Health perceptions and risk behaviors of lung cancer survivors

Lorraine S. Evangelista, RN, PhD,[a] Linda Sarna, RN, DNSc, FAAN,[a] Mary Lynn Brecht, PhD,[a] Geraldine Padilla, PhD,[b] and Jenny Chen, BS[a] Los Angeles and San Francisco, California

BACKGROUND: Lung cancer survivors are at an increased risk for recurrence and the development of secondary tumors and other comorbid conditions. However, little is known about lung cancer survivors' risk behaviors and the effect of these behaviors on overall health perceptions.

OBJECTIVE: The purpose of this study was to describe the prevalence of health risk behaviors among non–small cell lung cancer survivors and their relationship perception to overall health.

METHODS: One hundred forty-two survivors of non–small cell lung cancer with a minimum of 5 years disease free completed a battery of questionnaires to assess perception of health status and self-reported risk behaviors (smoking, exposure to secondhand smoke, alcohol use) and weight before and after diagnosis. Urinary cotinine level was used to verify smoking status, and actual height and weight were obtained to determine overweight status (body mass index, ≥25). Descriptive statistics and logistic regression were used to analyze the data.

RESULTS: Seventy percent of participants reported their health as good to excellent. Although 81% quit smoking after diagnosis, 13.4% continued to smoke and 28% reported exposure to secondhand smoke. Approximately half the sample (58%) drank alcohol (16.3% quit after diagnosis) and was overweight (51%). A strong agreement between current smoking and exposure to secondhand smoke was observed. In a multivariate analysis, smoking (odds ratio [OR], 7.02; CI, 2.45 to 20.13), exposure to secondhand smoke (OR, 5.37; CI, 2.42 to 11.95), alcohol use (OR, 9.04; CI, 3.28 to 24.92), and overweight (OR, 8.51; CI, 3.44 to 21.10) were independent predictors of perceived poor health status.

CONCLUSION: Although most lung cancer survivors have made healthy lifestyle changes, a substantial proportion has not. Our findings suggest the need for multiple risk factor interventions to decrease risk behaviors and improve overall health after a cancer diagnosis. (Heart Lung® 2003;32:131-9.)

Lung cancer is one of the most common cancers that affect Americans, accounting for 14% of all cancers among men and women. Approximately 169,400 new cases and 154,900 deaths from lung cancer are projected for 2002 in the United States.[1] Lung cancer survivors are at an increased risk for recurrence and development of secondary tobacco-attributable malignant diseases. The risk of development of a second lung cancer in patients who survived resection of a non–small cell lung (NSCL) cancer is approximately 1% to 2% per patient per year; the median survival time from diagnosis of a second lung cancer in these patients is between 1 and 2 years, with a 5-year survival rate of approximately 20%.[2]

Tobacco use is the primary risk factor for more than 80% of all lung cancers.[3] Lifetime smoking can affect pulmonary function[4] and increase the incidence of other tobacco-attributable diseases.[5] Cigarette smoking causes oxygen desaturation, excessive secretions, and a predisposition to pulmonary infections, heart disease, and chronic obstructive pulmonary disease.[6] Survivors who continue to smoke cigarettes also have an increased risk of development of a second lung cancer.[2] Tobacco may act as a promoter of carcinogenesis in previously initiated cancer sites among patients who continue to smoke after diagnosis.[7] In addition, cancer survi-

From the School of Nursing, University of California, Los Angeles, California[a]; and the School of Nursing, University of California, San Francisco, California.[b]

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Reprint requests: Dr Linda Sarna, Professor, UCLA School of Nursing, 700 Tiverton, Factor Bldg 4-262, Los Angeles, CA 90025-6918.

