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Correlates of continued smoking versus cessation among survivors of smoking-related cancers

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Abstract

Objective—We examined correlates of continued smoking versus cessation among a sample of survivors of smoking-related cancers who were actively smoking at the time of cancer diagnosis.

Methods—Participants with a history of smoking and a smoking-related cancer diagnosis (lung, oral, pharynx, larynx, esophagus, bladder, stomach, cervix, kidney, pancreas, acute myeloid leukemia) within the past four years were identified in the electronic medical record. We recruited 613 individuals to complete a mail-based survey and received 139 completed surveys (22.7% response rate). We focused on 105 participants who smoked at the time of diagnosis and dichotomized them to having either quit since diagnosis (48.6%; n=51) or continued smoking (51.4%; n=54). We assessed sociodemographics, type of cancer and treatment(s), and psychosocial factors (depressive symptoms, social support, hope, quality of life). We then conducted structured interviews with a subset of 21 survey respondents.

Results—Binary logistic regression indicated that, controlling for age, gender, ethnicity, marital status, and income, factors associated with continued smoking versus cessation included being diagnosed with other smoking-related cancers versus lung or head and neck cancer (OR=11.21, CI 2.85, 44.02) and having significant depressive symptoms (OR=1.25, CI 1.08, 1.45). Qualitative findings highlighted motivators for cessation (impact of being diagnosed with cancer, doctor advice to quit, social influences) and barriers to cessation (hopelessness, stress, addiction).

Conclusions—These findings highlight the need to address depressive symptoms among cancer survivors, particularly those continuing to smoke, and the importance of exploring messages cancer survivors are given regarding the need for cessation post cancer diagnosis.

Keywords

Smoking; smoking cessation; survivors; depression; cancer; oncology

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INTRODUCTION

Tobacco use is the leading preventable cause of illness and mortality in the U.S.[1], causing 438,000 deaths annually [2, 3]. The association of tobacco use with cancers of the lung, head and neck, and other sites (e.g. bladder, stomach, cervix, kidney, pancreas, acute myeloid leukemia) is well established. Lung cancer is the leading cause of cancer-related death in the U.S. [4]. In 2011, 221,130 new cases of lung cancer occurred [5], 90% of which were attributable to smoking [4]. In 2011, 27,710 new cases of head and neck cancer were diagnosed [5], 85% of which were associated with tobacco use [4]. For smoking-related cancers, the risk for morbidity increases with the frequency, quantity, and years of smoking, but decreases after cessation [4]. Over 67% of individuals diagnosed in 2009 with cancer can expect to survive at least 5 years, joining the 11 million cancer survivors in the U.S. [5]. Unfortunately, second primary malignancies among this high-risk group account for 16% of all cancer incidence [6]. Focusing on modifiable health risk factors among cancer survivors, such as smoking, is critical for preventing cancer recurrence and may also enhance quality of life.

Smoking cessation after cancer diagnosis has substantial medical advantages. First, continued smoking may reduce treatment effectiveness [7], while quitting smoking increases odds of survival [8–11]. Second, continued smoking may worsen side effects of treatment [7, 12–15], while cessation is related to enhanced pulmonary and immune functioning and wound healing [16–18]. Third, smokers diagnosed with cancer (smoking-related and non–smoking-related) increase their risk of a second malignancy at the same site or another site if they continue to smoke [19–23]. When initial prognosis is more favorable, evidence is even stronger that continued smoking increases the risk of new primary cancers [24–26]. However, cessation unequivocally reduces the risk of a second cancer [25, 27].

Smoking rates at diagnosis are estimated at 45–75%, depending on the study and type of cancer [28]. The proportion who continue to smoke after treatment is 14–58% [28], depending on the research methods and the type of cancer the patients studied had [28]. A smoking prevalence of 44% was documented at the time of diagnosis among early stage lung cancer patients, with 41% of ever smokers relapsing within 4 months post-surgery [29, 30]. Thus, smoking and relapse rates among cancer patients are higher than the general population.

