


Predictors of Discussing Lung Cancer Screening with a Health Care Provider Among Current and Former Smokers in HINTS: A Secondary Data Analysis

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Abstract

Introduction: Lung cancer screening is greatly underutilized among those who may benefit from early detection.

Methods: We analysed data from a subsample (n = 929) of the 2020 Health Information National Trends Survey. We tested multivariable logistic regression models of associations of cancer worry, information insufficiency, and perceived information gathering capacity with reports of having discussed lung cancer screening with a health care provider.

Results: Among former smokers, no factors were associated significantly with lung cancer screening information seeking. However, for current smokers, extreme cancer worry was positively and significantly associated with having discussed lung cancer screening with a health care provider (OR: 12.95; 95% CI: 2.11, 79.39).

Conclusion: To increase uptake of lung cancer screening, public health campaigns and healthcare providers will face the dual challenge of increasing perceived need for screening among former smokers while directing current smokers with high levels of worry to see the benefits of early detection.

Keywords

lung cancer screening, information seeking, behaviors, smoking status, cancer worry

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Introduction

Lung cancer is the leading cause of cancer-related deaths among adults in the United States.¹ Nearly half of all lung cancers are diagnosed at a distant stage when the survival prognosis is poor.² Low-dose CT (LDCT) is an evidence-based screening approach that can detect lung cancer early when treatment is most likely to be effective.¹ Approximately 14.5 million Americans are eligible for screening under current guidelines, however, at 6.5%, uptake of LDCT among Americans remains significantly lower than for other evidence-based cancer screenings (mammography 76.4%, cervical 73.5%, and colorectal 67.1%).^{3–5}

Guidelines indicate that adults eligible for LDCT include individuals between 50 and 80 years of age who are active

cigarette users and have smoked at least 1 pack per day for 20 years.¹ Former smokers, particularly those who quit within the last 15 years, are also eligible for screening as they remain

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at elevated risk for lung cancer.¹ After 10 years of cessation, lung cancer risk for former smokers remains 30-50% higher than for never smokers.⁶

Lung cancer screening guidelines recommend annual screening for eligible individuals following a referral or discussion with a primary care provider and are implemented through a combination of shared decision-making, reporting and interpretation of findings, and management of nodules that can be conducted in various healthcare settings.^{1,7} Improvements in the early detection of lung cancer could save an additional 10,000-20,000 lives each year.³

Several barriers have been reported that impede the uptake of LDCT (henceforth lung cancer screening). These include the time required for patients and providers to engage in shared decision-making, lack of patient and provider knowledge regarding screening eligibility criteria and shared decision-making requirements, and limited access to screening due to rurality.⁸ Some studies suggest that misperceptions of lung cancer risk among former smokers may impact screening behaviors and uptake.^{9,10} Additionally, medical system mistrust has been reported as a barrier to lung cancer screening among minority populations.⁸

Health information seeking is a process or activity of attempting to obtain needed information via technical or human interactions.¹¹ For the purpose of this report, we characterize lung cancer screening discussions with a healthcare provider as information seeking as a provider referral is strongly recommended for at-risk individuals to be screened.¹² This acquired knowledge has the potential to motivate self-management, uptake of therapies, and adoption of risk-reducing behaviors.¹¹ However, there is limited research on cognitive and affective factors that may influence at-risk individuals' decisions to talk with their providers about lung cancer screening, particularly among older current and former smokers.^{13,14}

The Risk Information Seeking and Processing (RISP) model suggests that a strong affective response (eg, cancer worry), information insufficiency (perceived cognitive need for additional information to handle risks confidently), and perceived information gathering capacity (perceived ability to perform steps necessary for information seeking) influence the extent to which an individual will seek out risk information.¹⁵ The RISP model was used specifically to guide the selection of survey items to be included in our analysis. Our primary objective was to identify cognitive and affective factors that may be associated with talking to a health care provider about lung cancer screening. We analysed data from the 2020 Health Information National Trends Survey (HINTS) to determine if there were differences by current vs former smoking status.