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vors who smoke will continue to compromise lung function that already may be diminished by loss of lung tissue from resectional surgery, other thoracic surgeries, infections, chemotherapy agents with pulmonary toxicity, chest irradiation, or other tobacco-related problems.[6] On the contrary, smoking cessation after cancer has been associated with reduced morbidity and mortality.[8,9] Exposure to secondhand smoke is another risk factor for lung cancer. The US Environmental Protection Agency projected 3000 cases of lung cancer per year associated with exposure to secondhand smoke.[10] Likewise, passive smoking has been identified as an important risk factor for cardiovascular disease.[11]

Alcohol use is also linked with a higher risk for smoking, and less frequent alcohol intake is an independent predictor of successful smoking cessation.[12,13] The use of alcohol has been associated with increased risk of hemorrhagic stroke, certain cancers, and a range of social problems.[14] Alcoholic beverages are carcinogenic and are causally related to cancers of the oral cavity, pharynx, esophagus, and liver.[15] Cheng and colleagues[16] reported a decreased risk for esophageal cancer recurrence associated with cessation of drinking.

Overweight and obesity have been identified as leading determinants of health in the United States.[3] Healthy People 2010 states that overweight and obesity are major contributors to many preventable causes of death and that both substantially raise the risk of illness from certain types of cancers, high blood pressure, high cholesterol, heart disease, and stroke.[3]

The negative impact of risk behaviors on health outcomes reinforces the importance of assessment of risk behaviors of cancer survivors. Little is known about risk behaviors (eg, smoking and drinking) after diagnosis with cancer,[17] and almost nothing is known about risk behavior profiles of the rare lung cancer survivor. In addition, little is known about the association among risk behaviors and overall health perceptions.

This paper reports on the overall health perceptions of lung cancer survivors in relation to their risk behavior profiles. We asked the following research questions: 1, What is the overall health perception of lung cancer survivors?; 2, What are the risk behaviors—smoking, exposure to second hand smoke, alcohol use, and overweight—of lung cancer survivors before and after diagnosis?; 3, Do differences in demographic and clinical characteristics exist in lung cancer survivors on the basis of perceived health status and risk behaviors?; 4, What are the associations between each of the 4 risk behaviors?; and 5, What is perceived health status on the basis of risk behaviors? We hypothesized that each of the 4 risk behaviors being examined would be associated with poorer perceived health status.

Efforts to gain a better understanding of factors associated with risk behaviors are important in supporting the recovery of cancer survivors, helping them promote healthy behaviors, and reducing their risk for second malignant diseases or recurrence and other preventable comorbid diseases. These data will provide the information essential to the development and testing of appropriate strategies and interventions to help minimize risks, improve health perceptions, and reduce morbidity and mortality associated with the disease condition.

METHODS

Study design

A descriptive, cross-sectional design was used because of the limited information about lung cancer survivors. This study was conducted as part of a larger study designed to describe the quality of life and experiences of lung cancer survivors.[18] After approval of the study by the appropriate Institutional Review Boards, a nonprobability sample of 142 5-year disease-free survivors of NSCL cancer was enrolled in the study. All participants signed appropriate consent forms before entering the study. Exclusion criteria included diagnosis with small cell disease or other types of lung cancer (eg, mesothelioma, lung metastasis, carcinoid).

The vast majority (98%) of the lung cancer survivors who expressed an interest in our survivor study participated in the study. Details about recruitment and other study procedures including psychometric properties of study instruments are reported elsewhere.[18] Two research nurses were trained to collect data needed for the study and administer the research questionnaires, measure height and weight, and assess urinary cotinine level as briefly described subsequently.

Health status

The measure of perceived health status was a single-item scale that was obtained from the Short Form 36.[19] This global measure of health status (health perceptions) tapped participants' own ratings of their current health in general. Participants were asked to rate their overall health as either "excellent," "very good," "good," "fair," or "poor." The categories for self-rated health were later recoded to combine "fair" and "poor" responses to create only 3 levels: excellent, good, and poor health perceptions.

