Lung Cancer 80 (2013) 55–61

Contents lists available at SciVerse ScienceDirect

Lung Cancer

journal homepage: www.elsevier.com/locate/lungcan

Factors associated with smoking abstinence after diagnosis of early stage lung cancer

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ARTICLE INFO

Article history:
Received 8 October 2012
Received in revised form 5 December 2012
Accepted 7 December 2012

Keywords:
Smoking
Smoking abstinence
Smoking cessation
Lung cancer
Appalachia
Kentucky
Early stage

ABSTRACT

Smoking cessation after a diagnosis of lung cancer is associated with improved outcomes, including quality of life and survival. The research presented here is based on data obtained from sequential interviews with early stage lung cancer patients in Kentucky, on their smoking patterns at four time points: (1) six months before enrollment in the study, before diagnosis, (2) at enrollment (shortly after surgical resection), (3) three months post-enrollment, and (4) six months post-enrollment. A number of covariates were considered to examine the factors associated with smoking abstinence and rebound trajectories. The results indicate that, while about 75% of patients who were smoking at six months before enrollment had quit by the first post-surgery interview, almost 50% of them had returned to smoking six months later. Multivariate analysis to evaluate the relative contribution of covariates indicated that low household income, exposure to environmental tobacco smoke at home and evidence of depression were positively associated with returning to smoking. Furthermore, even after controlling for these factors, patients from the Appalachian region of Kentucky, an area with substantially high smoking prevalence and very high lung cancer incidence rates, were less likely to abstain from smoking throughout the study than subjects in the rest of the state. Future research is suggested to investigate in more detail the tobacco-related behaviors and cessation attempts of patients and their families, which can lead to more targeted, successful smoking cessation interventions for lung cancer patients.

1. Introduction

The cessation of cigarette smoking after diagnosis among patients with respiratory cancers is known not only to improve survival [1,2], but also to reduce the risk of recurrence [3], and increase performance status [4] and quality of life [5,6]. Smoking cessation has even been referred to as "an integral part of lung cancer treatment" [7]. Researchers have published complementary work on the rates of smoking cessation, and factors associated with cessation, among patients diagnosed with respiratory cancers, especially lung cancer [8–18]. Several studies have indicated that depression, a low level of emotional support, or other psychosocial factors are associated with continued smoking [8,9,13,15]. At least two studies have shown the presence of comorbidities appears to encourage patients to quit smoking [9,16], and another demonstrated that smoking among family members can make it more difficult [14]. Others have indicated that socioeconomic factors, such as low income, low education, or reliance on government-subsidized health insurance, are associated with continued smoking [8,11,12]. Despite these insights, many of these studies only examined a single time point after resection [8,11,13,14], or followed patients for a short amount of time [10,13,14], or did not examine factors associated with continued smoking [17,18].

The state of Kentucky has the highest lung cancer age-adjusted incidence and mortality rates in the United States: 99.3 and 73.5 per 100,000, respectively for 2008 [19]; nationally, the corresponding figures were 62.6 and 50.6 per 100,000 for 2005–2009 [20]. Corresponding rates are even higher in Kentucky's Appalachian region: 113.8 and 84.7 per 100,000 residents, respectively [19]. Displayed in Fig. 1, this region is characterized by high poverty and low educational levels, among other adverse factors. Not surprisingly, the rates of smoking in Kentucky are among the highest in the United States (24.8% of adults reported being current smokers in 2010 compared to 17.3% nationwide), and within Appalachian Kentucky they are even higher (29.0%) [21]. A recent analysis of multiple years of Kentucky Cancer Registry (KCR) data indicates that cancer patients from this region have poorer survival than those from the rest of the state, after controlling for several relevant covariates, including

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http://dx.doi.org/10.1016/j.lungcan.2012.12.013

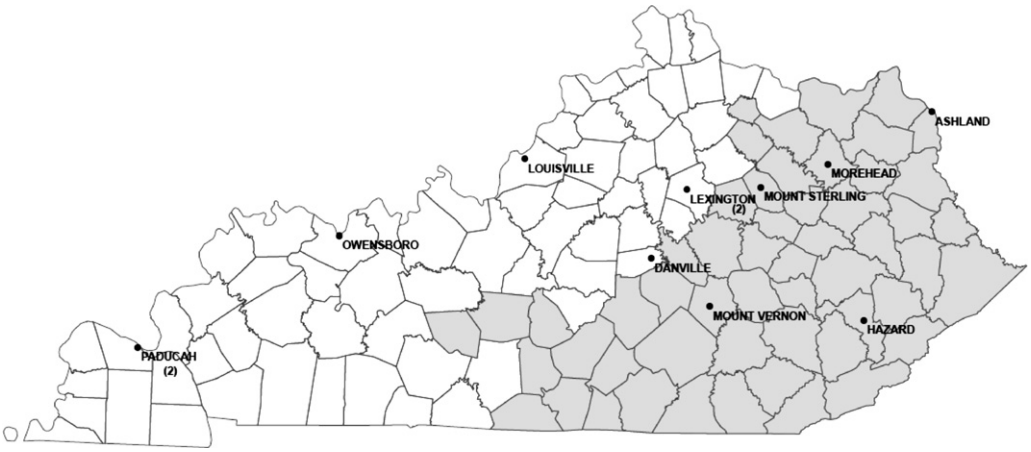

Fig. 1. Map of Kentucky, showing Appalachian region (shaded gray) and locations of patient recruitment sites.

lifetime smoking [22]. It is therefore possible that the Appalachian disparity in survival is due, at least in part, to a lower rate of smoking cessation among lung cancer cases.

