psychological distress (anxiety, depressive symptoms, worries about potential recurrence) in patients with oral and oropharyngeal malignancy.[7]

Studies have found relationships between smoking behavior and anxiety problems.[8,9] Individuals higher in anxiety sensitivity, a fear and avoidance of anxiety symptoms, are more motivated to smoke and to relapse following quit attempts.[10] These connections between anxiety, especially anxiety sensitivity, and smoking relapse may be attributed to a dysfunction of the neurological gating system, which then leads to overestimation of mild breathing discomfort that has been shown to be corrected through administration of nicotine through smoking or patch administration.[11,12]

The cognitive processing, particularly the types of content that is processed, associated with a life-threatening illness is critical to adjustment to the disease.[13] Worry, involuntary aversive cognitions about anticipated threats and concerns, is common and associated with anxiety in patients newly diagnosed with life-threatening illnesses such as cancer.[14] Worry has been shown to correlate with a particular disruption in the variability of ones breathing pattern, a disruption that is corrected through spontaneous and on-demand sighs similar to breaths used during cigarette smoking.[15,16] Environmental factors that heighten worry such

as unanticipated stipulations to quit smoking, the need for forthcoming treatments associated with potential side effects, and personal life adjustments also may compromise perceived cognitive effectiveness for patients with newly diagnosed lung cancer.[5] Realistic worry that occurs with effective cognitive function and contributes to lowered negative affect may be adaptive in the face of serious stressors and/or threats where cognitive resources are targeted towards the problem so that effective strategies for coping can be utilized. However, in risk reduction research such as cancer screening, results are mixed in the role of worry in motivating positive health behavior.[17]

Patients' perceptions of the health care environment, whether positive or negative, impact illness adaptation. Patients with cancer strongly desire active participation in their treatment information about options and expectations, and desire time from health care professionals for support and communication.[18] However, health care professional interactions have been shown to trigger the most concerns over the post-diagnosis period contributing to negative adaptation in patients with cancer.[19]

A growing literature has examined factors associated with positive adaptation to cancer. [13,14,20] Dispositional optimism is a stable personality tendency to expect positive outcomes from life events.[21] In the face of a life-threatening diagnosis of cancer, patients who are realistically optimistic might reflect on positive goal-oriented or problem-solving aspects as opposed to aversive, negative self-deprecating thoughts.[20] On the other hand, patients may unrealistically assume their risk for adverse health consequences are lowered despite evidence to the contrary.[22] In this regard, optimistic individuals may underestimate risk and potential negative outcomes associated with smoking behaviors.[22]

Self-regulation research and theory articulates mechanisms for understanding how illness perceptions impact behavior and adaptation in the face of life shattering health threats.[23] In this regards, the context or environment is critical to recognizing how patients build mental frameworks that guide their interpretation, decision-making, and coping strategies in the face of cancer. Smoking conduct may be backed by beliefs that the behavior serves a self-regulation role for managing negative affect states and stress.[24]

While much research and practice resources have addressed smoking cessation among cancer patients, less emphasis has been placed on personal psychological and environment factors associated with smoking at the time of diagnosis. Therefore, the purpose of this study was to examine: 1) differences in psychological distress and perceptions of the health environment/illness experience between patients who are current, former, and never smokers, 2) differences in these associations by smoking intensity, and 3) whether optimism influences these associations in relation to smoking status at diagnosis among newly diagnosed patients with suspected or actual lung cancer. We operationalize psychological distress as evidence of heightened anxiety, worry, and lowered perceived cognitive effectiveness.

Methods

Design

Data were derived from a study of patients undergoing diagnostic evaluation and treatment for actual or suspected lung cancer at a Midwestern university comprehensive cancer center and a Veteran's Administration health system.

Sample and Setting

The convenience sample was comprised of 52 patients who were assessed during the pretreatment period in relation to psychological parameters, perceptions about their illness experience and the health environment. Inclusion criteria included patients who were: (a) age 21 years or older, (b) diagnosed with actual or suspected non-small cell lung cancer. Exclusion criteria included the following: (a) a known history of cancer other than the suspected lung cancer, (b) documented cognitive or psychiatric disorder (e.g., dementia, schizophrenia, major affective disorder), (c) history of a debilitating medical disorder such as advanced cardiac or respiratory disease, and (d) current psychoactive medication that would impede study participation.