The Theory of Reasoned Action [31] suggests that behavior is determined by intention to perform the behavior and that this intention is, in turn, a function of attitudes toward the behavior and subjective norms. In this theory, a person's attitude toward a behavior consists of 1) a belief that a particular behavior leads to a certain outcome and 2) an evaluation of the outcome of that behavior. If the individual believes that the behavior will lead to the outcome and that the outcome is beneficial, he/she may intend to or engage in the behavior. Also included in one's attitude toward a behavior is his or her concept of the subjective norm (i.e., beliefs about how people view the behavior) and perceived behavioral control (i.e., perceived ability to perform a given behavior). Thus, several factors may influence the smoking behaviors of cancer survivors. First, their level of depressive symptoms, hope, and overall quality of life may impact their beliefs about the impact of smoking on their treatment outcomes and overall subsequent health outcomes. Moreover, these beliefs, which are also impacted by their interactions with healthcare providers, may influence cessation. Finally, their experiences with their cancer diagnosis, treatment, and healthcare provider team as well as their level of social support may impact their subjective norms regarding smoking post cancer diagnosis.

Given the importance of quitting smoking and the high rate of continued smoking and relapse among this vulnerable population, the current study employed a mixed methods approach to examine factors associated with continued smoking among survivors of smoking-related cancers, specifically in terms of sociodemographic, cancer-related, smoking-related, and psychosocial factors (e.g., depression, hope, quality of life, social support). We also examined motivators for and barriers to smoking cessation among this population.

METHODS

Survey Research

Participants for this study were identified using electronic medical records (EMR) from a National Cancer Institute (NCI) designated cancer center in a large southeastern city. Individuals with any indication of a history of smoking and with a smoking-related cancer diagnosis (i.e., lung, oral cavity, pharynx, larynx, esophagus, bladder, stomach, cervix, kidney, pancreas, acute myeloid leukemia) within the past four years were recruited to complete a mail-based survey. We mailed surveys to 798 potential participants, and research staff made follow-up phone calls to encourage participation one week later. We received notifications that 72 of these individuals were deceased, and 65 had incomplete or incorrect addresses. Upon making phone calls to encourage participation, an additional 48 were unreachable. Thus, a total of 139 individuals completed and returned the survey (22.7% response rate; n=139/613). Due to the incomplete nature of smoking-related information in the EMR, we were unable to determine any differences between respondents and nonrespondents in terms of smoking history. However, our sample was proportionately representative of the cancer types selected for inclusion in this study. Analyses for this study focus on the 105 participants meeting the criteria of smoking at the time of diagnosis and either having quit since diagnosis (48.6%; n=51) or having continued to smoke (51.4%; n=54). The remaining 34 had quit smoking prior to diagnosis. This study was approved by the Emory University Institutional Review Board.

Measures

Sociodemographic Characteristics: The characteristics we assessed included age, gender, ethnicity, education level, household income, employment status, marital status, and insurance coverage. Ethnicity was categorized as non-Hispanic White, Black, or Other due to the small numbers of participants who reported other race/ethnicities.

Cancer Diagnosis and Treatment: We assessed type of cancer, stage of cancer at diagnosis, time of diagnosis of current cancer, current treatment status (waiting to begin treatment; currently in treatment; finished treatment), and prior cancer diagnoses. We also asked, “Did/does your treatment protocol include chemotherapy? surgery? radiation?” with response options of “No; Yes, I completed it; or Yes, I am currently going through it.” We also assessed other health problems, including heart attack, stroke, diabetes, hypertension, and high cholesterol.

Smoking Status: To assess smoking status, participants were asked, “In the past 30 days, on how many days did you smoke a cigarette (even a puff)?” This question has been used to assess tobacco use in the Behavioral Risk Factor Surveillance System (BRFSS) [32] and the National Survey on Drug Use and Health [33]. Those who reported smoking on at least one day in the past 30 days were considered current smoker [32, 33]. We also assessed the age when they smoked their first whole cigarette, the age they began smoking regularly, and the greatest number of cigarettes smoked per day in their lifetime. Finally, we administered the six-item Fagerstrom Test for Nicotine Dependence [34].