This study examined post-diagnosis smoking patterns among early stage lung cancer patients who reside in Kentucky to (1) describe the trajectory of smoking following diagnosis, (2) investigate correlates associated with continued smoking during a six-month post-diagnosis period, and (3) assess post-diagnosis differences in smoking behaviors among Appalachian and non-Appalachian lung cancer patients.

2. Methods

2.1. Research setting and subject recruitment

Patients were recruited between January 2008 and November 2011 at 12 sites in ten counties across Kentucky, beginning with the University of Kentucky Hospital (Fig. 1). Study protocols at the remaining sites were coordinated through the Kentucky Clinical Trials Network (KCTN), which conducts investigator-initiated and industry-sponsored research statewide, related to the prevention, early detection, and treatment of cancer. Protocols were reviewed by the University of Kentucky Medical Institutional Review Board (IRB), as well as the IRBs of each study site. Eligible patients were required to be a Kentucky resident, at least 18 years old, with a histologically confirmed, surgically-resected stage I or II lung cancer, no history of previous cancers within the last five years (other than non-melanoma skin cancer), and no previous lung cancer history. Patients were limited to cases of early stage disease to ensure the great majority would be available for follow-up interviews up to six months after enrollment, given the low survival rate of advanced stage lung cancer. After October 2010, stage IIIA cases were also accepted to supplement recruitment. Patients were enrolled within 14 weeks post-surgery.

2.2. Data collection

Patient contact was initiated during a regularly-scheduled clinic appointment to obtain informed consent, usually followed by the first questionnaire (Q1), administered in-person. To accommodate patients who could not complete Q1 during enrollment, Q1 was administered by telephone within a few days ($n = 16$). Subsequent questionnaires (Q2 and Q3) followed at approximately three and six months post-enrollment, and were generally administered by telephone. Q1 was the most comprehensive, including demographic, socioeconomic, and biometric data, tobacco use history and current tobacco-related behaviors, exposure to environmental tobacco smoke (ETS), alcohol use, comorbidities, and psychosocial assessments.

Demographic and socioeconomic questions at Q1, including gender, age, household income, educational attainment, were modeled on questions from the Behavioral Risk Factor Surveillance System (BRFSS), a nationwide population-based health behavior survey [21]. In addition, county of residence was used to categorize whether patients lived in one of the 54 counties designated as "Appalachian" [23]. Comorbid conditions were assessed by asking patients whether they had ever been diagnosed with any of the following: asthma, black lung disease, chronic obstructive pulmonary disease (COPD), chronic bronchitis, diabetes, emphysema, heart disease, hypertension, or stroke. Alcohol use was evaluated by asking patients how often they consume alcohol, and how many standard drinks (12 oz. beer, 5 oz. wine, or 1.5 oz. liquor) they usually consume.

Patients answered an extensive set of smoking history questions at Q1, including whether they had ever regularly smoked cigarettes, and whether they smoke currently. ETS at home was determined at Q1 by asking, "Do you currently live in a home where you are regularly exposed to secondhand smoke indoors?" Patients were also asked at Q1 about their smoking status and the number of cigarettes they smoked at six months prior to enrollment. This time point six months previous (referred to hereafter as Q0) presumably reflects their usual smoking behavior a few months before diagnosis with lung cancer.

Symptoms of depression and anxiety were measured at Q2 using the Hospital Anxiety and Depression Scale (HADS), a standardized instrument specifically designed to assess symptoms of anxiety and depression associated with medical treatment [24,25].

2.3. Analysis

There were 179 patients who participated in the overall study, representing 64% of the 278 deemed eligible and invited to enroll. Most of those who declined said they were either not feeling well or were too tired after their medical appointment. For the University of Kentucky clinic site, we were able to obtain the age and gender of this group ($N = 22$). Among them, 50% were male, and the mean age was 65.1 years, comparable to 51.4% male and mean age of 62.1 for the total study participants. Seven were lifetime non-smokers, and thus eliminated from this analysis. Also excluded were 30 patients who did not complete all questionnaires (16 were not located for Q2 and/or Q3, and 14 expired before Q2 or Q3), resulting in 142 patients for most analyses described here. Only 89 patients were included in the final multivariable regression analysis, which was