Procedures

Full institutional review board approval was received from the respective university and participating medical center sites. Eligible volunteers were approached by the study researcher during scheduled pre-operative or clinic visits where patients and physicians discussed diagnostic test results and future treatment (e.g. surgery). The researcher explained the purpose, requirements, risks, benefits, and rights, including the right to withdraw from participation at any time before written informed consent was obtained. If participants agreed to participate in the study, they completed the surveys in a private consulting room. At the time of the survey, 44% of the patients had only suspicious test findings and did not yet have a confirmed diagnosis. The diagnosis was confirmed and the disease stage were determined after surgery. All measures were administered using a standard set of instructions.

Measures

Demographic information included age, marital status, race/ethnicity, educational level, occupation, and employment status. Health history information including smoking status was obtained from the computerized medical access systems. Smoking status was categorized as current, former, and no previous history. Smoking pack years were calculated by multiplying the number of cigarettes smoked per day and the number of years smoked.

Distress variables—Anxiety was measured by the validated Spielberger's State-Trait Anxiety Inventory (STAI).[25–27] Consisting of two separate 20–item scales, participants were asked to rate current (state) and general (trait) perceptions about how they feel on a 1–4 point scale, from "not at all" to "very much so" (range 20–80).[25] In this study, the Cronbach's α coefficient for the state and trait anxiety scale was .94 and .87, respectively.

Worry was evaluated with measures of both general (non-specific) and cancer-related worry. The Penn State Worry Questionnaire (PSWQ), a 16-item self-report instrument, was used to measure the frequency and intensity of general worry.[28,29] The PSWQ is scored on a 5-point Likert scale with response options of 1 (not at all typical) to 5 (very typical), with a summed composite score (range 16–80). In this study, the Cronbach's alpha (α) coefficient for the PSWQ was 0.90. Cancer-related worry was measured with a 3-item Cancer-related Worry Questionnaire to evaluate perceived worry about cancer, cancer treatment, and the impact of cancer-related worry on daily functioning using a 5-point Likert scale (range 3 to 15).[30,31] The Cronbach's α coefficient was .85.

Perceived effectiveness in cognitive functioning was evaluated with the validated Attentional Function Index (AFI) consisting of three essential domains of effective action, interpersonal effectiveness, and attentional lapses.[32,33] The AFI consists of 16 linear analogue scales, that is labeled with polar opposite phrases at each end ("not at all", "extremely well"; range 0–100).[32] The Cronbach's α coefficient for the current study was .87.

Health Environment Perceptions—A 7-item survey was developed to obtain information about the patient's perceived illness experiences in relation to the health care environment, such as perceptions about treatment participation, time taken by doctors and nurses to listen to concerns, and opportunity to make choices and ask questions relative to treatment and scheduling of appointments.[5] Participants were asked to rate on a five-point scale from 1="not at all" to 5 ="always" or "a lot" statements related to current experiences with the health care environment (range 7–35). Higher scores indicated stronger agreement with statements. The Cronbach's α coefficient was 0.81.

The 10-item Life Orientation Test-Revised (LOT-R) was used to measure optimistic outlook.[34] The LOT-R consists of 10 Likert scale items (0=strongly disagree; 4=strongly agree) that reflect expectations of positive versus negative life experiences. Only 6 items of the LOT-R are used in scoring the instrument (4 items are filler) so the scale has a range of 0–24. The Cronbach's α coefficient was .84.

Statistical Analysis

All statistical procedures were performed using the SAS program. Descriptive statistics were computed on all variables. To examine differences in distress and perceptions about the health environment/illness experience between patients who were current, former, and never smokers, one-way ANOVA test for continuous variables and chi-square or Fisher exact test for categorical variables were performed. Assumptions of ANOVA test were examined and none of them were violated. To examine distress and perceptions about the health environment/illness experience in relation to optimistic outlook, Spearman correlation test were conducted. Statistical significance was determined at the level of 0.05.

