

# Fatalistic Beliefs about Cancer Prevention and Three Prevention Behaviors

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## Abstract

**Background:** A substantial proportion of US adults hold fatalistic beliefs about cancer prevention. Although evidence suggests that fatalistic beliefs discourage people from engaging in screening behaviors that can reduce their cancer risk, far less is known about associations between cancer fatalism and other prevention behaviors. We examined sociodemographic correlates of these beliefs and their associations with regular exercise, smoking, and fruit and vegetable consumption with a national sample of American adults.

**Methods:** Data were analyzed from the first wave of the Health Information National Trends Survey (HINTS 2003). HINTS used random-digit dialing to complete phone interviews with adult Americans ( $N = 6,369$ ).

**Results:** Nearly half of respondents (47.1%) agreed that "It seems like almost everything causes cancer," 27.0% agreed

that "There's not much people can do to lower their chances of getting cancer," and 71.5% agreed that "There are so many recommendations about preventing cancer, it's hard to know which ones to follow." These beliefs were stronger in subjects who were less educated but generally weaker among both African Americans and Hispanics relative to Whites. Fatalistic beliefs about cancer prevention were negatively associated with exercising weekly, not smoking, and eating five or more fruits and vegetables daily in multivariate analysis controlling for sociodemographic characteristics.

**Conclusions:** Americans who hold fatalistic beliefs about cancer prevention may be at greater risk of cancer because they are less likely to engage in various prevention behaviors. Results have notable implications for future cancer communication and education efforts. (Cancer Epidemiol Biomarkers Prev 2007;16(5):998–1003)

## Introduction

It is estimated that half of all men and one third of all women will develop some type of cancer in their lifetime (1), but several behaviors reduce cancer risk. Fruit and vegetable consumption reduces the risk of cancer (2), and lower weight, influenced by diet and exercise, is associated with lower risk of cancer onset and recurrence (3, 4). Some scientists estimate that 30% of US cancer deaths are attributable to smoking (5), whereas 14% to 20% are attributable to overweight and obesity (6). Thus, a thorough understanding of the barriers to these behaviors is critical to efforts in cancer control.

Fatalism, an outlook that events are controlled by external forces and humans are powerless to influence them, has been proposed as a barrier to cancer prevention and screening behavior (7, 8), particularly among the poor (9, 10), African Americans (11, 12), and Hispanics (13, 14). Cancer fatalism has been operationalized at multiple stages of the cancer continuum, from prevention (refs. 7, 8, 12-16; e.g., "there's nothing a person can do prevent cancer") to screening (refs. 7, 17; e.g., "if you don't die from this, you'll die from that, so there's no point in taking screening tests") to survivorship (refs. 11, 13, 14, 17-21; e.g., "cancer is a death sentence"). Fatalistic beliefs about cancer prevention, prevalent among US adults (13, 22, 23), are characterized by pessimism, helplessness, and confusion about ways to avoid getting cancer (7, 10, 15, 24, 25).

Little is known about sociodemographic and behavioral correlates of fatalistic beliefs about cancer prevention. Fatalistic beliefs about cancer survivorship are more prevalent among Hispanic and African American populations than Whites (13, 14, 18, 21), stronger among those with lower levels of education (13, 20, 21), and associated with decreased use of cancer screening tests (13, 17, 18, 24), but far less is known about the correlates of fatalistic beliefs about cancer prevention. The most recent national survey of these beliefs, which found that half of the US population believed that "everything causes cancer" and that "there's not much a person can do to prevent cancer," was conducted in 1986 (23). Although more recent studies document racial/ethnic differences in fatalistic beliefs about cancer prevention (7, 12, 16) and associations with screening test use (7, 8, 14, 16), these studies are based on small samples from specified geographic locations. Other studies have found few differences in these beliefs by race/ethnicity (14), and some argue that observed associations between race/ethnicity and all types of cancer fatalism are largely attributable to differences in socioeconomic status (9, 10). Furthermore, there is no published evidence linking fatalism, at any stage of the cancer continuum, to physical activity, smoking, and fruit and vegetable consumption.