Materials and Methods

HINTS is a nationally representative survey administered by the National Cancer Institute to collect data from adults on their knowledge, attitudes, and use of cancer and health-related

information.¹⁶ We conducted a secondary data analysis of publicly available HINTS 5 Cycle 4 data collected at a single timepoint. HINTS 5 Cycle 4 data were collected from February to June 2020 via mail and had a response rate of 37%.¹⁶ The sample for this analysis was limited to individuals ages 50 to 80 and those who reported being current or former smokers, as these individuals are at heightened risk for developing lung cancer.¹ Current smokers in HINTS were defined as those who reported smoking at least 100 cigarettes in their lifetime and currently smoke cigarettes every day or some days. Former smokers reported smoking at least 100 cigarettes in their lifetime but currently do not smoke cigarettes at all.

The outcome variable, lung cancer screening information seeking, was determined by the question, "*At any time in the past year, have you talked with your doctor or other health professional about having a test to check for lung cancer?*" We focused on 3 RISP constructs that were measured in HINTS: cancer worry (frequency of worry about getting cancer), information insufficiency (gaps in knowledge regarding cancer prevention recommendations), and perceived information gathering capacity (confidence in retrieving cancer advice or information). *Please refer to the footnotes for the exact wording of these HINTS items Table 1.* Due to small cell sizes, for the perceived information gathering capacity measure, we combined the categories of somewhat confident, a little confident, and not confident at all into a single category (somewhat confident). We selected the following covariates: age, race, smoking status, education level, gender, and family history of cancer. Age was measured continuously, while the remaining covariates were measured categorically.

Complex survey-adjusted descriptive statistics (mean, frequencies, confidence intervals) were calculated for each of the variables, stratified by smoking status. Crude and adjusted logistic regression analyses were run to estimate odds ratios and 95% confidence intervals to assess the associations between each of the predictors and talking with a health care provider about lung cancer screening stratified by smoking status. Regression analyses were also conducted to determine which covariates were significantly associated with talking with a health care provider. Missing data for all variables were omitted via listwise deletion. SAS 9.4 was used for all analyses. The reporting of this study conforms to the STROBE guidelines for reporting observational studies.¹⁷

Results

Among the HINTS sample of 3,865 participants, 929 participants met age and smoking status eligibility; 654 former smokers and 275 current smokers. The mean age was 63.3 years for former smokers and 60.8 years for current smokers. Most former and current smokers were White (>75%). Former smokers were more likely to have completed college (22.2%) compared to current smokers (8.2%). Fewer former smokers reported having discussions with their doctor about lung cancer screening (8.9%) compared to current

Table 1. Descriptives and Multivariable Associations Between RISP Constructs and Discussing Lung Cancer Screening with a Healthcare Provider, Stratified by Smoking Status.

	Former Smokers (n = 654) n (%)	Current Smokers (n = 275) n (%)	Adj Model (Former smokers) OR (95% CI)	Adj Model (Current smokers) OR (95% CI)
Information insufficiency¹				
Strongly agree	123 (18.17%)	66 (21.99%)	1.02 (.23, 4.48)	.33 (.07, 1.48)
Somewhat agree	337 (56.14%)	134 (56.32%)	1.21 (.29, 5.08)	.23 (.05, 1.05)
Somewhat disagree	131 (19.32%)	49 (18.12%)	1.32 (.21, 8.22)	.30 (.06, 1.45)
Strongly disagree	55 (6.36%)	20 (3.56%)	Ref	Ref
Cancer worry²				
Extreme	71 (8.68%)	46 (14.40%)	3.84 (.71, 20.80)	12.95 (2.11, 79.39) ^{**3}
Moderate	121 (17.58%)	51 (17.50%)	3.81 (.71, 20.53)	3.21 (.48, 21.67)
Some	186 (34.63%)	71 (29.70%)	1.64 (.29, 9.24)	3.40 (.40, 28.93)
Slight	173 (26.32%)	54 (19.11%)	1.87 (.42, 8.39)	5.15 (.58, 45.52)
None	98 (12.80%)	52 (19.29%)	Ref	Ref
Perceived information gathering capacity⁴				
Completely confident	185 (28.04%)	84 (32.85%)	1.58 (.49, 5.12)	1.35 (.40, 4.56)
Very confident	256 (38.25%)	99 (34.43%)	.46 (.16, 1.29)	1.22 (.46, 3.26)
Somewhat confident	206 (33.71%)	88 (32.72%)	Ref	Ref

smokers (21.5%). Former smokers (8.7%) were less likely to report extreme cancer worry than current smokers (14.4%). Former smokers were more likely to have a family history of cancer (84.4%) than current smokers (76.4%).