Depressive Symptoms: Depressive symptoms were assessed using the Centers for Epidemiological Studies Depression Scale – 10 item (CES-D) [35], which is a 10-item depression screening tool but not a diagnostic tool. It assesses distress associated with depressive symptoms in the past week. Response options range from 0 = "Rarely or none of the time" to 3 = "All of the time." Higher total scores reflect greater distress. A score of 10 or higher has been used to indicate significant distress or a positive screen for depression. Cross-validation of the Rasch-derived CES-D short form supported its utility and structural validity across samples. Tests of structural validity using latent variable modeling methodology indicated that a hierarchical, single-factor model of depression had the best fit for the original full form and the Rasch-derived short form of the CES-D [35].

Hope: Hope was assessed using the 6-item State Hope Scale, which assesses the extent to which an individual endorses hope-related items on a scale of 1 = "Definitely false" to 8 = "Definitely true" [36]. This scale has three agency items and three pathways items assessing how respondents describe themselves "right now" (versus "in general"). Numerous studies support the scale's (1) internal reliability (alphas of 0.90–0.95 for the overall scale and ≥0.90 for the subscales); (2) factor structure; and (3) concurrent, discriminant, and convergent validity [36, 37]. In terms of test-retest reliability, the longer periods between retests have lower reliability (i.e., 0.93 over a two-day interval and 0.48 over a thirty-day interval), as should hold true for assessments of state psychosocial measures.

Quality of Life: Quality of life was assessed using the Functional Assessment of Cancer Therapy – General [38], which is a 28-item scale assessing reactions to different items in terms of how they apply to the individual on a scale of 0 = "Not at all" to 4 = "Very much." It yields a total score and subscale scores for physical, functional, social, and emotional well-being. Coefficients of reliability and validity have been shown to be uniformly high. The scale's ability to discriminate patients on the basis of stage of disease, performance status rating, and hospitalization status supports its sensitivity. It has also demonstrated sensitivity to change over time. Finally, the validity of measuring separate areas, or dimensions, of quality of life was supported by the differential responsiveness of subscales when applied to groups known to differ along the dimensions of physical, functional, social, and emotional well-being.

Perceived Social Support: Perceived social support from family, friends, and significant others was assessed using the Multidimensional Scale of Perceived Social Support (MSPSS) [39], which is a 12-item measure comprising three subscales: support from friends, support from family, and support from significant others. There are four items per subscale, each with response options ranging from 1 = "Very strongly disagree" to 7 = "Very strongly agree." Higher scores on each of the subscales indicate higher levels of perceived support, and a sum of the 3 scales yields a summary score. The construct and concurrent validity of the MSPSS has been supported with correlations with relevant measures of anxiety, depression, and previously validated social support scales [39]. Previous studies suggest a low impact of social desirability bias influencing subject response [39]. The MSPSS has also demonstrated strong internal consistency (Chronbach's alpha = 0.85 to 0.91) and stability (r= 0.72 to 0.85) over a three-month period for all three subscales [39].

Data Analysis—Participant characteristics were summarized using descriptive statistics. Bivariate analyses were conducted comparing current smokers versus quitters using chi-squared tests for categorical variables and independent samples t-tests for continuous variables. We then developed a binary logistic regression model, forcing entry of age, gender, ethnicity, marital status, and income level and using backwards stepwise entry of factors associated with smoking status per the bivariate analyses at $p<.10$. Only factors

associated at p<.05 were allowed to remain in the model. SPSS 18.0 was used for all data analyses. Statistical significance was set at $\alpha = .05$ for all tests.

Structured Interview Research

In the spring of 2011, we conducted 21 telephone-based structured interviews with individuals recruited from the initial survey research. Potentially eligible participants were identified through survey data information and were called via telephone to gauge interest in participating in the structure interview research phase and verify eligibility. Individuals who participated in the structured interviews received $30. We intended to recruit six participants to fill each of the following four categories: 1) lung or head/neck cancer survivors who continued to smoke post cancer diagnosis; 2) lung or head/neck cancer survivors who stopped smoking since cancer diagnosis; 3) survivors of other smoking-related cancers who continued to smoke post cancer diagnosis; and 4) survivors of other smoking-related cancers who stopped smoking since cancer diagnosis. Participants were screened for smoking status and segmented into four categories. We were unable to recruit participants representing continued smokers among lung or head and neck cancer survivors due to lower continued smoking prevalence in this group in our sample or these potential participants being deceased at follow-up for recruitment for this study phase. Thus, we recruited four lung cancer survivor quitters, three head/neck cancer survivor quitters, eight survivors of other smoking-related cancers who quit (largely kidney, pancreatic, bladder, and colorectal cancer survivors), and six survivors of other smoking-related cancers who continued to smoke.