Fatalistic beliefs about cancer prevention may influence prevention behaviors by promoting a sense of external locus of control (7, 8) changing beliefs about the value of specific behaviors (24), or reducing self-efficacy (7) and motivation (24) to perform prevention behaviors, each of which, in turn, may decrease the likelihood of an individual engaging in behaviors that reduce cancer incidence or mortality (26-28). Because many behaviors (e.g., smoking, physical activity) influence the onset of multiple diseases (29, 30), fatalistic beliefs about cancer prevention may have implications for a variety of health conditions. Unanswered questions about associations between fatalistic beliefs and prevention behaviors highlight the need for empirical tests of these correlations.

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This study examines the prevalence of fatalistic beliefs about cancer prevention in the overall US adult population, identifies sociodemographic correlates of these beliefs, and examines whether these beliefs are associated with the likelihood of engaging in three prevention behaviors. Consistent with previous research on associations between sociodemographics and cancer fatalism (7, 12-14, 16, 18, 20, 21), fatalistic beliefs about cancer prevention are expected to be more prevalent among respondents with lower levels of education (Hypothesis 1) and among both Hispanics and African Americans and relative to Whites (Hypothesis 2). Based on the theoretical rationale described above (7, 8, 24), fatalistic beliefs about cancer prevention are expected to reduce the likelihood that individuals engage in prevention behaviors, including regular exercise, not smoking, and eating fruits and vegetables (Hypothesis 3).

## Materials and Methods

This study analyzed data from the first wave of the Health Information National Trends Survey (HINTS; ref. 31), conducted by the National Cancer Institute. HINTS used random-digit dialing to recruit Americans aged 18 years or older to participate in a telephone survey between October 2002 and April 2003. HINTS intentionally oversampled Hispanics and African Americans to achieve larger minority representation. Interviews were completed with 6,369 subjects (response rate = 34.5%). Additional details about the sampling strategy are published elsewhere (31).

### Measures

**Independent Variables: Fatalistic Beliefs about Cancer Prevention.** The interview asked respondents to report their level of agreement with three statements, two of which have been used in previous studies, to gauge fatalistic beliefs about cancer prevention: (a) "It seems like almost everything causes cancer" (15, 22, 23); (b) "There's not much people can do to lower their chances of getting cancer" (14-16, 22, 23); and (c) "There are so many recommendations about preventing cancer, it's hard to know which ones to follow." These beliefs address components of fatalism, including pessimism ("everything causes cancer..."), helplessness ("there's not much..."), and confusion ("hard to know..."; refs. 7, 10, 15, 23-25). Each item was measured with a five-point Likert scale with response categories ranging from strongly disagree to strongly agree. The three belief items had low correlations ( $r_{ab} = 0.19$ ,  $r_{ac} = 0.22$ ,  $r_{bc} = 0.21$ ). These variables were dichotomized to compare those who agreed with each item (strongly or somewhat) to those who disagreed (strongly or somewhat) or had no opinion. We examined each belief item separately.

**Dependent Variables: Three Prevention Behaviors.** We selected three prevention behaviors (physical activity, not smoking, and fruit and vegetable consumption) as dependent variables based on their known associations with cancer risk reduction (4-6, 28, 29). Each item was asked of all respondents. Physical activity was assessed by asking whether the respondent engages in regular sweat-producing exercise at least once a week. Although this is below the US Surgeon General's recommended frequency of exercise, any moderately strenuous physical activity is considered beneficial to health (1), and the HINTS did not ask about more regular intervals of physical activity. Smoking behavior was assessed with, "Do you now smoke cigarettes every day, some days, or not at all?" Nonsmokers were defined as those who reported that they do not currently smoke. Fruit and vegetable consumption was assessed by asking how often respondents ate fruit, drank 100% fruit juice, and ate vegetables using three separate questions. Responses to all three items were recorded and summed to produce a measure reflecting the average number

of fruits and vegetables consumed per day, which was recoded into adherence or not to the national "five-a-day" guideline in place at the time of the study (32).