In bivariate and unadjusted multivariable analysis, perceived information gathering capacity was the only construct associated significantly with former smokers having discussed screening with a health care provider (See Table IV in supplementary file). Former smokers who reported being very confident in their ability to seek cancer-related advice had .37 times the odds of engaging in lung cancer screening discussions with a provider compared to those who were somewhat or not at all confident (OR: .37; 95% CI: .14, .96). However, after adjusting for covariates, this association did not remain significant. Among former smokers, lower educational attainment was significantly associated with having discussed lung cancer screening with a health care provider.

In unadjusted analyses, current smokers with extreme cancer worry were 5.71 times more likely to have discussed lung cancer screening with a health care provider than those with no cancer worry (OR: 5.71; 95% CI: 1.29, 25.15). Cancer worry remained significant in adjusted analyses and was the only construct associated significantly with having talked with a health care provider about lung cancer screening. Current smokers who reported extreme cancer worry were almost 13 times more likely to report engaging in lung cancer screening discussions with a provider than those with no cancer worry (OR: 12.95; 95% CI: 2.11, 79.39). Among current smokers, older age was significantly associated with having discussed lung cancer screening with a provider.

Race was not associated with having discussed lung cancer screening with a health care provider among current or former smokers.

Discussion

Former smokers did not report being as worried about developing lung cancer as their lingering risk level might suggest. This is concerning since clinical research suggests that their risk of developing lung cancer remains appreciable following cessation and they could benefit from early detection.⁶ These results are consistent with other studies, as former smokers consistently exhibit less general cancer and lung cancer worry than current smokers.¹⁸⁻²⁰ The HINTS measures did not allow for deeper exploration of the association of perceived information gathering capacity with discussing screening with a provider, but it warrants future consideration. Taken together, the challenge for public health programs and health professionals aiming to increase uptake of lung cancer screening will be to increase the relevance of such screening for former smokers while affirming the health benefits of their long-term cessation. Additionally, future studies should explore confidence levels among former smokers and potential explanations for the lack of associations of RISP constructs with information seeking. Future studies should also measure risk perceptions and cancer worry specific to lung cancer and more granularly assess differences by smoking status (eg, recent quitters vs long-term quitters).

Among current smokers, high levels of cancer worry can lead to avoidance behaviors that could undermine screening uptake.²¹ Thus, the challenge for lung cancer screening promotion is to direct these high levels of cancer worry to seeing the value of lung cancer screening regardless of the screening outcome. In this case, early detection of lung cancer can greatly improve one's prognosis. In either case, high levels of concern should also be directed towards smoking cessation and other health promoting behaviors.

Our study had several limitations. For 1, HINTS is a cross-sectional survey that does not enable causal inference or temporality of the observed associations. As a result, it is not clear if increased worry preceded screening discussions or was the result of having discussed screening with a provider. There were also no items in HINTS that asked participants about their years since quitting smoking or smoking pack-years, so this sample may not accurately represent those eligible for lung cancer screening. Confidence intervals for tested associations were wide indicating a wide range of estimates compatible with the available data. There was also no explicit measure of risk perceptions related to cancer in HINTS, so the cancer worry item may have conflated the 2 constructs. However, cancer worry and risk perceptions are typically assessed separately.^{22,23} Lastly, the questions were not directly related to lung cancer screening and this non-specificity may account for the lack of associations. Despite these limitations, our results are predicted to be generalizable to the population because of the representativeness of the HINTS sample.¹⁶

Conclusion

In order to fully actualize the public health success of steadily declining rates of cigarette smoking, former smokers must be engaged in lung cancer screening. Increasing the seriously low rates of lung cancer screening will require public health campaigns and healthcare providers to face the dual challenge of increasing perceived need among former smokers while directing smokers' high levels of worry toward preventive actions.

Declaration of Conflicting Interests

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Ethics Statement

This manuscript describes secondary analysis of a public data set and ethical approval was not required.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. Participants were asked to respond to the following statement on a 4 item Likert scale: There are so many different recommendations about preventing cancer, its hard to know which ones to follow.

2. Participants were asked "How worried are you about getting cancer?"

3. * $P < .05$, ** $P < .01$.

4. Participants were asked "Overall, how confident are you that you could get advice or information about cancer if you needed it?"

Missing data values for the RISP constructs ranged from 1 to 8 among current and former smokers.

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