Prior to beginning the structured interviews, participants were read an informed consent and provided oral consent. A trained interviewer (the second author) facilitated discussion on experiences with smoking and quitting smoking since cancer diagnosis as well as motivators for and barriers to cessation. Each session lasted about 60 minutes. All sessions were audiotaped and transcribed.

Data Analysis—Qualitative data were analyzed according to the principles outlined in Morgan & Krueger [40]. NVivo 7.0 (QSR International, Cambridge, MA) was used for text coding and to facilitate the organization, retrieval, and systematic comparison of data. Transcripts were independently reviewed by the PI, an MPH level staff, and an MPH graduate student to generate preliminary codes. They then refined the definition of primary (i.e., major topics explored) and secondary codes (i.e., recurrent themes within these topics) and independently coded each transcript. The independently coded transcripts were compared and consensus for coding was reached. Two coders independently coded 25% of the narratives. Intra-class correlations for context were 0.92 for the initial 25% of transcripts. The remaining narratives were coded by one of the coders. Themes were then identified and representative quotes were selected.

RESULTS

Survey Research

Table 1 presents participant characteristics and bivariate analyses. Bivariate results indicated that those who continued smoking versus quit smoking after cancer diagnosis were less likely to be married (p=.004), reported lower household income (p<.001), were more likely to have significant symptoms of depression (p<.001), were less likely to report having radiation as part of their cancer treatment (p=.05), were more likely to have been diagnosed with lung or head and neck cancer compared to all other smoking-related cancers (p<.001), had lower quality of life in terms of physical well-being (p=.01) and emotional well-being (p=.02), and had lower perceived social support from a significant other (p=.04).

The binary logistic regression model indicated that, after controlling for age, gender, ethnicity, marital status, and household income, significant factors associated with continued smoking versus cessation since cancer diagnosis included being diagnosed with other smoking-related cancers versus lung or head and neck cancer (OR=11.21, CI 2.85, 44.02, p=.001) and screening positive for significant symptoms of depression (OR=1.25, CI 1.08, 1.45, p=.003). Importantly, the rate of significant depressive symptoms among continued smokers was 63.8% versus 26.7% among those who quit smoking since cancer diagnosis. Moreover, the proportion of those who continued to smoke since cancer diagnosis was 27.1% among lung and head and neck cancer survivors versus 72.9% among survivors of other smoking-related cancers.

Structured Interview Research

The sample for the current qualitative study included a total of 21 participants (see Table 3). Overall, 15 of the structured interview participants reported quitting smoking post cancer diagnosis, while 6 were current (past 30-day) smokers. Four were diagnosed with lung cancer, 3 with head and neck cancer, and 14 with kidney, pancreas, bladder, or colorectal cancer (i.e., other smoking-related cancers). All participants who had been diagnosed with lung or head and neck cancer had successfully quit smoking after diagnosis. Eight of those diagnosed with other smoking-related cancers had successfully quit post diagnosis, and six continued to smoke after diagnosis. Notably, all of the continued smokers had made a quit attempt since cancer diagnosis.

Table 4 displays qualitative findings regarding themes and specific sample quotations related to motivators for and barriers to cessation among this sample of survivors of smoking related cancers. In terms of motivators for cessation, common themes that emerged included the impact of being diagnosed with cancer, receipt of advice to quit and/or cessation information provided by their doctor, concern about other aspects of their health, and social influences supporting cessation particularly from family and significant others. In terms of common barriers to cessation, participants reported hopelessness regarding their health outcomes or survival, stress particularly related to coping with cancer diagnosis and treatment, addiction, the habit/routine of smoking, and being around cigarettes or smokers.

DISCUSSION

The current mixed methods study documents a significant association between continued smoking and depressive symptoms among survivors of smoking-related cancers. Moreover, findings suggest that cancer survivors may not be fully aware of the connection that smoking has to cancers other than lung or head and neck cancers and also may not be informed about the negative health- and treatment-related consequences of smoking post cancer diagnosis. These quantitative and qualitative findings have significant implications for the design and delivery of cessation interventions among individuals with smoking-related cancers.