### Analytic Approach

Analyses were conducted using "svy jackknife" commands in Stata 9.0. Analyses weighted HINTS data to reflect national demographic characteristics and used jackknife SEs for all significance tests to account for oversampling by race/ethnicity and nonresponse. Descriptive analyses examined the prevalence of agreement with fatalistic beliefs about cancer prevention and the proportion of respondents that engaged in the three prevention behaviors.

**Testing Hypotheses 1 and 2.** Multivariate logistic regression models were used to test associations between sociodemographic characteristics and each fatalistic belief about cancer prevention.

**Testing Hypothesis 3.** Separate multivariate logistic regression models were used to test associations between fatalistic beliefs about cancer prevention and each prevention behavior. Demographic characteristics that were associated with each behavior in bivariate models at  $P < 0.25$  were retained as potential confounders in multivariate models (33). We tested *Hypothesis 3* in two steps. Although the three belief items were meant to represent distinct dimensions of a broader concept, not three indicators of a latent construct, their correlations revealed some shared variance. Focusing only on coefficients from models where the three beliefs were entered simultaneously could produce misleading conclusions about their associations with prevention behaviors (34). We thus began the analysis of prevention behaviors by estimating nine "independent" multivariate logistic regression models (three beliefs by three behaviors) to assess whether each individual item was significantly associated with each prevention behavior, net potential sociodemographic confounders. We then estimated three comprehensive models (one model for each behavior) that simultaneously included all three belief items (net potential sociodemographic confounders) to assess which beliefs retained statistically significant associations with each behavior. We present coefficients from these comprehensive models in tables but discuss both sets of results in the text.

## Results

**Sample Characteristics.** The weighted mean age of the sample was 45.2 years (SD, 17.4). More than half of the weighted sample was female (51.9%) and self identified as non-Hispanic White (71.8%; Table 1). More than half of the sample earned <\$50,000 per year, 24.3% graduated college, 59.8% were employed, and 63.6% were married or living as married.

**Prevalence of Fatalistic Beliefs about Cancer Prevention and Prevention Behaviors.** Nearly half of respondents agreed or strongly agreed that "everything causes cancer..." about a quarter of subjects agreed or strongly agreed that "there's not much a person can do..." and nearly three quarters of subjects agreed or strongly agreed that "it's hard to know which ones to follow" (Table 1). There was also considerable variation in prevention behaviors. Only slightly greater than half of respondents engaged in weekly exercise. More than three fourths were classified as nonsmokers. The majority did not consume five daily servings of fruits and vegetables.

**Sociodemographic Characteristics and Fatalistic Beliefs about Cancer Prevention.** Consistent with Hypothesis 1, respondents without a high school degree, those who only completed high school, and those with only some college or trade school had higher odds of agreeing with each belief than respondents who graduated from college (Table 2). Contrary to Hypothesis 2, English-speaking Hispanic and