Risk behaviors

Tobacco. Assessment of lifestyle behaviors, including tobacco use, was obtained through self-report surveys on the basis of the Lung Health Survey.[11] The Smoking and Nicotine Use Questionnaire assessed previous tobacco history and current smoking behaviors (including the presence of other smokers in the household) and exposure to secondhand smoke. Participants who were exposed to secondhand smoke more than 1 day a week were identified as individuals that were at risk for exposure to passive smoking. Specific questions were added to assess advice and assistance with smoking cessation that smokers received at the time of diagnosis and the change in smoking status of other members of their immediate household after their diagnosis.

Biochemical validation of smoking status was performed with urine cotinine dipstick testing that allowed for immediate results. Cotinine, the major metabolite of nicotine, has a half-life of approximately 19 hours and served as a reliable and valid measure for distinguishing between smokers and nonsmokers.[20] Patients provided a fresh urine specimen that was used for the test. The research assistant dipped a test strip into the cup with the urine and read and recorded the colored response that was associated with cotinine level. We had approximately 95% agreement between self report and urine cotinine confirmation in our lung cancer survivor study, with 5% of patients reporting no tobacco use with positive cotinine testing.

Alcohol. The Alcohol Use Questionnaire assessed the extent and type of current alcohol use.[21] Participants who reported drinking beer, wine, or liquor in the last 12 months were categorized as current drinkers and were asked to report on average the number of glasses (wine), cans/bottles (beer), or shots (liquor) and the number of days per week the beverage was consumed. Survivors were also asked to report the number of times they had more than 8 drinks on 1 occasion in the last 3 months. An additional question was added to the original 10 items to assess change in alcohol use since the diagnosis of lung cancer. This information was used to approximate the number of drinkers before lung cancer diagnosis.

Overweight. The current height and weight of participants were measured during the home visits. Participants' height and weight at the time of diagnosis were obtained from medical records. Body mass index (BMI) was calculated (BMI = kg/height in meters^2) to identify overweight participants. Flegal, Carroll, and Kuczmarski[22] described 4 BMI cut points for overweight and obese individuals: 25.0 to 29.9 (preobese), 30.0 to 34.9 (class I obesity), 35.0 to 39.9 (class II obesity), and ≥40 (class III obesity). On the basis of this classification, we categorized participants as overweight with a BMI of ≥25.

Sociodemographic and clinical characteristics

Personal demographics (age, gender, race/ethnicity, marital status, living situation, education) were collected on a self-report survey at study entry. Financial status was defined as current annual family income. Employment and retirement history were assessed.

An assessment of clinical status included information related to lung cancer characteristics and current health status (comorbidities). The years since lung cancer diagnosis, type of NSCL cancer (histology), stage of disease, and type of surgery and other treatment were determined from patient self reports and verified in their medical records. Comorbidity was assessed with subject self report on the basis of the Lung Health Study assessment of comorbid conditions.[11] Chart review was used to verify and supplement data.

Data analysis

Descriptive statistics were used to provide profiles of current health perception, tobacco use, exposure to secondhand smoke, alcohol use, and overweight. Differences in smoking and alcohol use and overweight status at the time of diagnosis and during the interview were measured with *t* tests. Differences in sociodemographic and clinical characteristics were calculated for participants by health perception (excellent, good, and poor), and each of the 4 risk behaviors were conducted with χ^2 statistics or *t* test, depending on the level of measurement. Concordance of presence or absence of the 4 risk behaviors was described with κ statistics. Multiple logistic regressions were used to examine bivariate relationships between overall health perceptions among survivors and each of the 4 risk behaviors. We recoded overall health perceptions into 2 comparative groups (survivors who reported either "excellent" or "good health" were compared with participants who reported "poor health"). Criteria for entry and removal of variables were based on the likelihood ratio test with enter and remove limits set at $P \leq .05$ and $P \geq .100$, respectively. Statistical analysis was carried out with SAS (SAS Institute, Cary, NC) and SPSS (SPS, Inc, Chicago, Ill).