Prior research has documented that a history of major depression is positively related to smoking initiation [41–43] and smoking intensity [41–43]. Moreover, depression is also related to an inability to stop smoking [41, 43–53]. In fact, depressed smokers are 40% less likely to quit than non-depressed smokers [44, 53]. Depression is also associated with nicotine withdrawal during quit attempts and relapse after quit attempts [54, 55]. Likewise, smoking increases the likelihood and severity of depressive symptoms [41–43], and smokers with a history of major depression who attempt to quit smoking are more likely to develop a new depressive episode [55]. The current findings document that depressive symptoms are a more important correlate of cancer survivors' continued smoking than hope, quality of life, or social support. Our qualitative findings further highlight individuals' perceptions

regarding the future, how depressive symptoms may be reflected in their thoughts about their prognosis, and how smoking relates to their future health. Addressing depression is a critical element in affecting smoking cessation among cancer survivors.

Equally critical, survivors of lung or head and neck cancer were much more likely to have quit smoking since cancer diagnosis in comparison to survivors of other smoking-related cancers. Qualitative findings provided greater insight into the reasons for these findings. First, some participants who had a smoking-related cancer that was not of the lungs, head, or neck did not strongly attribute their cancer to their history of smoking. Prior research [56] has indicated that people more commonly attribute lung cancer and cancers of the head and neck versus other cancers to smoking. This may, in part, account for these findings. Our qualitative findings also indicate that knowledge about the subsequent negative effects of smoking after the initial cancer diagnosis may have been an important motivator for cessation. Thus, it is critical for healthcare providers to highlight the association between smoking and all smoking-related cancers, including those that are not as commonly associated with smoking. Moreover, they should emphasize the negative consequences of continued smoking in terms of treatment effectiveness, increased risk for adverse side effects, and subsequent malignancies.

Our multivariate model also indicated that being unmarried or without a significant other was a predictor of continued smoking versus cessation post cancer diagnosis. Bivariate analyses also suggested that less perceived support from a significant other predicted continued smoking. Prior research has documented the role of various sources of social support in the cessation process [57, 58]. The current findings highlight the critical importance of social support in smoking cessation among this population.

The Theory of Reasoned Action [31] suggests that the beliefs and expectations that one has regarding the benefits of quitting smoking and the subjective norms around smoking impact subsequent smoking behavior. Our quantitative findings further highlight the role of depressive symptoms in altering one's expectations regarding the benefit of smoking cessation post cancer diagnosis. Moreover, the impact of healthcare providers on patient knowledge regarding the association between their smoking and their cancer diagnosis and the importance of cessation post cancer diagnosis may also impact their beliefs about subsequent smoking. Furthermore, healthcare providers and significant others may play a critical role in altering the subjective norms regarding continued smoking among survivors of smoking-related cancers.

The current study has important implications for research and practice. In terms of research, further documentation is warranted regarding one's belief regarding smoking as a contributing cause of his or her cancer and as a risk factor for decreased treatment effectiveness or second malignancy as a predictor of continued smoking or cessation after the initial cancer diagnosis. Moreover, intervention research and clinical practice should capitalize on these findings by explicitly attending to depression and smoking in order to concurrently address both. Finally, healthcare providers must emphasize and reiterate throughout the term of cancer treatment and survivorship the negative consequences of continued smoking on subsequent health outcomes.

Limitations

This study has some limitations. First, despite the fact that this sample reflects the characteristics of the cancer survivor populations from the medical setting from which they were recruited, it may not generalize to other cancer survivor populations. Second, the survey response rate was 22.7%, which may seem low and might suggest responder bias. However, it is difficult to ascertain the true denominator of the response rate. Although the

medical records contained some information on current patient status, several families notified us that the survey had been sent to a deceased patient; others who were deceased may not have been reported to us. We also cannot assume that the medical records included up-to-date contact information; thus, additional surveys may not have reached the intended individuals. Also, it is possible that other important factors may have impacted smoking among this sample but were not explored in this study. Additionally, our qualitative research did not include lung, head, or neck cancer patients that continued to smoke, which limits the generalizability of our findings. Another concern is that the confidence intervals for the odds ratio resulting from the binary logistic regression analysis, particularly in relation to the factor indicating cancer type, indicates a wide range of variability. Moreover, there may have been other factors that were not assessed or included in this analysis (e.g., alcohol consumption, number of friends or family members that smoke) that may have impacted cessation outcomes. Finally, the cross-sectional nature of this study limits the extent to which we can make causal attributions. Future research should examine the predictive validity of this finding in longitudinal studies examining smoking initiation and potentially smoking cessation.