Results

The study sample was comprised of 52 adults aged 37 to 83 years old who were being evaluated for possible thoracic surgery following a new diagnosis of suspected or confirmed stage non-small cell lung cancer at two Midwestern hospitals (See Table 1 for demographics

and health characteristics). The majority of patients were either current (n=12, 23%) or former (n=37, 71%) smokers at diagnosis with a mean 49.79 pack years. Most participants were White (94%), male (65%) and currently married (69%). Half of the patients had a high school education or less and were retired. Most patients had either Stage I or II disease (75%) reflecting their eligibility to be evaluated for potential curative surgical resection. Over half (56%) of the patients had a confirmed cancer diagnosis prior to surgery.

Table 2 shows descriptive results for the major study variables. The mean state anxiety score was 43.75 ± 14.25 demonstrating that the patients in general were experiencing anxiety. Trait anxiety ranged from 20 to 67 with the mean of 37.73 (SD=10.44). The mean PSWQ score indicated lower levels of worry, yet there were patients in the sample with general worry comparable to psychiatric populations (range 20 – 75). On the Cancer-Related Worry Questionnaire, the mean score of11.06 was reflective of generally moderate to high levels of cancer-related worry, with scores ranging from the lowest to the highest possible score.

The AFI scores reflect low to only moderate levels of perceived cognitive effectiveness. Such findings suggest that patients in general were experiencing symptoms of cognitive fatigue, challenges with emotion regulation, and difficulties with focus and concentration in relation to completing common tasks associated with daily life. Importantly, the range of scores of the Illness Experience Questionnaire was 13 to 35 suggesting perceived satisfactory interactions with the health care environment in general.

Scores on the optimism scale (LOT-R) ranged from 6 to 24 with the mean of 15.90 (SD=3.7). Analysis of sex differences in the major study variables showed a trend of females having higher psychological stress (higher anxiety and worry) and higher optimism, albeit mostly not significant except trait anxiety (t=−2.10, P=.041).

Differences in distress and illness experience based on smoking status

Compared to either patients who were former or never smokers, patients who currently smoked tended to report higher anxiety (both state and trait) and worry (both general and cancer-related) and lower levels of perceived effectiveness in cognitive function, positive perceptions about the health environment/illness experience, and optimistic outlook (Table 3). Most correlations, however, were not significant except cancer-related worry (F=3.61, P=.034) where current smoking status was associated with the highest levels of cancer-related worry. Currently smoking patients reported the least positive perceptions about their health environment and illness experience, although this was not statistically significant (F=2.56, P=.087).

To further examine these associations in relation to smoking intensity (pack years), one-way ANOVA's were conducted (Table 3). Compared to either never smokers or patients with less than 20 pack years, patients with 20 pack years showed higher anxiety (state and trait) and worry (general and cancer-related) and less positive perceptions of their health environment/ illness experience, perceived effectiveness in cognitive function, and optimistic outlook, although these associations were not significant with most variables. The only significant difference in relation to smoking intensity existed in cancer-related worry (F=3.29, P=.046).

Associations of distress and illness perception with life orientation

While greater optimistic outlook tended to be associated with decreased levels of anxiety (state) and worry (general and cancer-related), and to increased perceived effectiveness in cognitive function, these findings were not statistically significant. However, there were significant inverse relationships between optimistic outlook and trait anxiety ($\rho = -0.36$, $P = .01$), and positive perceptions of the health care environment/illness experience ($\rho = 0.49$, $P < .001$).

To further examine differences in these relationships relative to smoking status, Spearman's correlations were repeatedly tested with smokers only (n=48), current smokers only (n=12) or former smokers only (n=37). While the directions of the relationships did not significantly change in most cases, effect sizes were larger mostly when the analyses included only current smokers (Table 4).

Discussion

The study examined differences in psychological distress and perceptions of the health environment/illness experience among current smokers, former smokers, and never smokers who were newly diagnosed with suspected or actual non-small cell lung cancer. The majority of the patients had stopped smoking by the time of assessment, and only 6% of the sample had no smoking history.

Overall anxiety levels in this sample were similar to those of general medical and surgical patients or college students under stressful exam conditions.[26] While the comparative findings depending on smoking status were not significant, the 12 patients who were currently smoking had clinically significant levels of state anxiety. As shown in the literature,[35,36] increases in trait anxiety were significantly associated with decreased optimistic outlook. Importantly, cancer-related worry was in the highest range among current smokers.