Table 1
Demographic and clinical characteristics of specific subsamples of lung cancer survivors on basis of current health risk behaviors

	Poor health* (n = 42; 29.6%)	Smokers† (n = 19; 13.4%)	ESHS[c] (n = 40; 28.2%)	Drinkers‡ (n = 82; 57.7%)	Overweight§ (n = 72; 50.7%)
Gender					
Male	19 (45.2%)	13 (68.4%)	22 (55.0%)	38 (46.9%)	34 (47.2%)
Female	23 (54.8%)	6 (31.6%)	18 (45.0%)	44 (53.1%)	38 (52.8%)
Race					
White	31 (73.8%)	14 (73.7%)	34 (85.0%)	69 (85.2%)	58 (80.5%)
Nonwhite	11 (26.2%)	5 (26.3%)	6 (15.0%)	13 (15.8%)	14 (19.5%)
Marital status					
Married	17 (40.5%)	5 (26.3%)	16 (40.0%)	37 (45.7%)	39 (54.2%)
Single, divorced, widowed	25 (59.5%)	14 (73.7%)	24 (60.0%)	45 (54.3%)	33 (45.8%)
Living status					
With someone	28 (66.7%)	3 (15.8%)	16 (40.0%)	18 (22.2%)	51 (70.8%)
Alone	14 (33.3%)	16 (84.2%)	24 (60.0%)	64 (78.8%)	21 (29.2%)
Education					
Some high school or less	6 (14.3%)	3 (15.8%)	7 (17.5%)	8 (9.8%)	7 (9.8%)
High school degree	6 (14.3%)	5 (26.3%)	11 (27.5%)	10 (12.2%)	11 (15.2%)
Some college	17 (40.5%)	5 (26.3%)	5 (26.3%)	37 (45.1%)	30 (41.7%)
College degree or more	13 (30.9%)	6 (31.6%)	6 (31.6%)	27 (32.9%)	24 (33.3%)
Lung cancer type					
Adenocarcinoma	27 (64.2%)	10 (52.6%)	25 (62.5%)	49 (59.8%)	40 (55.5%)
Squamous cell	15 (35.8%)	9 (49.4%)	15 (37.5%)	33 (40.2%)	32 (44.5%)
Type of surgery					
Lobectomy	34 (80.9%)	12 (63.1%)	27 (67.5%)	62 (75.6%)	52 (72.2%)
Pneumonectomy	6 (14.3%)	4 (21.1%)	4 (10.0%)	10 (12.3%)	4 (5.5%)
Resection	2 (4.8%)	3 (15.8%)	9 (22.5%)	12 (14.6%)	16 (22.2%)

*Perceptions of health status.
†Current smokers.
‡Current alcohol use.
§BMI ≥ 25.
ESHS, Exposure to secondhand smoke.

RESULTS

One hundred and forty-two participants met the criteria for the study. The personal sociodemographic and clinical characteristics of respondents distinguished by health perceptions of self-reported poor health, smoking, exposure to secondhand smoke, alcohol use, and overweight status are listed in Table I. The average age of participants in the sample was 71 years (range, 33 to 92 years; 91% 60 years or older), and time since diagnosis ranged from 5 to 21 years (mean, 10 years; standard deviation, 3 years). Most participants were unemployed/retired (79%) and had more than a high school education (72%). Family income ranged from $7800 to >$750,000 (mean, $50,837; standard deviation, $81,712). Although more women reported poor health and more men reported exposure to secondhand smoke, the differences were not statistically significant. However, more men and more single respondents continued to smoke (χ^2 = 4.532; P = .033; and χ^2 = 3.885; P = .05, respectively).

More than a third of respondents reported their health as very good to excellent (n = 52; 36.6%). The remaining respondents indicated that their health was good (n = 48; 33.8%) or fair to poor (n = 42; 29.6%). Health perceptions were not significantly different on the basis of sociodemographic and clinical characteristics of participants.