Conclusions

The current study documents a strong connection between continued smoking and depressive symptoms among survivors of smoking-related cancers. Moreover, findings suggest that cancer survivors may not be fully aware of the connection of smoking to cancers other than lung or head and neck cancers and also may not be informed about the negative health- and treatment-related consequences of smoking post cancer diagnosis. These findings are significant, as they highlight 1) the need to address depressive symptoms among cancer survivors, particularly those continuing to smoke; and 2) the need to explore the messages cancer survivors are given regarding the connection of their smoking to their cancer diagnosis and the need for cessation.

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Table 1

Survey participant characteristics and bivariate analyses comparing cancer survivors who quit smoking since cancer diagnosis and those who continued smoking

Variable	Total N=105 N (%) or M (SD)	Quitters N=51 (48.6%) N (%) or M (SD)	Smokers N=54 (51.4%) N (%) or M (SD)	p-value
Sociodemographics				
Age (SD)	56.80 (9.58)	57.68 (8.43)	55.94 (10.59)	.36
Gender (%)				.32
Male	57 (54.3)	26 (51.0)	31 (57.4)	
Female	48 (45.7)	25 (49.0)	23 (42.6)	
Ethnicity (%)				.07
White	85 (81.0)	44 (86.3)	41 (75.9)	
Black	16 (15.2)	4 (7.8)	12 (22.2)	
Other	4 (3.8)	3 (5.9)	1 (1.9)	
Marital status (%)				.004
Married/living with partner	57 (54.3)	35 (68.6)	22 (40.7)	
Other	48 (45.7)	16 (31.4)	32 (59.3)	
Education (%)				.07
≤ High school	35 (33.3)	13 (25.5)	22 (40.7)	
> High school	70 (66.7)	38 (74.5)	32 (59.3)	
Employment status (%)				.17
Employed part- or full-time	35 (33.7)	20 (39.2)	15 (28.3)	
Other	69 (66.3)	31 (60.8)	38 (71.7)	
Income (%)				<.001
≤ $2,399/month	49 (49.5)	14 (29.8)	35 (67.3)	
> $2,399/month	50 (50.5)	33 (70.2)	17 (32.7)	
Insurance (%)				.47
Uninsured	13 (12.5)	7 (13.7)	6 (11.3)	
Some type of insurance	91 (87.5)	44 (86.3)	47 (88.7)	
Cancer-related factors				
Type of cancer (%)				<.001
Lung or head/neck	45 (46.9)	32 (66.7)	13 (27.1)	
Other smoking-related cancer	51 (53.1)	16 (33.3)	35 (72.9)	
Years since cancer diagnosis (SD)	3.63 (2.25)	3.56 (2.00)	3.69 (2.48)	.77
Radiation (%)				.05
No	65 (61.9)	27 (52.9)	38 (70.4)	
Yes	40 (38.1)	24 (47.1)	16 (29.6)	
Chemotherapy (%)				.43
No	41 (39.0)	19 (37.3)	22 (40.7)	
Yes	64 (61.0)	32 (62.7)	32 (59.3)	
Surgery (%)				.41
No	38 (36.9)	17 (34.7)	21 (38.9)	
Yes	65 (63.1)	32 (65.3)	33 (61.1)	