**Table 1. Weighted sample characteristics and variable distributions, HINTS 2003**

N = 6,369, unless otherwise noted	Percentage
Sociodemographic characteristics	
Female gender	51.9
Race/ethnicity (nonmissing <i>n</i> = 6,068)	
Non-Hispanic White	71.8
Non-Hispanic African American	10.5
Hispanic, English speaking	5.8
Hispanic, non-English speaking	5.9
Other race/ethnicity	6.0
Income	
Income not reported	12.3
<\$25,000 per year	25.5
\$25,000 to \$49,999	27.0
\$50,000 to \$74,999	15.3
>\$75,000	19.9
Education (nonmissing <i>n</i> = 6,139)	
Less than high school degree or equivalent	16.9
Completed high school	32.0
Some college or technical school	26.8
Completed college	24.3
Employed (nonmissing <i>n</i> = 6,133)	59.8
Married or living as married (nonmissing <i>n</i> = 6,136)	63.6
Has health insurance (nonmissing <i>n</i> = 6,152)	85.4
Family member has had cancer (nonmissing <i>n</i> = 6,319)	61.9
Fatalistic beliefs about cancer prevention (% agree or strongly agree)	
It seems like almost everything causes cancer ( <i>n</i> = 6,345)	47.1
There's not much a person can do to lower their chances of getting cancer ( <i>n</i> = 6,346)	27.0
There are so many recommendations about preventing cancer, it's hard to know which ones to follow ( <i>n</i> = 6,351)	71.5
Prevention behaviors (% who engage in the behavior)	
Exercise weekly (work up a sweat; <i>n</i> = 6,154)	54.4
Nonsmoker ( <i>n</i> = 6,213)	77.8
Eat five servings of fruits/vegetables a day ( <i>n</i> = 6,120)	13.5

NOTE: Cells contain weighted percentages, excluding cases with missing values.

African American respondents were less likely than non-Hispanic White respondents to believe that "everything causes cancer," and English-speaking Hispanic respondents were also less likely than non-Hispanic White respondents to believe that "it's hard to know..." Spanish-speaking Hispanic respondents, however, were more likely than non-Hispanic White respondents to believe "there's not much a person can do..." Age was positively associated with one fatalistic belief, negatively associated with a second, and unassociated with the third. Compared with males, females had higher odds of agreeing with the belief that "everything causes cancer." Income, employment status, and insurance status were not associated with any of the three fatalistic beliefs about cancer prevention. Being married or living as married (compared with being divorced, widowed, separated, or never married) was positively correlated with two of the three beliefs. Compared with those without a family cancer history, respondents with a family cancer history were more likely to believe that "everything causes cancer."

**Fatalistic Beliefs about Cancer Prevention and Prevention Behaviors.** Consistent with Hypothesis 3, fatalistic beliefs about cancer prevention were associated with a lower likelihood of weekly exercise, being a nonsmoker, and eating five daily servings of fruits and vegetables in eight of nine "independent" models (not shown in tables). The single exception was that "there's not much a person can do..." was not associated with a lower odds of being a nonsmoker. At least one of the three beliefs remained significantly associated with lower odds of each prevention behavior in the three "comprehensive" models (Table 3). Controlling for potential

confounders and the other belief items, "everything causes cancer" was associated with lower odds of being a nonsmoker and fruit and vegetable consumption in accordance with national guidelines. The belief that "there's not much a person can do to..." was associated with lower odds of weekly exercise, whereas the belief that "it's hard to know..." was associated with lower odds of being a nonsmoker.

## Discussion

This study of a nationally representative sample of American adults reveals three major findings. First, fatalistic beliefs about cancer prevention are prevalent in the US adult population. Second, these beliefs are stronger among less-educated Americans but, when controlling for socioeconomic status (and with one exception), are either weaker or equivalent among African Americans and Hispanics compared with Whites. Third, these beliefs are associated with lower odds of engaging in prevention behaviors, including regular exercise, not smoking, and fruit and vegetable consumption.

In light of these associations, the sheer prevalence of fatalistic beliefs about cancer prevention among US adults is a cause for concern. Despite tremendous improvements in the availability of cancer information in the past two decades (e.g., via the Internet; ref. 31), there seems to have been little progress in changing the belief that "everything causes cancer" (23). The fact that only slightly more than a quarter of respondents believed that "there's not much people can do..." might be viewed as evidence of successful cancer communication and education over the past 20 years. However, the fact that almost three out of four respondents indicated that "there are so many recommendations... it's hard to know which ones to follow" suggests a sizeable disconnect between the knowledge that one can reduce cancer risk and clarity about how that should be done.