Table II
Risk behavior profiles of participants at diagnosis and at time of interview

Health behavior	At diagnosis	Current
Smoking		
Never	22 (15.5%)	22 (15.5%)
Former	21 (14.8%)	101 (71.1%)
Current	99 (69.7%)	19 (13.4%)
Exposed to secondhand smoke		
Yes		40 (28.2%)
Alcohol use		
Yes	98 (69.0%)	82 (57.7%)
Overweight*		
Yes	62 (43.7%)	72 (50.7%)
Preobese (25-29.9)	44 (31.0%)	49 (34.5%)
Class 1 (30-34.9)	15 (10.6%)	17 (12.0%)
Class 2 (35-39.9)	2 (1.4%)	4 (2.8%)
Class 3 (≥ 40)	1 (0.7%)	2 (1.4%)

*BMI ≥ 25.

The risk behavior profiles at diagnosis and during the interview are presented in Table II. An overwhelming majority of the participants (85%) indicated that they had smoked at some point during their lifetime (average, 46 ± 28 pack per year history). Only 1 participant reported smoking cigars, and another reported using pipes. None of the participants chewed snuff. Approximately 18% had stopped smoking before diagnosis, and another 67% stopped smoking after diagnosis. A small proportion of patients (13%) continued to smoke. Of the current smokers, 95% (n = 18) reported using a filtered tip, 74% (n = 14) reported using menthol cigarettes, and 80% (n = 15) reported smoking light cigarettes. Only 12% of the participants who were smoking at the time of diagnosis reported having received assistance and referrals for smoking cessation, of which 3% continued to smoke until the time of interview. Approximately half of the smokers at diagnosis reported nicotine gum use, and one fourth tried nicotine patches and medications to aid with smoking cessation efforts.

Approximately a third of participants (28.2%) reported current exposure to secondhand smoke. Data related to exposure to second hand smoke before diagnosis were not available. Our findings also indicated that 23 of the participants (16%) reported changes in their alcohol use after diagnosis (18 stopped drinking totally and the other 5 decreased their use of alcohol). However, approximately half of the patients continued to drink alcohol (58%); 88% drank beer, 64% drank wine, and 73% drank liquor. Approximately one quarter of the participants (22%) who used alcohol used only 1 type of drink, another three-fourths (34%) used a combination of 2 drinks, and a third (44%) of the patients reported drinking all 3 types of alcoholic drinks. However, a small proportion of survivors (3%) who used alcohol reported having had more than 8 servings of alcoholic beverages in 1 sitting in the last 3 months.

The mean weight of participants at diagnosis and during the interview was 156 ± 36 lbs and 161.4 ± 38.8 lbs, respectively (7% increase; $P < .001$). Again, we observed that half of the patients (n = 72; 50.7%) were overweight (BMI, ≥25), with most participants (16.2%) being classified as frankly obese.

κ statistics for agreement among variables measuring each of the 4 risk behaviors are provided in Table III. A strong agreement was observed between respondents who continued to smoke and respondents who reported exposure to secondhand smoke. No agreement was observed among any of the other risk behaviors.

Logistic regressions were conducted to examine the bivariate relationships between each of the 4 risk behaviors and overall health perceptions. Each of the 4 risk behaviors significantly predicted a risk for perception of poor health (Table IV).

Table III
κ statistics for agreement among behaviors of smoking, exposure to secondhand smoke, drinking, and overweight

Behaviors	Overweight*	Drinking	ESHS
Smoking	κ = 0.05	κ = 0.00	κ = 0.33†
ESHS	κ = 0.09	κ = 0.04	
Drinking	κ = 0.07		

*BMI ≥ 25.
†$P < .001$.
ESHS, Exposure to secondhand smoke.

Table IV.
Independent predictors of poor health perceptions

Risk behaviors	Odds ratio	95% CI	χ^2 (Df = 1)	*P* value
Smoking	7.023	2.45-20.13	14.403	<.001
Exposure to secondhand smoke	5.371	2.42-11.95	17.637	<.001
Drinking	9.044	3.28-24.92	25.142	<.001
BMI ≥ 25	8.511	3.44-21.10	27.187	<.001

DISCUSSION

This study provides important information on health risk behaviors of lung cancer survivors. We found that most lung cancer survivors reported their health as good to excellent. Our findings are consistent with findings in a study that measured self-rated health status among men and women with early stage prostate and breast cancer.[23] However, contrary to other studies,[24,25] differences in self-rated health scores were not observed among participants by age or race.