Variable	Total N=105 N (%) or M (SD)	Quitters N=51 (48.6%) N (%) or M (SD)	Smokers N=54 (51.4%) N (%) or M (SD)	p-value
Smoking-related factors				
Age at first whole cig (SD)	15.88 (2.89)	15.42 (3.81)	16.30 (2.89)	.19
Age began regular smoking (SD)	17.95 (4.09)	17.96 (4.93)	17.94 (3.18)	.98
Most CPD in lifetime (SD)	27.59 (15.83)	27.42 (13.31)	27.74 (17.98)	.92
Nicotine dependence (SD)	3.81 (1.21)	3.00 (0.82)	3.88 (1.22)	.17
Psychosocial factors				
Depressive symptoms (SD)	11.34 (6.25)	9.64 (5.22)	12.96 (6.77)	.01
Hope (SD)	32.55 (11.00)	33.98 (11.04)	31.17 (10.89)	.19
FACT scales (SD)				
Physical well-being	19.32 (7.31)	21.14 (6.90)	17.57 (7.32)	.01
Social and family well-being	19.28 (6.69)	20.12 (6.51)	18.42 (6.83)	.21
Emotional well-being	16.59 (5.57)	17.94 (5.10)	15.29 (5.74)	.02
Functional well-being	16.64 (7.58)	17.65 (7.66)	15.62 (7.44)	.18
Social support (SD)				
Family	22.43 (5.82)	23.12 (5.76)	21.75 (5.85)	.24
Friends	21.01 (6.57)	21.75 (6.15)	20.29 (6.95)	.26
Significant other	22.51 (6.81)	23.88 (5.77)	21.15 (7.50)	.04

Table 2

Binary logistic regression model identifying correlates of continued smoking vs. smoking cessation among survivors of smoking-related cancers

Variable	OR	95% CI	p-value
Age	0.97	0.90, 1.06	.53
Gender			
Male	Ref	--	--
Female	0.29	0.07, 1.16	.08
Ethnicity			
White	Ref	--	--
Black	4.27	0.47, 38.94	.19
Other	0.01	0.01, 1.19	.06
Marital status			
Married/living with partner	Ref	--	--
Other	1.07	0.22, 5.10	.94
Income			
≤ $2,399/month	Ref	--	--
> $2,399/month	0.27	0.06, 1.31	.10
Type of cancer			
Lung or head/neck	Ref	--	--
Other smoking-related cancer	11.21	2.85, 44.02	.001
Depressive symptoms			
No	Ref	--	--
Yes	1.25	1.00, 1.09	.003

Nagelkerke $R^2 = 0.584$

Table 3

Structured interview participant characteristics

Variable	N (%) or M (SD)
Age (SD)	60.29 (7.95)
Gender (%)	
Male	9 (33.3)
Female	12 (44.4)
Ethnicity (%)	
White	17 (63.0)
Black	2 (7.4)
Other	2 (7.4)
Education level (%)	
≤ High school education	7 (25.9)
Some college or technical school	6 (22.2)
≥ Bachelors degree	8 (29.6)
Employment status (%)	
Part-time	2 (7.4)
Full-time	7 (25.9)
Retired	6 (22.2)
Other	6 (22.2)
Cancer type (%)	
Lung cancer	4 (19.0)
Head/neck cancer	3 (14.3)
Other smoking-related cancer	14 (66.7)

Table 4

Themes identified as motivators for and barriers to quitting smoking among survivors of smoking-related cancers