Perceptions of effective cognitive function were the lowest among current smokers, consistent with previous studies.[37,38] Underlying mechanisms of such findings are not clear, yet decrements may be associated with increased levels of cortisol resulting from high levels of psychological distress (e.g., anxiety and worry) existing among current smokers at diagnosis.[38] Perceptions of effective cognitive function were significantly and positively related to optimistic outlook, similar to other studies where dispositional optimism was related to improved perceived cognitive function.[39] Our patients' showed similar optimistic levels as reported in the general population.[21] These findings demonstrate the importance of assessment and management of psychological distress (anxiety and worry). It is critical that smoking cessation interventions address psychological distress including training in emotion regulation and physiological nicotine craving management to promote cessation efforts and reduce relapse in lung cancer patients. Cognitive behavior therapies and mindfulness-based interventions that focus on adaptive coping skills and relieving stress might be beneficial.[40,41]

Limitations

The present study has limitations that must be considered. Firstly, the study is limited by the small convenience sample that was lacking in both ethnic and racial diversity. The small sample size, especially never smokers, may provide low statistical power, leading to a reduced chance to detect a true effect and low reproducibility of results.[42] However, such findings are reflective of patients with lung cancer more generally where the majority are either current or former smokers.[43–45] Moreover, the aim of this study was to explore relationships between psychological and environment factors and smoking status, thus studies with larger sample sizes are needed before findings are generalizable. The findings were reliant on self-reported smoking status. Given the social stigma associated with smoking, self-reported smoking status without biochemical verification could introduce misclassification of current smokers. Further, the study was cross-sectional in nature. Therefore, it is unable to provide information on causal relationships as do longitudinal studies. The study was unable to provide information about anxiety sensitivity in this group of patients, which could better demarcate markers of emotional vulnerability in smoking patients.[10]

Nursing Implications

Nurses are cognizant of the need to provide smoking cessation counseling and resources for patients newly diagnosed with lung cancer. Patients who successfully stop smoking following a cancer diagnosis have better clinical outcomes, such as decreased fatigue and shortness of breath, increased functional activity level and quality of life, less treatment toxicity, as well as better survival.[46–48] The Surgeon General's Report "The Health Consequences of Smoking—50 Years of Progress" articulated the essential need for providing cessation interventions to cancer patients.[49,50] A diagnosis of cancer can be a "teachable moment" since many patients are highly motivated to quit smoking as the benefits of quitting are evident.[51,52] However, smoking cessation may be cognitively and emotionally overwhelming to patients who smoke to help manage stress in the face of a life-threatening stressor.[2] Given that unsuccessful quit attempts may increase psychological difficulties and subsequently affect cancer adaptation negatively, interventions beyond smoking cessation counseling (e.g., assessing contributing factors of continuing smoking) may be needed for patients with a smoking-related cancer diagnosis.[7]

Less attention has been played towards promoting optimistic outlook for patients with lung cancer. Although the benefits of smoking cessation have been well-established, fatalistic view towards health consequences are prevalent among patients with lung cancer, which may contribute to relapse.[52] Identifying resources and helping patients to recognize positive, realistic aspects of their lives are important. The study was able to provide important information relative to smoking status and psychological distress at the time of diagnosis of suspected or actual lung cancer.

Research Implications

More research is needed to develop understanding of patient and disease factors that impact smoking and smoking cessation. Further research in both lung cancer groups and among other cancer populations is also needed to clarify factors associated with persistent smoking

following diagnosis. Studies aimed at better understanding strategies that would help vulnerable subgroups of patients with high distress to manage the negative effects of managing an addiction coincident with receiving a life-threatening diagnosis are needed. Surprisingly, a recent Cochrane review identified no randomized controlled studies of smoking cessation interventions tailored to lung cancer patients.[53] Psychotherapeutic modalities such as mindfulness-based cognitive therapy, that address negative perseverant cognitions such as worry with cognitive-behavioral and mindfulness meditation practices are promising.[54] Such interventions also target the relaxation response providing somatic quieting for affective activation. It is also imperative that physiological mechanisms that connect breathing patterns with psychological states such as worry, anxiety and negative affect are evaluated such as measurement of breathing timing parameters in persons prone to continued smoking or smoking relapse. This knowledge would guide appropriate incorporation of practices such as yoga and qigong breathing practices into mindfulness based cessation interventions that may prevent smoking relapse via relief of interoceptive discomfort to reduce anxiety sensitivity.[55,56] Finally, longitudinal studies that are able to address the impact of smoking on subsequent cancer adaptation are imperative.

