

Lay Beliefs About the Accuracy and Value of Cancer Screening

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Introduction: Appreciating the accuracy and value of cancer screening is essential to informed decision making about screening. This study's objectives were to (1) examine people's beliefs about the accuracy and value of cancer screening, and (2) determine whether sociodemographics, cancer beliefs, and shared decision making are associated with these beliefs.

Methods: Data from the National Cancer Institute's Health Information National Trends Survey (cycle 4, August–November 2014) were used. Respondents were non-institutionalized adults (aged ≥ 18 years, $n=3,677$). Weighted generalized linear modeling was used to examine bivariate and multivariate associations between key covariates and beliefs about cancer screening (assessed by four-item scale and independently). Secondary analyses examined whether these beliefs were associated with self-reported cancer screening. Data were analyzed between 2016 and 2017.

Results: Only 5.6% ($n=189$) of respondents answered all four cancer screening items correctly. Men, racial/ethnic minorities, and those with lower education and higher cancer fatalism were less likely to have accurate beliefs about cancer screening. However, those who reported shared decision making for colorectal cancer screening were more likely to know that "when a test finds something abnormal, more tests are needed to know if it is cancer" and "when a test finds something abnormal, it is [not] very likely to be cancer" (adjusted risk ratio=1.13, $p<0.01$, adjusted risk ratio=1.25, $p<0.01$). Beliefs were not associated with likelihood of past mammography or Pap testing.

Conclusions: Educators, researchers, and clinicians should consider opportunities (e.g., through shared decision making) to improve the accuracy of individuals' beliefs about cancer screening.

Am J Prev Med 2018;■(■):■■■–■■■. Published by Elsevier Inc. on behalf of American Journal of Preventive Medicine

INTRODUCTION

Patients are recommended to play active roles in cancer screening decision making through shared decision making (SDM) with their providers to attain high-quality, patient-centered care.^{1,2} Consequently, appreciating the accuracy and value of cancer screening is fundamental for effective SDM. Cancer screening is not perfect; it shows whether someone is potentially at increased risk for cancer, and positive screens warrant follow-up tests to rule out or diagnose cancer. It is unclear whether laypeople appreciate the nature of such tests. These tests are only recommended when the benefits (accurate detection/mortality reduction) outweigh the risks (overdiagnosis/overtreatment³), and evidence suggests that individuals overestimate screening benefits.^{3–5}

This study aims to better understand people's beliefs about cancer screening and whether individual characteristics, cancer beliefs, and cues to action are associated with these screening beliefs.⁶ The secondary aim is to determine whether there is an association between these beliefs and past self-reported cancer screening (Appendix Figure 1, available online, provides conceptual framework).

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0749-3797/\$36.00
<https://doi.org/10.1016/j.amepre.2018.02.002>

METHODS

Study Population

Data came from the National Cancer Institute's Health Information National Trends Survey (cycle 4),⁷ which is administered via mail (August–November 2014) to a nationally representative sample of non-institutionalized adults ($n=3,677$).⁸ Analyses were conducted between 2016 and 2017 and restricted to respondents who answered all cancer screening belief items ($n=3,351$).

Measures

Outcome variables were derived from the four-item module assessing cancer screening beliefs: *As far as you know, which of the following statements are true or false about medical tests or exams such as colonoscopies, mammograms, and Pap tests that check for early signs of cancer? (a) These tests can definitely tell that a person has cancer; (b) When a test finds something abnormal, more tests are needed to know if it is cancer; (c) When a test finds something abnormal, it is very likely cancer; (d) The harms of these tests and exams sometimes outweigh the benefits.*⁷ The total number of items (a–d) answered correctly and each item (a–d, independently) were assessed.

Independent variables included the following:

1. sociodemographics (age, gender, marital status, personal and family cancer history, race, employment, health insurance, education, imputed income, general health, most recent medical check-up, trust in cancer information sources);
2. cancer beliefs (*How likely are you to get cancer in your lifetime; It seems like everything causes cancer; There's not much you can do to lower your chances of cancer; There are so many different recommendations about preventing cancer, it's hard to know which ones to follow*); and
3. cues to action (patient-centered communication⁹ and three SDM measures: *Has a doctor ever told you... there are different tests, such as colonoscopy, sigmoidoscopy, or blood stool tests to detect colorectal cancer?; ... that you could choose whether or not to have the Pap test?; ... that you could choose whether or not to have a mammogram?*)¹⁰ (Appendix Figure 1, available online).

Statistical Analysis

To directly estimate risk ratios, weighted generalized linear modeling was used with a Poisson family and log link¹¹ with Stata, version 14. Bivariate and multivariate associations were assessed among key independent and outcome variables. Independent variables were included in multivariable models if the

bivariate association was $p < 0.05$. For analyses assessing SDM about colorectal, cervical, and breast screening, only screening-eligible adults were included (colorectal: ages ≥ 50 years [$n=2,182$]; cervical: women ages 30–65 years [$n=1,258$]; and breast: women ages 50–74 [$n=927$]). Secondary analyses examined whether screening beliefs were related to women having had a mammogram within 2 years (aged 50–74 years) or Pap testing within 5 years (aged 30–65) using weighted generalized linear modeling.¹¹ Detailed information about colorectal or prostate screening was not collected in this Health Information National Trends Survey cycle. For all analyses, complete case analysis was conducted, and complex probability sampling design was accounted for to obtain nationally representative estimates.

RESULTS

Only 5.6% ($n=189$) of respondents answered all screening questions correctly (Appendix Table 1, available online). Across individual items, accuracy varied (Table 1). Most (91.5%) knew that follow-up tests are needed to know if an abnormal result is cancer. However, few (19.7%) respondents understood that screening test harms may outweigh the benefits. Factors associated with correctly answering each question varied, although some consistency emerged (Table 2, Appendix Table 2, available online). Men, racial/ethnic minorities, lower education levels, and higher cancer fatalism (believing “there is not much you can do to prevent cancer”) were associated with less accurate screening beliefs. Conversely, reporting a family cancer history was associated with a higher likelihood of answering screening questions correctly. As perceived likelihood of being diagnosed with cancer decreased, likelihood of understanding that more tests are needed following an abnormal screen increased; this association held when controlling for other factors. Additional multivariable findings are presented in Table 2.

There were no significant associations between SDM measures for breast or cervical cancer screening and answering the cancer screening questions correctly. However, those who reported SDM for colorectal cancer (CRC) were more likely to answer correctly “when a test finds something abnormal, more tests are needed to know if it is cancer” and “when a test finds something abnormal, it is very likely to be cancer,” controlling for

Table 1. Weighted Proportion of Respondents Who Answered Each Question About Cancer Screening Correctly

Question	% Correct ^a	95% CI
These tests can definitely tell that a person has cancer...(False)	71.5	69.0, 74.1
When a test finds something abnormal, more tests are needed to know if it is cancer...(True)	91.6	90.1, 93.0
When a test finds something abnormal, it is very likely to be cancer...(False)	34.5	31.8, 37.3
The harms of these tests and exams sometimes outweigh the benefits...(True)	19.7	16.7, 22.7

^aIncorrect and “Don't know” responses were combined.

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