Theme	Sample Quotation
Motivators for Quitting	
Knowing I have cancer	"It has made it a lot easier because I am very motivated. Once you go through chemotherapy and five to six weeks of radiation, and feel like you want to die, the last thing you want to do is have to go through that again. That is a heck of a motivator." – lung/head/neck cancer, quit after diagnosis "I don't want the cancer to spread. The way I understand it, cigarettes or the nicotine is like throwing fertilizer on a flower garden. It makes it grow." – other smoking-related cancer, quit after diagnosis "When the doctor tells you you've got cancer…I used to be one of those people that thought `well you've got to die of something.' I realize, now more than ever, those are just words. That is just somebody trying to be a smart aleck. But when the doctor tells you you've got cancer, your whole world changes." – lung/head/neck cancer, quit after diagnosis
Doctor's advice	"Once the diagnosis was in and the doctor said that, unless I agreed to quit he wasn't going to treat me, it was an easy decision. I was shocked when he told me that statistically, as many as ¾ of the people who quit start back again. I was floored by that information. Once he told me that and then the treatment started almost immediately, the desire was gone." – lung/head/neck cancer, quit after diagnosis "When they first told me I was still in the hospital. Of course you can't smoke there. I came home and told my kids what the doctor had told me. I didn't slow down [on my smoking], but then I had an appointment when I was going to start my chemo and radiation, and she told me, `you know, if you're smoking, the radiation and chemo won't work. You'll be doing this for nothing'." – lung/head/neck cancer, quit after diagnosis "I had to stop [smoking]. [My doctor] wouldn't take my feeding tube out until I stopped smoking again." – other smoking-related cancer, current smoker "Then there comes a point with me when somebody tells me `you've got lung cancer, you've got this cancer, and if you've never smoked before in your life, you wouldn't be going through this.' When you've got one of the top surgeons in the country that says `I'm not going to operate on you if you don't do this,' then that was the end of it for me." – other smoking-related cancer, quit after diagnosis
Other health concerns	"I thought about people just having lung cancer. I didn't know that it was also the cause of bladder cancer. I went to the eye doctor the other day because I was having trouble seeing. He asked me if I smoked. I said I did until about a month or so ago. He said I had something behind my eyes that was related to smoking. So many things are caused by it. It is not just cancer." – other smoking-related cancer, quit after diagnosis "Well, most of my health problems are probably more or less related to cigarette smoking, I smoked so long. I know it's not good for me; quitting is the reasonable thing to do. People who still smoke are not very smart. And then I don't feel good about myself when I did start again, because it's not a smart thing to do." – other smoking-related cancer, current smoker
Social motivators	"My husband quit because he saw that I had started smoking again. I think that he felt responsible for me having started again, so he quit…." – other smoking-related cancer, quit after diagnosis "Both of my daughters were like `Mom, you cannot smoke and take radiation and chemotherapy,' so I just quit." – other smoking-related cancer, quit after diagnosis
Barriers to Quitting	
Hopelessness	"The thought of going ahead and smoking anyway because you are already probably…it is difficult because I think about my colon and stuff. I can't. It's hard. It's very, very hard. That makes me want [a cigarette] because I don't have nobody to talk to." – other smoking-related cancer, current smoker "I have quit so many times. The year or two years before, I don't think I was smoking; but then I started again because I felt really stressed and sort of hopeless when I first found out [I had cancer], and just discouraged. I know it's a bad attitude, but I'm so sick anyway, who cares? I might as well smoke since I enjoyed it for so many years. Out of stress and anxiety I started again. Then after the cancer surgery I quit for over a year." – other smoking-related cancer, current smoker
Stress	"When I get nervous, if I have a bad day, or some of those things, it makes me want to smoke. That is the first thing I turn to when I have a bad day or things weren't going my way, I would have a cigarette and smoke." – other smoking related cancer, quit after diagnosis
Addiction/cravings	"It's very addicting. Gosh, it's addicting. It makes you crazy. It's crazy, but I have actually looked for cigarette butts before, in the ashtray. I've looked for some in my car, under the car seat, to see if maybe one had fallen out of my purse. It's like you tear up the house. It's like you're an addict. It's just bad." – lung/head/neck cancer, quit after diagnosis "I was so badly addicted that the nurse caught me trying to slip down to go out because my daughter would take me out with the IV thing rolling it along to go outside and smoke. One time the nurse wouldn't let me go downstairs, so I had a window in my room. I opened it up and climbed out on the roof and smoked." – other smoking-related cancer, quit after diagnosis
Habit/routine	"Smoking is not just one habit. Even though my body had stopped being addicted to the nicotine, I still have to deal with the fact of wanting the cigarette. It is not a physical addiction anymore, but it is very much so a mental addiction." – lung/head/neck cancer, quit after diagnosis

Theme	Sample Quotation
	"Particularly after I eat and in the morning with coffee is just a habit to wake up and have that cigarette. It was really hard to break that habit. I used straws, mostly straws. I would puff on a straw." – other smoking-related cancer, quit after diagnosis
Being around cigarettes/smokers	"My wife smokes. It is difficult to be in the house with a smoker. I am not blaming it on my wife in any stretch of the imagination, but if she didn't smoke it would be easier." – other smoking-related cancer, current smoker "The bad thing with that is if you're constantly around people that smoke, there's always the temptation to have a cigarette. You just have to control yourself and think I'm not going to have one." – other smoking-related cancer, quit after diagnosis