Previous studies have shown that approximately 50% of all with diagnosis with lung cancer have already stopped smoking at the time of diagnosis.[5,26] The most common reasons for smoking cessation were concern over health (91%), expense (60%), concern about exposing others to secondhand smoke (56%) and wanting to set a good example for others (55%).[13] However, our findings show that only a small percentage of patients stopped before diagnosis and that most quit only after having been diagnosed with lung cancer. In 2 studies, Gritz and colleagues[27,28] reported that even in the face of cancer diagnosis patients may continue to be addicted to nicotine. Approximately 13% continued smoking, which is quite similar to smoking rates reported in another study examining adult survivors of childhood cancers.[29] Quite alarmingly, only 11% of the participants reported having received any assistance with smoking cessation after diagnosis and only a fourth of the patients who continued to smoke indicated that they were given any guidance from their healthcare provider. This is consistent with other studies that show that most smokers are seen at primary care settings and are not offered effective assistance in quitting.[6] Because recommendations from the healthcare provider have been shown to have a powerful impact on patient behavior,[30] efforts to promote smoking cessation should be encouraged to further decrease the number of patients who continue to smoke. Because cigarette smoking affects multiple organs, smoking cessation will decrease the risk of respiratory and cardiovascular disease among long-term survivors and also may reduce the risk of development of secondary malignant diseases.[6] Education and counseling sessions to promote behavior change, referral to smoking cessation programs, and

recommendations to treat with nicotine replacement substances may be key to helping patients with their nicotine addiction.[6]

Consistent with the findings of Satoh and colleagues[31] and Gritz and colleagues,[27,28] we found that the proportion of nonsmokers was significantly higher in female patients than in male patients and that more male patients continued to smoke despite lung cancer diagnosis. Because the prevalence of cigarette smoking among adults in the state of California is one of the lowest in the United States,[32] the number of lung cancer survivors who continue to smoke may actually be higher in other areas of the country.

We also found that despite efforts to successfully stop smoking, a third of the survivors continued to be exposed to secondhand smoke, a proven risk factor for lung cancer and cardiac disease. Therefore, friends and family who live with the lung cancer survivor need to be encouraged to also change their lifestyle behaviors to minimize healthcare risks associated with passive smoking on their loved ones.[6]

Alcohol use in our sample decreased by 16% after lung cancer diagnosis but remained relatively high. However, a similar study examining risk behaviors of adult survivors of childhood cancer reported an even higher rate (72.5%) of continued alcohol use.[29] Our information on alcohol use is limited by the fact that we did not obtain data on length of alcohol use among survivors. However, earlier studies have also shown that former drinkers were not homogeneous with respect to risk and that duration of drinking habit was found to be less important in determining risk than average amount of consumption.[16] Therefore, attention to the amount of alcohol consumed may be a better predictor of risk for poor health in our study. In examining amount of alcohol consumption in our sample, we found that only 3% of the current drinkers reported an alcohol consumption of more than 8 drinks in 1 sitting. However, use of a combination of wine, beer, and liquor was observed among the current drinkers. Some survivors (5%) reported a decrease in their use of alcohol after diagnosis. The effect of reducing alcohol intake rather than total cessation is not known, but results on the relation between amount and risk indicate that there is probably a decrease in risk from reduced alcohol intake.[16]

Our findings support that participants in our sample gained weight after diagnosis and treatment for lung cancer. Contrary to our stereotype of lung cancer survivors,[33] more than half of our participants were overweight and a fifth of the participants were frankly obese. The presence of obesity is a major risk factor for a number of chronic diseases. Furthermore, overweight and obesity also exacerbate many chronic conditions.[3] Because risk generally rises with progressive accumulation of body fat,[33] efforts to screen and identify cancer survivors at high risk for overweight and obesity early in the recovery phase are necessary to prevent and manage these 2 major healthcare problems. Additional research is also needed to better understand the factors that contribute to overweight and obesity among cancer survivors (ie, dietary and exercise habits). Likewise, additional research to develop and test cost-effective programs that address prevention and treatment of overweight and obesity in this patient population is essential.