Conclusion

Given the better clinical outcomes for patients who successfully stop smoking following a lung cancer diagnosis, heightening efforts to ensure that cessation is permanent are essential. Cognitive behavior therapies incorporating adaptive coping and stress management skills could be options to help manage distress, promote effective cognitive functioning, and promote cessation efforts for smokers diagnosed with lung cancer. Open discussion, provision of referrals for individual and/or family counseling may be needed to facilitate effective coping with a new diagnosis of lung cancer.

Acknowledgments

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Table 1

Demographic and Health Characteristics (N=52)

	Mean (SD)	Frequency (%)
Age	64.08 (11.62)	
Race/Ethnicity		
Caucasian		49 (94.23)
African American		3 (5.77)
Gender		
Female		18 (34.62)
Male		34 (65.38)
Marital Status		
Married		36 (69.23)
Widowed		10 (19.23)
Divorced		6 (11.54)
Education (in years)	12.77 (1.98)	
Employment status		
Employed		18 (34.73)
Retired		25 (51.02)
Unemployed		6 (12.24)
Children		
Has children		48 (92.31)
No children		4 (7.69)
Smoking status		
Current smoking		12 (23.08)
Quit smoking		37 (71.15)
Never smoking		3 (5.77)
Pack years	49.79 (30.75)	
Stage		
I		18 (34.62)
II		22 (42.31)
III/IV		12 (23.08)
Pre-op diagnosis		
Confirmed		29 (55.77)
Suspected		23 (44.23)

Table 2

Major Study Variables

	Mean (SD)	Range
Anxiety (State)	43.75 (14.25)	20.0–77.0
Anxiety (Trait)	37.73 (10.44)	20.0–67.0
General Worry	40.96 (12.83)	20.0–75.0
Cancer worry	11.06 (3.70)	3.0–15.0
Attentional function	60.12 (14.97)	28.56–91.63
Health environment/Illness experience	28.65 (5.45)	13.0–35.0
Life orientation	15.90 (3.97)	6.0–24.0

Table 3

Bivariate Association in Relation to Smoking Status and Smoking Intensity (N=52)

	Smoking Status				Smoking Intensity			
	Never Smokers (n=3), Mean	Former smokers (n=37), Mean	Current Smokers (n=12), Mean	P-value	Never Smokers (n=3), Mean	<20 Pack Years (n=11), Mean	20 Pack Years (n=38), Mean	P-value
Anxiety (State)	33.33	43.57	46.92	.339	33.33	37.27	46.45	.070
Anxiety (Trait)	36.00	36.70	41.33	.400	36.00	33.45	39.11	.279
General Worry	36.67	40.70	42.83	.746	36.67	37.45	42.24	.462
Cancer worry	6.00	11.14	12.08	**.034**	6.00	11.09	11.45	**.046**
Attentional function	72.17	60.35	56.39	.264	72.17	62.95	58.35	.243
Illness experience	32.33	29.24	25.92	.087	32.33	29.64	28.08	.348
Life orientation	16.33	16.35	14.42	.341	16.33	16.45	15.71	.850

Table 4

Associations with Life Orientation (N=52) [a]

	All Patients (N=52)	All Smokers (N=49)	Current Smokers (N=12)	Former Smokers (N=37)
Anxiety (State)	−0.27 (P=.055)	−0.25 (P=.080)	−0.34 (P=.276)	−0.18 (P=.299)
Anxiety (Trait)	**−0.36** (P=.010)	**−0.33** (P=.020)	−0.49 (P=.109)	−0.21 (P=.205)
General worry	−0.16 (P=.247)	−0.14 (P=.345)	−0.23 (P=.472)	−0.06 (P=.721)
Cancer worry	−0.19 (P=.177)	−0.17 (P=.234)	−0.33 (P=.301)	−0.11 (P=.502)
Attentional function	0.19 (P=.177)	0.16 (P=.258)	0.16 (P=.622)	0.18 (P=.281)
Health environment/Illness experience	**0.49** (P<.001)	**0.47** (P<.001)	0.45 (P=.144)	**0.44** (P=.007)

[a]Spearman correlation