Results also suggest that individuals who hold these beliefs may be at greater risk of cancer. Failure to engage in the three prevention behaviors are linked to an increased risk of several cancers (2-6, 29, 30). These behaviors are also linked to a variety of other serious diseases, such as heart disease and hypertension (29, 30), which suggests that fatalistic beliefs about cancer prevention may also influence the risk of a variety of diseases and conditions. The fact that beliefs about one particular class of disease (cancer) were associated with a lower likelihood of engaging in behaviors linked to a variety of diseases (e.g., heart disease) suggests that beliefs about cancer prevention may influence a variety of disease outcomes. Individuals report higher levels of concern about cancer relative to other prevalent diseases such as heart disease, diabetes, AIDS, and mental health (15). Beliefs about a disease of widespread concern may be particularly salient in promoting or inhibiting health-promoting behaviors.

Collectively, evidence suggests that cancer fatalism is consequential at multiple stages of the cancer continuum (prevention and survivorship). Fatalistic beliefs about cancer survivorship may inhibit individuals from engaging in screening tests out of fear that a positive test result represents a death sentence (13, 17, 18, 24). Fatalistic beliefs about cancer prevention may inhibit individuals from engaging in prevention behaviors by increasing external locus of control (7, 8) and reducing both self-efficacy (7) and motivation (24) to perform these behaviors. It nevertheless remains unclear whether cancer fatalism is a unidimensional construct or whether it represents a larger, multidimensional phenomenon comprised of prevention, screening, and survivability subdimensions. Future studies might measure cancer fatalism at each stage of the cancer continuum and conduct psychometric analyses to enhance our understanding of the construct, its antecedents, and its potential consequences.

**Table 2. Multivariate logistic regression models of associations between sociodemographic characteristics and fatalistic beliefs about cancer prevention, HINTS 2003**

	"It seems like everything causes cancer," OR (95% CI)	"There's not much a person can do..." OR (95% CI)	"...It's hard to know which ones to follow," OR (95% CI)
Age	0.98* (0.98-0.99)	1.01* (1.00-1.01)	1.00 (1.00-1.01)
Female (versus male)	1.54* (1.36-1.73)	1.02 (0.88-1.19)	1.12 (0.97-1.28)
Race/ethnicity			
Non-Hispanic White	Comparison group	Comparison group	Comparison group
Non-Hispanic African American	0.79 <sup>†</sup> (0.63-0.99)	1.03 (0.74-1.43)	0.81 <sup>‡</sup> (0.64-1.02)
Hispanic, English speaking	0.71 <sup>†</sup> (0.55-0.92)	1.11 (0.85-1.45)	0.66 <sup>‡</sup> (0.51-0.86)
Hispanic, Spanish speaking	1.04 (0.72-1.49)	2.00* (1.49-2.69)	0.86 (0.61-1.19)
Other race/ethnicity	0.81 (0.59-1.11)	1.20 (0.85-1.70)	1.15 (0.84-1.58)
Income			
Income not reported	1.03 (0.72-1.48)	1.27 (0.88-1.84)	0.81 (0.58-1.14)
Income <\$25,000 per year	1.08 (0.78-1.49)	1.26 (0.93-1.70)	0.91 (0.70-1.20)
Income \$25,000-\$49,999	1.19 (0.97-1.37)	1.25 (0.99-1.56)	1.04 (0.83-1.29)
Income \$50,000-\$74,999	1.23 (0.97-1.56)	1.03 (0.77-1.37)	0.90 (0.71-1.14)
Income >\$75,000	Comparison group	Comparison group	Comparison group
Education			
Education > HS	1.37 <sup>†</sup> (1.05-1.79)	2.12* (1.64-2.74)	1.13 (0.82-1.55)
Education HS degree	1.78* (1.46-2.18)	1.94* (1.57-2.40)	1.46* (1.19-1.78)
Education some college	1.36 <sup>†</sup> (1.12-1.65)	1.28* (1.03-1.59)	1.39 <sup>‡</sup> (1.14-1.68)
Education completed college	Comparison group	Comparison group	Comparison group
Employed (versus out of work, homemaker, student, retired, or unable to work)	1.09 (0.93-1.27)	1.01 (0.82-1.24)	1.02 (0.87-1.20)
Married or living as married (versus divorced, widowed, separated, or never married)	1.26 <sup>†</sup> (1.10-1.45)	0.88 (0.76-1.02)	1.23 <sup>‡</sup> (1.06-1.43)
Has health insurance (versus no health insurance)	1.15 (0.90-1.46)	0.86 (0.64-1.14)	0.97 (0.79-1.19)
Family member had cancer (versus no family member had cancer)	1.26 <sup>†</sup> (1.10-1.44)	1.03 (0.91-1.16)	1.13 (0.97-1.31)
Number of observations	5,953	5,953	5,959