The weight gain that we observed in our sample may be associated with smoking cessation. Several studies support this notion.[34] Froom and colleagues[35] found that most smokers who quit smoking gain fewer than 10 lbs, but there is a broad range of weight gain, with as many as 10% of smokers gaining as much as 30 lbs.[26] However, weight gain that follows smoking cessation is a negligible health threat compared with the risks of continued smoking.[6]

Research has shown that engagement in 1 risk behavior may be associated with engagement in other such behaviors.[36] However, we found little evidence to support clustering between the risk behaviors we assessed in our study. We only found a strong positive association between smoking and exposure to secondhand smoke. Similarly, Hymowitz and colleagues[12] found that the absence of smokers in the household was a significant predictor of successful smoking cessation. These findings underscore the need for interventions that address multiple risk factors, particularly those in which overlap is observed and where behavior change in one may influence change in the other.

Finally, our findings support our hypothesis that continued smoking, exposure to secondhand smoke, alcohol use, and overweight were independent predictors of poor overall health perceptions. Therefore, strategies that aim to promote health and reduce risks through lifestyle changes need to be developed and tested among lung cancer survivors in an effort to further increase overall health perceptions and improve quality of life. Health promotion and identification of risk prevention in people diagnosed with cancer has several purposes that were clearly outlined by Rose[6]: 1, to enhance a sense of well being and control over personal health; 2, to eliminate behaviors that may contrib-

ute to future health problems; and 3, to enhance early recognition of recurrent disease or a second malignant disease. The ultimate goal is consistent with the overarching goals of Healthy People 2010, which is to improve quality of life of all Americans and eliminate health disparities.[3]

Several limitations must be considered when interpreting the results from our study. As expected with prospective, cross-sectional studies, causation cannot be inferred. Our findings merely support the association between risk behaviors and perceptions of health status. Furthermore, the use of a single-item global evaluation of health perceptions, although widely accepted in the assessment of health status among populations with chronic illness, limits our ability to compare results of our study with other populations.[37,38] The convenience sample also limits generalization to all lung cancer survivors. The survivors who chose to participate in the study may be healthier than those who chose not to participate. It should also be noted that data from the study were gathered in a primarily white sample; therefore, our findings may not generalize to other ethnic groups, especially African Americans, who have the second highest percentage of lung cancer and poorer survival rates.[18]

We only focused on smoking, exposure to secondhand smoke, alcohol use, and overweight for this study. We did not examine other important health risk behaviors, including limited physical activity and adherence to dietary guidelines, which are also important factors that may impact on the participants' overall health behavior profile and consequently on their assessment of health status. Furthermore, other than smoking cessation, we did not assess survivors' readiness to change other risk behaviors. Future studies that examine additional health behaviors and readiness to change are warranted to identify effective strategies to promote lifestyle changes.

SUMMARY

Our findings suggest that, despite a history of lung cancer, most survivors appear to believe that they are in good to excellent health. We also found that although many lung cancer survivors already practice behaviors that are associated with a healthy lifestyle, there are still many who do not and who may need help in select areas. The impact of risk behaviors on cancer survivor outcomes and overall health perceptions is being examined with increasing frequency. Promoting behavior change may be key to higher levels of self-perceived health status and well being, in addition to reducing risk of cancer recurrence and second primary diseases and decreasing overall comorbidities.

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Correction

In the article entitled "Cardiovascular autonomic function in healthy adolescents" by Melissa Spezia Faulkner, RN, DSN, Donna Hathaway, RN, PhD, and Betsy Tolley, PhD, in the January/February issue (Heart Lung 2003;32:10-22), there was an error in Table VII on page 19. For DBPM, the Lower 95% CI for the total sample should indicate a value of 35.46, not 5.46.