NOTE: Cells contain odds ratio estimates and 95% confidence intervals for associations between each variable and the odds of respondents agreeing or strongly agreeing with each fatalistic belief about cancer prevention using jackknife variance estimation techniques to calculate SEs and 95% confidence intervals.

Abbreviations: OR, odds ratio; 95% CI, 95% confidence interval; HS, high school.

\*Denotes  $P < 0.001$ .

<sup>†</sup>Denotes odds ratios significantly different from one at  $P < 0.05$ .

<sup>‡</sup>Denotes  $P < 0.01$ .

This study also adds to a large body of evidence concluding that cancer fatalism is strongly and negatively associated with education (7, 9-11, 13, 14, 20, 21, 23). All three fatalistic beliefs about cancer prevention were stronger among respondents with lower levels of education. Contrary to previous literature, however, we found little evidence that fatalistic beliefs about cancer prevention were stronger among Hispanics and African Americans compared with Whites. In fact, there were three instances where fatalistic beliefs were lower among African Americans and English-speaking Hispanics relative to White respondents. The only result consistent with study hypotheses with respect to demographics was the finding that Spanish-speaking Hispanics were more likely than Whites to believe that "there's not much a person can do..."

At first glance, these results seem contrary to previous findings. Indeed, studies consistently find that these fatalistic beliefs about cancer survivorship are more prevalent among African Americans and Hispanics compared with Whites, even when controlling for education (13, 14, 18, 21). However, the existing evidence for racial/ethnic differences in fatalistic beliefs about cancer prevention is far less compelling. One study found no differences between Whites and Hispanics in these beliefs (14); a second found significant differences between recent Hispanic immigrants and White respondents in fatalistic beliefs about cancer prevention but failed to control for dramatic differences in education (16), whereas a third found far greater racial/ethnic differences in fatalistic beliefs about cancer survivorship compared with cancer prevention

**Table 3. Multivariate logistic models of associations between fatalistic beliefs about cancer prevention and prevention behaviors, HINTS 2003**

Prevention behaviors	Exercise weekly, OR (95% CI)	Nonsmoker, OR (95% CI)	Eat five servings, OR (95% CI)
It seems like almost everything causes cancer	0.92* (0.80-1.06)	0.67 <sup>†</sup> (0.55-0.82)	0.80 <sup>‡</sup> (0.66-0.97)
There's not much a person can do to lower their chances of getting cancer	0.71 <sup>†</sup> (0.59-0.85)	0.96 (0.79-1.18)	0.79* (0.61-1.01)
There are so many recommendations... it's hard to know which ones to follow	0.91* (0.79-1.05)	0.79 <sup>‡</sup> (0.65-0.96)	0.84* (0.69-1.02)
Number of observations	5,970	6,045	5,946

NOTE: Cells contain adjusted odds ratio estimates and 95% confidence intervals for associations between each belief and each outcome using jackknife variance estimation techniques to calculate SEs and 95% confidence intervals. Odds ratios were adjusted for potential confounders (including age, gender, race/ethnicity, household income, education, employment status, marital status, health insurance status, and family cancer history) that were correlated with the prevention behavior in bivariate models at  $P < 0.25$ .

Abbreviations: OR, odds ratio; 95% CI, 95% confidence interval.

\*Denotes that variables that were statistically significant correlates with the behavior ( $P < 0.05$ ) in "independent" models but became nonsignificant when all three belief items were considered in the same "comprehensive" model.

<sup>†</sup>Denotes odds ratios significantly different from one at  $P < 0.001$  in "comprehensive" models.

<sup>‡</sup>Denotes odds ratios significantly different from one at  $P < 0.05$  in "comprehensive" models.

(13). All three studies that reported racial/ethnic differences in fatalistic beliefs about cancer prevention used samples from small geographic locations which limit their generalizability (12, 13, 16).

One might thus conclude that fatalistic beliefs about cancer prevention and survivorship are associated with different sociodemographic characteristics. Our results are consistent with the argument that racial/ethnic differences in fatalistic beliefs about cancer prevention may be attributable to differences in socioeconomic status (9, 10), although the finding that Spanish-speaking Hispanic respondents were more likely to hold at least one fatalistic belief about prevention than Whites suggests that ethnicity and culture do play a role in cultivating these beliefs (16). Fatalism about cancer survivorship may nevertheless have stronger ethnic and cultural origins (12, 13, 25). Future studies, particularly those using longitudinal panel designs, would help to draw stronger conclusions about the relationship between race/ethnicity, education, and cancer fatalism.

A few other findings are worthy of further exploration. Family cancer history was linked to a stronger belief that "everything causes cancer," suggesting that a proximal cancer experience, while raising perceived risk, may act as a barrier to effective health promotion efforts (35). Being married or living as married was associated with greater agreement on two of three fatalistic beliefs about cancer prevention, whereas age exhibited no clear pattern of associations with these beliefs. We have no obvious explanation for this observed pattern of findings. In light of the lack of an existing theoretical rationale to explain these results, future research might explore these associations in greater detail.

**Study Limitations.** As a cross-sectional survey, the results cannot speak to the causal direction of the associations found. It is possible that the reverse pathway—that those who do not engage in health behaviors rationalize this by endorsing fatalistic beliefs about cancer—explains the associations found. Longitudinal panel data are needed to help sort out the causal direction of these associations. Nevertheless, the current study justifies further research to understand whether fatalistic beliefs about cancer prevention increase cancer risk.

In addition, the relatively low response rate (34.5%) raises questions about how well the sample represents the national population. It is unknown whether there are meaningful differences in sociodemographic characteristics, fatalistic beliefs about cancer prevention, prevention behaviors, or the magnitude of association between these variables between HINTS respondents and those who chose not to participate.

#### Implications for Cancer Communication and Education.

The sheer volume of news coverage about cancer causes and prevention (36, 37) has led to broad speculation about its role in promoting fatalistic beliefs about cancer prevention (15, 22, 38-40). Others suggest that cancer fatalism is a deeply ingrained product of social and cultural experience that results in a broader life philosophy of nihilism, angst, and helplessness (9, 10, 25). The former scenario suggests that targeted education efforts could help alleviate fatalistic beliefs about cancer prevention, whereas the latter presents a much bleaker likelihood of success in changing fatalistic beliefs. One study has shown that a brief media intervention targeting cancer fatalism was successful in reducing fatalistic beliefs about cancer survivorship, suggesting that cancer fatalism is modifiable (41). Future research should work to clarify sources of cancer fatalism and assess the impact of interventions to reduce cancer fatalism. If fatalistic beliefs about cancer prevention are largely attributable to information overload, particularly among less-educated populations (rather than specific racial/ethnic groups), health educators might target

less-educated populations (rather than specific racial/ethnic groups) to dispel these beliefs. Educators could likewise develop simpler cancer prevention messages that can be widely disseminated and understood by less-educated individuals.

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